Final General Management Plan

Including alternatives for the following implementation plans:
Sand, Rock, and Gravel Plan
Forest Fuel Reduction / Firewood Management Plan
Wilderness Management Plan
Transportation Plan
Stehekin Landing and Valley Development Concept Plans
Land Protection Plan

Environmental Impact Statement

Volume 1

LAKE CHELAN

National Recreation Area • Washington

Final General
Management Plan
Including alternatives for the following implementation plans:
Sand, Rock, and Gravel Plan
Forest Fuel Reduction / Firewood Management Plan
Wilderness Management Plan
Transportation Plan
Stehekin Landing and Valley Development Concept Plans
Land Protection Plan
Environmental Impact Statement
Volume 1

June 1995

LAKE CHELAN

National Recreation Area
Chelan County, Washington

This *Final General Management Plan /Implementation Plan Alternatives / Environmental Impact Statement* describes and analyzes a proposed action and four alternatives for future management and use of Lake Chelan National Recreation Area, as required by the consent decree that was approved and entered on April 22,1991, in the United States District Court for the Western District of Washington (Civil Case No. C-89-1342D). Under the proposed action, the National Park Service would not manipulate the Stehekin River nor remove or manipulate woody debris except to protect public roads and bridges. The active sand, rock, and gravel borrow pit would be maintained at less than or equal to its current size. Fire suppression, prescribed natural fire, management-ignited prescribed fire, and selective manual fuel reductions would provide more effective fire protection. Firewood would be provided at fair market value, and there would be no guaranteed cordage per year. The airstrip would remain open. Land protection would emphasize high flood influence areas, wetlands, riparian areas, and high visual sensitivity areas. Under the no-action/minimum requirements alternative, river erosion and flooding would be controlled only to protect life, health, public roads, and bridges. Where feasible, federal lands would be treated with prescribed fire to reduce fuels. Firewood would be obtained from harvesting 1-acre woodlots. The airstrip would remain open. Land protection would emphasize wetlands, shoreline characteristics, high scenic quality, water quality, visitor access, restriction of unsightly development, and development on areas with gradients greater than 20%. Under alternative A, new river shoreline or bank protection structures would be prohibited. The mining of sand, rock, and gravel would be prohibited within the valley. Natural ignitions would be suppressed on the valley floor for the protection of human life and property. Woodlot cutting of firewood would stop immediately. The airstrip would be closed and restored to natural conditions. The Stehekin Valley road between the Landing and Cottonwood Camp would be converted to a trail. All NPS and concession housing and maintenance facilities would be substantially reduced and located at the Landing. Land protection would involve acquisition, on a willing seller /willing buyer basis, or by eminent domain authority, of all private lands within the recreation area. Under alternative B, riverbank protection structures would be allowed if no adverse environmental impacts would result. Mining of sand, rock, and gravel in the valley would be prohibited. Fire and forest fuels would be managed to restore or replicate the natural role of fire. Firewood would be provided at fair market value instead of a set permit fee. There would be no guarantee of firewood cordage per year. The airstrip would be closed. Land protection emphasizes high flood influence areas, wetlands, riparian areas, and high visual sensitivity areas. Under alternative C, protection of public or private improvements threatened by river erosion and flooding would be allowed. The size of the borrow pit would remain constant. Selective manual forest fuel reduction techniques would be used to reduce hazard forest fuel loadings. Firewood would be supplied from administrative wood and natural selection ecoforestry selective cutting from a designated area. The airstrip would be managed by the National Park Service for emergency use only. Land protection emphasizes high flood influence areas, wetlands, and high visual sensitivity areas. Major impact topics assessed for the proposed action and alternatives include natural and cultural resources and the socioeconomic environment, including the local and regional economy. Comments received on the *Draft General Management Plan /Implementation Plan Alternatives / Environmental Impact Statement* are contained in volume 2.

The final environmental impact statement will be forwarded to the secretary of the interior for approval. A record of decision can be issued 30 days after publication of release of the document in the *Federal Register*. For further information, contact the Superintendent, North Cascades National Park Service Complex, 2105 State Route 20, Sedro Woolley, WA 98284-1799.

United States Department of the Interior • National Park Service • Denver Service Center

SUMMARY

BACKGROUND

The purpose of the federal action is to manage visitor use, natural and cultural resources, development, and operation of Lake Chelan National Recreation Area (NRA) according to the enabling legislation and other laws and regulations affecting management of the national recreation area (see appendix A). The general management plan (GMP) and implementation plans that result from this environmental impact statement process will guide the management of the recreation area for the next 10 to 15 years. The GMP will replace those portions of the 1988 *General Management Plan for North Cascades National Park, Ross Lake National Recreation Area, and Lake Chelan National Recreation Area* (NPS, USDI 1988a) that deal with Lake Chelan NRA. The implementation plans, which have been prepared separately, will either replace existing plans or provide guidance for topics that do not currently have implementation plans. The implementation plans are as follows:

Sand, Rock, and Gravel Plan Forest Fuel Reduction / Firewood Management Plan
Wilderness Management Plan
Transportation Plan Stehekin Landing and Valley Development Concept Plans
Land Protection Plan

Preparation of this final environmental impact statement (final EIS), with the inclusion of alternatives for the GMP and implementation plans specified above, is required by, and adheres to a consent decree. On April 22, 1991, a consent decree (see appendix B) was approved by and entered in the United States District Court for the Western District of Washington. The consent decree specified actions agreed to for resolving the dispute between the plaintiff, North Cascades Conservation Council, and defendants, Manuel Lujan, secretary of the United States Department of the Interior, James M. Ridenour, director of the United States National Park Service, Charles H. Odegaard, regional director of the United States National Park Service, Pacific Northwest Region, and John R. Earnst, superintendent of the North Cascades National Park Complex. The consent decree resulted from a law suit filed by the North Cascades Conservation Council (Civil Case No. C-89-1342D).

This final EIS analyzes the environmental consequences of the proposed action alternative, a no-action/minimum requirements alternative, and three other GMP and implementation plan alternatives for management and use of Lake Chelan NRA. The document provides a full discussion of the environmental impacts associated with the alternatives. Technical preparation of the EIS has been in compliance with the requirements of the National Environmental Policy Act and the regulations of the Council on Environmental Quality. Other laws and executive orders that have directed this effort are described in the document text where appropriate.

Site-specific environmental compliance will be done at a later time at the design phase as appropriate.

In developing this document, numerous issues and concerns were identified by the consent decree and through scoping. Several of these issues and concerns are listed below.

Protection of water quality
Water rights and protection of resources
Man-caused channel modification of the Stehekin River Air pollution/acid precipitation impacts on resources
Protection of wetlands

Impacts of sand, rock, and gravel extraction on vegetation, wildlife, and scenic quality Barging of sand, rock, and gravel from outside the recreation area Amounts of sand, rock, and gravel available for private use Forest fire management Unnatural and dangerous levels of forest fuel accumulations Cutting of green trees for firewood Gathering of dead and downed wood for firewood Amounts and sources of firewood Barging of firewood from outside the recreation area Impacts of additional electrical generation facilities on air quality and valley growth and development Protection of threatened, endangered, or rare species Impacts of nonnative species Impacts of grazing by horses on natural vegetation in wilderness Impacts of campfires on meadow vegetation in wilderness Impacts of removing dead wood used for campfires in wilderness Cultural resource protection Airstrip provision of access to the Stehekin Valley Airstrip use for search and rescue and fire control staging Airstrip use for emergencies Airstrip provision of a special recreational experience Safety of the airstrip Impacts of the airstrip on scenic quality Impacts of the airstrip on wetlands Impacts of airplane use on natural sights and sounds expected by visitors Impacts of access provided by the roads Impacts of road repair and maintenance on natural resources and the regional economy Impacts of road closures Impacts of accidental spills or leakage of toxic substances Development by the National Park Service Impact? of valley growth and development Changes in the size and character of the Stehekin community Impacts of development on sensitive and scenic natural areas Adequacy and impacts of land protection plan Adequacy and impacts of compatibility standards Number and kinds of services provided by the National Park Service Number and kinds of services provided by the private sector

THE ALTERNATIVES

The five alternatives, including a proposed action and a no-action/minimum requirements alternative, are summarized here.

Proposed Action

Under the proposed action, the rustic setting of Lake Chelan NRA would be part of a transition from the downlake recreational, residential, agricultural, and industrial setting to the very wild and natural North Cascades National Park. The use of recreation area resources by visitors and residents would be managed in order to preserve the natural, scenic, and cultural values of the area.

The National Park Service would not manipulate the Stehekin River or its tributaries nor manipulate woody debris except to protect public roads and bridges. Woody debris could be trimmed or turned in the lower 9 miles of the Stehekin River to allow safer recreational use of the river for rafting, kayaking, and canoeing if it did not alter the function or stability of woody debris accumulations and was permitted by the appropriate regulatory agency. Woody debris would not be removed from the river system in any case. The Park Service also would discourage private landowners from

manipulating the Stehekin River or removing woody debris. If such actions would harm recreation area resources or would not be in compliance with local, state, or federal ordinances, regulations, or laws, the Park Service would take appropriate action.

The active sand, rock, and gravel borrow pit would be maintained at less than or equal to its current size. No new borrow pits would be opened. Old inactive borrow pits would be restored to natural-like contours and vegetative cover as appropriate. Allocation of pit material for private use would be based on available supply, resource impacts, and type of use. Pit material sold to the public would be at fair market value. No sand, rock, or gravel would be removed from the 100-year floodplain of the Stehekin River or its tributaries.

Fire suppression, prescribed natural fire, management-ignited prescribed fire, and selective manual fuel reductions would be used to improve wildland fire protection for human life and property; to manage for late-succession stage in ponderosa pine/Douglas fir forest; and to monitor and evaluate manual thinning and prescribed fire effects over time.

Human- and lightning-caused fires on the valley floor would be suppressed for the protection of human life and property.

Selective manual thinning and management-ignited prescribed fire would be used in forest fuel reduction areas to accomplish the following objectives:

- to reduce the amount of fuel in strategically located sites for more effective fire protection
- to strive for a 40%-60% forest canopy cover in some areas based on the mature forest component
- to perpetuate a multiaged ponderosa pine/Douglas fir forest
- to restore the effects of low-intensity fire
- to provide firewood for Stehekin residents from surplus logs as a secondary objective, contingent upon meeting the other objectives

Selective manual thinning would precede management-ignited prescribed fire treatment in some of the forest fuel reduction areas. Coniferous trees may be thinned in riparian communities within the fuel reduction areas.

The practice of woodlot cutting for firewood would be phased out over a two-year period while the forest fuel reduction areas are established.

When available, firewood would be provided from the following sources:

- hazard trees that are pruned or removed in accordance with an approved hazard tree management plan
- blowdown trees in developed areas
- trees removed to restore historic landscapes in historic districts
- trees removed because of new development
- trees pruned or removed for fire protection as a result of hazard fuel surveys for government-owned structures
- driftwood within the high-pool limits of Lake Chelan
- trees removed from forest fuel reduction areas by selective manual thinning

Firewood would be provided at fair market value. There would be no guarantee of firewood cordage per year. The firewood supply would probably diminish over the long term.

The Golden West Lodge and the High Bridge Historic District would be rehabilitated, and the Buckner homestead and orchard would be preserved. Significant parts of the Buckner collection should be acquired. Some artifacts should be maintained onsite for interpretation, and others should be stored in a curatorial facility constructed outside the valley but within Chelan County.

The airstrip would be operated under a special use permit with the Washington State Department of Transportation for private, noncommercial use by the public. Some NPS and concession seasonal housing, maintenance, and related facilities would be consolidated beside the airstrip in such a way as to not impair aircraft operations.

The Stehekin Valley road between the Landing and Harlequin Bridge would remain a two-lane paved road; from Harlequin Bridge to 9-Mile, it would become a single-lane, paved road with pullouts; from 9-Mile to High Bridge, a single-lane, gravel road; and from High Bridge to Cottonwood, a heavy-duty, high-clearance shuttle vehicle road.

Unconstrained private vehicle use would end at High Bridge. Private vehicle use from High Bridge to Bridge Creek would be allowed, but traffic flow would be regulated by season of year and/or hour of day. Public shuttle service would be provided from the Landing to Cottonwood. Only the public shuttle service, hikers, horses, and bicycles would be allowed to use the road from Bridge Creek to Cottonwood. The National Park Service would seek a concessioner to replace the NPS-operated public shuttle service. Frequency of shuttle service would increase over the current rate. Fare structure would provide discounts for frequent and local public shuttle users.

Company Creek road would be maintained in its current alignment. This road would be protected from river erosion at two locations with structures designed to withstand frequently recurring floods and made from rock, soil, and native vegetation.

Stehekin Landing would be redesigned to improve visitor flow and parking and to relocate lodging and other facilities away from geohazards. Relocation would occur as the end of the life cycle of structures was reached.

Land protection would emphasize high flood influence areas, wetlands, riparian areas, and high visual sensitivity areas.

The current capacity of concession services for food and lodging would increase somewhat. The Park Service would provide services essential for resource protection and visitor health and safety. There would be a fair-share charge for these services. Private contracts would be used where appropriate.

No-Action/Minimum Requirements Alternative

Under this alternative, Lake Chelan NRA would be a rural resort community where resources are used, within limits, by an expanding residential presence. This alternative is the 1988 GMP and supporting plans.

River erosion and flooding would be controlled only to protect life, health, existing public roads, and bridges. Immediate flood hazards to private property would be alleviated using minimum actions.

The currently active sand, rock, and gravel borrow pit would be reclaimed as new excavation occurred. The size of the pit would remain constant. New pits would be established if the existing pit was depleted. Mining of sand, rock, or gravel from the 100-year floodplain of the Stehekin River or its tributaries could occur only if there were no adverse impacts.

Where feasible, federal lands would be treated with prescribed fire to reduce fuels.

A program would be implemented to reduce hazardous fuels adjacent to developments and private land. Naturally ignited fires burning under prescribed conditions would be suppressed in the lower Stehekin Valley.

Firewood would be obtained from harvesting 1-acre woodlots managed on an 80-year rotation for sustained-yield production. Administrative surplus trees cut by the National Park Service and driftwood from the lake also would be used as firewood.

The Golden West Lodge would be rehabilitated, and the Buckner homestead and orchard would be preserved. A small collection storage facility should be provided in the lodge or other NPS structure in the valley for storage of collection items.

The airstrip would be operated under a special use permit with the Washington State Department of Transportation.

The Stehekin Valley road between the Landing and Harlequin Bridge would remain a two-lane paved road: from Harlequin Bridge to Bridge Creek it would be maintained as a single-lane, gravel road; and from Bridge Creek to Cottonwood Camp, as a primitive road allowing safe vehicle passage. Company Creek road would be maintained in its current condition. Emergency repairs and reopening of the road following flood damage would be performed.

NPS and concession seasonal housing would remain at the Landing and throughout the valley. NPS administrative offices would remain at the Landing. NPS maintenance and related facilities would remain at the Harlequin Bridge area.

Land protection would emphasize wetlands, shoreline characteristics, high scenic quality, water quality, visitor access, restriction of unsightly development, and development on areas with gradients greater than 20%.

Services to accommodate existing and reasonable demand for expanded recreational experiences would be provided. The National Park Service would provide services essential for resource protection and visitor health and safety. Private contracts would be used where appropriate.

Alternative A

Under alternative A, Lake Chelan NRA would be a wild, natural area where resources and natural processes would be largely undisturbed and protected. Natural forces would be allowed to slowly remove evidence of manmade occupation.

Removal of existing river control structures would be pursued, and new river shoreline or bank protection structures on both federal and nonfederal lands would be prohibited. The removal or manipulation of woody debris from the river would be prohibited.

The mining of sand, rock, and gravel would be prohibited within the valley. All borrow pits would be restored to natural contours and vegetative cover.

Natural ignitions would be suppressed on the valley floor for the protection of human life and property. Management-ignited prescribed fire would be used to achieve desired stand conditions.

Wood lot cutting of firewood would stop immediately and the use of administrative wood would be phased out.

The Golden West Lodge would be rehabilitated; the associated historic cabins would be removed. The High Bridge Historic District would be rehabilitated. A minimum amount of Buckner artifacts should be acquired for interpretive purposed, and the remaining artifacts removed from Stehekin Valley by the family.

The airstrip would be closed and restored to natural conditions.

The Stehekin Valley road between the Landing and Cottonwood Camp would be converted to a trail. Nonmotorized modes of transportation would be used on this trail. Company Creek road would be converted to a trail.

All NPS and concession housing and maintenance and related facilities would be substantially reduced and located at the Landing. NPS recreation area headquarters would be in Chelan, and a reduced office space would remain at the Landing. All lodging would be removed. Appropriate areas at the Landing and other areas in the Stehekin Valley would be restored to natural conditions.

Land protection would involve acquisition, on a willing seller/willing buyer basis, or by eminent domain authority, all private lands within the recreation area. Acquisition would be with fee title purchase method.

Only those services that promote solitude and primitive recreational experiences would be provided. Services essential for resource protection and visitor health and safety would be provided.

Alternative B

Under alternative B, Lake Chelan NRA would be a rural woodland gateway to the North Cascades where the use of resources by visitors and residents would be limited in order to preserve the natural, scenic, and cultural values of the area.

Riverbank protection structures would be allowed for protection of existing improvements only if no adverse impacts on the natural environment would result. The National Park Service would only consider the removal of woody debris that was a recreational hazard.

The mining of sand, rock, and gravel in the valley would be prohibited, but material could be barged in from outside the valley. All old borrow pits would be restored to natural contours and vegetative rover as appropriate. No sand, rock, and gravel would be removed from the 100-year floodplain of the Stehekin River or its tributaries.

Fire suppression, prescribed natural fire, management-ignited prescribed fire, and' selective manual fuel reductions would be used to improve wildland fire protection for human life and property; to manage for late-succession stage in ponderosa pine/Douglas fir forest; and to monitor and evaluate manual thinning and prescribed fire effects over time.

Human- and lightning-caused fires on the valley floor would be suppressed for the protection of human life and property.

Selective manual thinning and management-ignited prescribed fire would be used in forest fuel reduction areas to accomplish the following objectives:

- to reduce the amount of fuel in strategically located sites for more effective fire protection
- to strive for a 40%-60% forest canopy cover in some areas based on the mature forest component
- to perpetuate a multiaged ponderosa pine/Douglas fir forest
- to restore the effects of low-intensity fire
- to provide firewood for Stehekin residents from surplus logs as a secondary objective, contingent upon meeting the other objectives

Selective manual thinning would precede management-ignited prescribed fire treatment in some of the forest fuel reduction areas. Coniferous trees may be thinned in riparian communities within the fuel reduction areas.

The practice of woodlot cutting for firewood would be phased out over a two-year period while the forest fuel reduction areas are established.

When available, firewood would be provided from the following sources:

- hazard trees that are pruned or removed in accordance with an approved hazard tree management plan
- blowdown trees in developed areas
- trees removed to restore historic landscapes in historic districts
- trees removed because of new development
- trees pruned or removed for fire protection as a result of hazard fuel surveys for government-owned structures
- driftwood within the high-pool limits of Lake Chelan
- trees removed from forest fuel reduction areas by selective manual thinning

Firewood would be provided at fair market value. There would be no guarantee of firewood cordage per year. The firewood supply would probably diminish over the long term.

The Golden West Lodge would be rehabilitated; the associated historic cabins would be retained. The High Bridge Historic District would be rehabilitated. A collections storage/museum curatorial facility should be constructed in Stehekin Valley.

The airstrip would be closed. Some NPS and concession housing, maintenance, and related facilities would be consolidated on and beside the closed airstrip.

The Stehekin Valley road between the Landing and Harlequin Bridge would remain a two-lane paved road: from Harlequin Bridge to High Bridge it would be reduced to a single-lane gravel road with pullouts; and between High Bridge and Cottonwood Camp the road would be converted to a pedestrian trail. Company Creek road would be maintained in its current alignment except for a 200-yard section that would be removed and replaced with a 0.9-mile section located away from active river erosion.

Stehekin Landing would be redesigned to improve visitor flow and parking and to relocate the lodging and other facilities away from the geohazards. Relocation would occur as the end of the life cycle of structures was reached.

Land protection would emphasize high flood influence areas, wetlands, riparian areas, and high visual sensitivity areas. Other land use control on private land would be done by Chelan County.

Services to accommodate existing and reasonable demand for expanded recreational experiences would be provided. The National Park Service would provide services essential for resource protection and visitor health and safety. Private contracts would be used where appropriate.

Alternative C

Under alternative C, Lake Chelan NRA would be a retreat/refuge/resort where resources and natural processes are showcased for the enjoyment of visitors.

Protection of existing public or private improvements threatened by river erosion and flooding would be allowed. Removal and manipulation of woody river debris that causes severe erosion problems or safety hazards, including hazards to recreational activity, would be allowed.

The currently active sand, rock, and gravel borrow pit would be reclaimed as new

excavation occurred. The size of the pit would remain constant. New pits would be established if the existing pit was depleted. Mining of sand, rock, or gravel from the 100-year floodplain of the Stehekin River or its tributaries could occur only if there were no adverse impacts.

Selective manual forest fuel reduction techniques would be used in selected areas rather than management-ignited prescribed fire to reduce hazard forest fuel loadings. Human- and lightning-caused fires on the valley floor would be suppressed for the protection of human life and property.

Woodlot cutting would be stopped within the next two years to allow the establishment of Company Creek road designated firewood area.

Firewood when available would be provided from the following sources:

- hazard trees that are pruned or removed in accordance with an approved hazard tree management plan
- blowdown trees in developed areas
- trees removed to restore historic landscapes in historic districts
- trees removed because of new development
- trees pruned or removed for fire protection as a result of hazard fuel surveys for government-owned structures
- driftwood within the high-pool limits of Lake Chelan

When fewer than 120 cords are supplied from administrative sources, an additional supply would be provided that, when added to the administrative wood, would not total more than 120 cords of firewood. The 120-cord limit should be reduced by an estimate of the amount eliminated by NPS conversions to other energy sources.

Selective cutting techniques would be used for the additional supply that comes from a designated area. These techniques are intended to retain the genetic stock of dominant trees of a species, preserve all existing layers of the vegetative community, and otherwise leave intact all elements and processes of the ecosystem.

All public lands within 250 feet of the Company Creek road or any historic roads on the south side of the river would be included within a designated area. The boundary of the designated area would be drawn on a map. No firewood cutting would be permitted in wetlands.

The Golden West Lodge, High Bridge Historic District, and Buckner homestead and orchard would be rehabilitated. A collection storage/museum curatorial facility should be constructed in Stehekin Valley.

The airstrip would be managed by the National Park Service for emergency use only.

The Stehekin Valley road between the Landing and Harlequin Bridge would remain a two-lane paved road: from Harlequin Bridge to High Bridge it would become a single-lane, paved road with pullouts; from High Bridge to Cottonwood Camp it would be maintained in its current condition except for some minor safety and comfort improvements. Company Creek road would be maintained in its current alignment except for a 300-yard section that would be removed, rehabilitated, and replaced with a 1.4-mile section located away from active river erosion.

Some NPS and concession seasonal housing, maintenance, and related facilities would be consolidated beside the airstrip in such a way as to not impair aircraft operations. The Landing would be redesigned to improve visitor flow and parking and to relocate

facilities away from the geohazards. Lodging would be expanded and relocated from the Landing to the Rainbow Falls site.

Land protection would emphasize high flood influence areas, wetlands, and high visual sensitivity areas. Other land use control on private land would be done by Chelan County.

Services that promote expanded recreational experiences would be provided. Services to accommodate existing and reasonable demand for expanded recreational experiences would be provided. The National Park Service would provide services essential for resource protection and visitor health and safety. Private contracts would be used where appropriate.

AFFECTED ENVIRONMENT

This section of the document provides a description of existing conditions only for those aspects of the national recreation area environment that would be affected by the alternatives and is the baseline used in determining those impacts. Major sections of the affected environment include the biological and physical environment, cultural resources, visual/scenic resources, access and transportation, visitor use/experience, and socioeconomic profile.

ENVIRONMENTAL IMPACTS

Proposed Action

The proposed action generally would have beneficial effects on natural river processes and habitat for fish and other aquatic species, including restoration of about 27 acres of the Stehekin River floodplain and reduced instream modifications. Acquiring interests in private lands would eventually provide additional long-term protection for another 149 acres of floodplain. Potentially hazardous conditions associated with flooding would be substantially reduced by relocating NPS facilities and acquiring land interests located in floodplain or geohazard areas.

Approximately 26 acres of habitat in or near wetlands would be restored where possible and another 63 protected by acquiring interests. Existing road disturbance and vegetation management activities to maintain the airstrip would adversely affect 6.7 acres of vegetated wetlands. Generally there would be beneficial effects on wetlands.

A total of 146 acres of riparian communities would be protected or restored, and up to 74 acres would be affected by prescribed fire. Given that there are only 936 acres of riparian land on the valley floor, this would be a major beneficial impact on community-level biodiversity in the valley.

A total of 140 acres of upland communities would be protected or restored, 9 acres would be lost, and 636 acres would be affected by prescribed fire and thinning.

The proposed action would enhance the integrity of existing native fish habitat and populations and would also help restore native cutthroat and bull trout populations in part of their historic habitat within the Stehekin drainage.

There would be no effect on existing bald eagle use of the area; possible effects on long-term recovery of the local population are unknown. Northern spotted owls and grizzly bears are not likely to be adversely affected, although impacts would be both beneficial and adverse. Gray wolves would be beneficially affected.

The proposed action would provide protection in addition to that provided by existing laws and regulations for water resources. Only minimal lakeshore erosion would be caused by wave action from boat or floatplane traffic compared to that caused by lake elevation fluctuation and natural wave action.

Compared to existing conditions, the proposed action would substantially increase some energy-related air pollutants within the Stehekin Valley, particularly for oxides of nitrogen if demand for electricity increases. Conversion to high-efficiency woodburning stoves and other energy conservation measures would help reduce some air pollutant emissions. Increases in dust and vehicle and prescribed fire emissions would adversely affect the recreation area's air quality.

Visual resources would be improved, while the opportunity to experience these resources by residents and visitors to the valley would become more confined as views from trails, the valley road, and the river became more enclosed and constricted.

A systematic and comprehensive program for the preservation, protection, and interpretation of cultural resources in the Lake Chelan NRA would be conducted in conformance with the park complex *Resource Management Plan.* The program would provide for the preservation of significant cultural resources illustrating the history of the area and for additional efforts directed toward management of the area's cultural resources and historic landscapes. One historic and two prehistoric archeological sites could be affected.

A wide spectrum of visitors would have diverse means of access to prime natural, cultural, scenic, and recreational resources without significantly affecting park resources or degrading the experiences of other visitors.

Moderate increases in visitor arrivals (40%-45%) would cause moderate increases in vehicular congestion and noise in the valley. Increased use would require increased maintenance of facilities, roads, and trails. Existing and proposed new facilities would meet the additional demand.

The proposed action would have moderate but positive effects on the regional economy. By 2007 visitor arrivals and lodging spaces would increase by about 40%. Visitor expenditures and total employment would increase by about 37%.

The net fiscal impacts on the Chelan County general and road funds would be a positive, resulting in a higher surplus in 2007 than in 1992. The school district is expected to have 24 pupils in 2007 and would generate a higher net fiscal surplus than in the 1992-93 school year.

Chelan County Public Utility District (PUD) No. 1 supplies power on a chronically deficit basis for the Stehekin system. Power costs are a limiting factor to Stehekin growth. A rate increase may be necessary over the next 15 years.

NPS-provided activities and their costs would expand in response to growth in visitor use and development levels. These services include sewer and water at the Landing, waste disposal, and road maintenance.

The Park Service would require compatibility of uses and would pursue land acquisition as sellers became willing and funds became available.

No-Action/Minimum Requirements Alternative

This alternative would have the least beneficial effects on natural river processes and habitat for fish and other aquatic species. Less than 1 acre of the Stehekin River floodplain would be restored. Acquiring interests in private lands with the owner's consent would eventually provide additional long-term protection for another 61 acres of floodplain. Potentially hazardous conditions associated with flooding and other geological hazards would not be substantially reduced. The potential for designation of the Stehekin River as a wild and scenic river would not be compromised.

Only 10 acres of habitat in or near wetlands would be restored where possible and another 11 acres protected by acquisition. Road disturbance and vegetation management activities would adversely affect 11.7 acres of wetlands. River manipulation and erosion and runoff from roads could also adversely affect an unknown amount of wetlands. The no-action/minimum requirements alternative would have the least beneficial impact on wetlands.

A total of 25 acres of riparian communities would be protected, and up to 130 acres would be lost. This would be a major adverse impact on riparian communities in the valley. The community-level biodiversity of the park complex would be adversely affected through impacts from this alternative.

This alternative would provide only limited additional protection for existing native cutthroat and bull trout populations and would not reestablish native fish populations in the Stehekin drainage.

Gray wolves and grizzly bears would continue to be adversely affected from the upper valley road, the loss of riparian areas, and general high levels of human activity in the lower valley. Existing bald eagle use would not be affected. Northern spotted owls would be adversely affected from multiple sources. These would combine to possibly preclude the potential nesting use of the lower valley by owls. Potential and occupied northern goshawk nesting sites could be adversely affected from human activities. The harlequin duck would be adversely affected from the loss of riparian areas and the continued construction of river control structures. The species-level biological diversity of the park complex would be adversely affected through impacts from this alternative.

This alternative provides some protection in addition to that provided by existing laws and regulations for water resources.

Compared to existing conditions, the no-action/minimum requirements alternative would increase the total energy-related air pollutant emissions within the Stehekin Valley by 12%, particularly for oxides of nitrogen if demand for electricity increases. Conversion to high-efficiency woodburning units and other energy conservation measures would help reduce some air pollutant emissions. Prescribed fire emissions and increases in dust and vehicle emissions would adversely affect the recreation area's air quality.

The incremental development of public facilities as well as an expanding private residential presence associated with the no-action alternative would affect visual resources. The shoreline of the lake and private parcels of land located on the river or along the Stehekin Valley road would be developed to service visitors or for private residences. Demands by both residents and visitors for additional services and facilities would create changes to the resources in the valley. These changes would affect visually sensitive areas and key viewpoints.

Cultural resource management actions would be more limited than under the proposed action, resulting in the possible deterioration or loss of some cultural resources and elements of the historic landscape and the lack of an interpretive program.

Visitors would have diverse means of access to prime natural, cultural, scenic, and recreational resources without significantly affecting park resources or degrading the experiences of other visitors.

Moderate increases in visitor arrivals (30%) would cause moderate increases in vehicular congestion, noise, and potential accidents in the national recreation area compared to existing conditions. Increased use would require increased maintenance of facilities, roads, and trails. Existing facilities would meet the additional demand.

The no-action/minimum requirements alternative would have modest positive impacts on the regional economy. By 2007 visitor arrivals and lodging spaces would increase by about 30%. Visitor expenditures are projected to increase accordingly. When all direct, indirect, and induced affects are counted, total FTE employment, earnings, and output are projected to increase substantially above 1992 levels.

The net fiscal impacts on the Chelan County general and road funds would have a higher surplus in 2007 than 1992. The school district is expected to have 28 pupils in 2007, with a net fiscal surplus slightly lower than 1992-93 school year.

Chelan County PUD No. 1 operates the Stehekin system at a deficit. This would continue under this alternative.

Services provided by the National Park Service and their costs would expand by the full-implementation year, 2007.

Community economic impacts would be favorable due to gradually increased commercialization of visitor services. The Park Service would purchase land as sellers became willing and funds became available.

Alternative A

Overall, compared to the other alternatives, alternative A has the greatest long-term beneficial impacts on natural resources. For natural river processes and habitat for fish and other aquatic species, this would include restoration of 90 acres of the Stehekin River floodplain and removal of instream modifications. Acquiring private lands with the owner's consent would eventually provide additional long-term protection for another 167 acres of floodplain. Potentially hazardous conditions associated with flooding would be reduced substantially by removing NPS buildings, facilities, and roads, and acquiring private land now located in floodplain or other geohazard areas.

A total of 67 acres of habitat in or near wetlands would be restored where possible, and another 63 acres would be protected by acquisition. In addition, 315 acres of riparian communities and 247 acres of upland communities would be protected or restored.

Under this alternative, the integrity of existing native fish populations and habitat would be enhanced, and native cutthroat and bull trout populations would be reestablished in most of their historic habitat within the Stehekin drainage on NPS lands.

Both the upper and lower valley would be permanently protected and available as habitat for all species. For gray wolves, grizzly bears, Pacific fishers and possibly California wolverines — all wide-ranging predators — this is particularly important given the valley's unique geographic and ecologic position in the surrounding ecosystem. Potential nesting habitat for northern spotted owls, bald eagles, and northern goshawks would be available for recolonization, assisting in meeting the goals of recovery plans for the first two species. Harlequin ducks would not be displaced from important breeding habitat. Forest habitat for flammulated owls, Vaux's swifts, pileated woodpeckers, and western gray squirrels would be protected permanently.

Potential water resource impacts would be reduced substantially by restoring most land disturbance and minimizing use of fuels and other toxic materials. Only minimal lakeshore erosion would be caused by wave action from boat or floatplane traffic compared to that caused by lake elevation fluctuation and natural wave action.

Alternative A would have the greatest long-term beneficial impact on air quality. Compared to existing conditions, alternative A would eventually decrease the total energy-related air pollutant emissions within the Stehekin Valley by 99%. Diminishing

vehicle use and revegetation of disturbed areas would also gradually improve air quality. Natural wildland fires would adversely affect the recreation area's air quality.

Visual resources would be enhanced. The potential to experience these resources by visitors to the area would be limited because of the reduction in viewing opportunities due to the elimination of culturally manipulated open spaces and restricted views from the shoreline and the valley road/trail.

Cultural resource management actions would be limited, resulting in the deterioration or loss of significant historic landscapes and historic properties and the lack of an interpretive program. There would be no impacts on any known archeological sites.

Visitors would have more opportunities for nonmotorized activities and fewer opportunities for motorized activities. Elderly, sedentary, and disabled visitors would have few opportunities to experience national recreation area resources and values.

Slight decreases in visitor arrivals and closing the airstrip and roads would eventually eliminate most vehicular congestion, noise, and potential accidents in Lake Chelan NRA. All maintenance equipment and activities to support motorized vehicles on the roadway system would eventually be eliminated. Landing facilities would be modified to meet pedestrian needs.

Alternative A would have modest negative effects on the regional economy. By 2007 visitor arrivals would decline about 7% from 1992. Lodging spaces would decline substantially to about 27% of the 1992 level. Visitor expenditures would decline to a level somewhat below that in 1992. Total direct, indirect, and induced effects generate employment, earnings, and output below those for 1992.

The net fiscal effects for the Chelan County general and road funds would be the lowest of the alternatives. The school district is projected to have 14 pupils and the lowest net fiscal balance (revenues in excess of expenditures) of the five alternatives.

Chelan County PUD No. 1 would have a lower operating deficit and might even break even on operations. NPS-provided public services would decline especially in view of the withdrawal of concession-provided food and lodging.

Impacts on the community by the year 2007 would be slightly negative. The NPS pursuit of land purchase and compatibility of uses would be more stringent than in 1992. Business might switch to some extent to the private sector after NPS withdrawal from food/lodging provision. However, overnight visits would likely decline sharply without NPS support. Economic survival for non-NPS local residents would be more difficult.

Alternative B

This alternative would generally have beneficial effects on natural river processes and habitat for fish and other aquatic species, including restoration of 26 acres of the Stehekin River floodplain. However, instream modifications could adversely affect natural river processes and aquatic habitat. Acquiring interests in private lands with the owner's consent eventually would provide additional long-term protection for another 153 acres of floodplain. Potentially hazardous conditions associated with flooding would be reduced substantially by relocating most NPS facilities and acquiring land interests now located in floodplain or geohazard areas.

Approximately 18 acres of habitat in or near wetlands would be restored where possible and another 63 protected by acquiring

interests. Existing road disturbance would continue to adversely affect about 1.2 acres of wetlands.

A total of 144 acres of riparian communities would be protected or restored, and up to 74 acres would be affected by prescribed fire. A total of 81 acres of upland communities would be protected or restored, and 636 acres would be affected by prescribed fire and thinning.

Alternative B would enhance the integrity of existing native fish populations and habitat and would also reestablish native cutthroat and bull trout populations in part of their historic habitat within the Stehekin drainage.

Impacts on threatened, endangered, or rare species are largely the same as those for the proposed action with the following exceptions. Three spotted owl nest sites would be better protected by the closure of the road between High Bridge and Bridge Creek. The closure of the upper valley road may benefit gray wolves, grizzly bears, Pacific fishers, and harlequin ducks.

Alternative B would reduce impacts on water resources compared to existing conditions. Only minimal lakeshore erosion would be caused by wave action from boat or floatplane traffic compared to that caused by lake elevation fluctuation and natural wave action.

Impacts on air quality would be the same as for the proposed action, except above High Bridge where vehicle-caused pollution would be less.

Under alternative B, visual resources would be improved. The opportunity to experience these resources by residents and visitors to the valley would increase because of the development of a vista and view clearing component to the vegetation management plan.

Cultural resource management actions would be limited, resulting in the deterioration or loss of significant historic landscapes and historic properties and the lack of an interpretive program. There is a possibility that one historic and two prehistoric archeological sites would be affected. No significant adverse effects are anticipated.

Impacts on visitor experiences would be the same as those for the proposed action, with greater access to river rafting and more limited access to interpretive activities.

Impacts on access and transportation would be similar to those for the proposed action.

Similar to the proposed action, alternative B would have moderate but positive effects on the regional economy. By 2007, visitor arrivals and lodging spaces would increase by 40%. Visitor expenditures and total employment would increase by about 37%.

The net fiscal impacts on the Chelan County general and road funds would have a higher surplus in 2007 than in 1992. The school district is expected to have 24 pupils in 2007 and would generate a higher net fiscal surplus than in the 1992-93 school year.

Chelan County PUD No. 1 supplies power on a chronically deficit basis for the Stehekin system. Power costs are a limiting factor to Stehekin growth. A rate increase may be necessary over the next 15 years.

NPS-provided activities and their costs would expand somewhat in response to growth in visitor use and development levels.

Impacts on the community would be generally favorable. The National Park Service would require compatibility and would pursue land acquisition as sellers became willing and funds became available.

Alternative C

This alternative would generally have beneficial effects on natural river processes and habitat for fish and other aquatic species, including restoration of 16 acres of the Stehekin River floodplain. Instream modifications could adversely affect natural river processes and aquatic habitat. Acquiring interests in private lands with the owner's consent eventually would provide additional long-term protection for another 118 acres of floodplain. Potentially hazardous conditions associated with flooding would be reduced substantially by relocating most NPS facilities and acquiring land interests now located in floodplain or geohazard areas.

Alternative C generally would have beneficial effects on wetlands. Approximately 17 acres of wetlands would be restored where possible and another 63 protected by acquiring interests. Existing road disturbance and vegetation management activities to maintain the airstrip would adversely affect about 6.7 acres of vegetated wetlands.

A total of 70 acres of riparian communities would be protected or restored, and up to 74 acres would be affected by prescribed fire. A total of 53 acres of upland communities would be protected, and up to 837 acres would be affected by prescribed fire, thinning, and firewood cutting.

Alternative C would provide additional protection for existing native cutthroat and bull trout populations. Native fish populations may become reestablished in portions of the Stehekin drainage because of supplemental stocking and control of nonnative species.

This alternative would have the greatest impacts on sensitive wildlife species. Expected levels of development and human activity in the lower valley would represent a permanent loss of this area as usable habitat for the following species: gray wolf, bald eagle (nesting), grizzly bear, northern spotted owl (nesting), Pacific fisher, northern goshawk (nesting), and possibly harlequin duck. The species-level biological diversity of the park complex would be adversely affected under this alternative.

Alternative C would reduce impacts on water resources compared to existing conditions. Only minimal lakeshore erosion would be caused by wave action from boat or floatplane traffic compared to that caused by lake elevation fluctuation and natural wave action.

Compared to existing conditions, alternative C would increase the total energy-related air pollutant emissions within the Stehekin Valley by 27%, particularly for oxides of nitrogen if demand for electricity increases. Conversion to high-efficiency woodburning units and other energy conservation measures would help reduce some air pollutant emissions. Increases in dust, vehicle, and prescribed fire emissions would adversely affect the recreation area's air quality.

Overall, the increased emphasis on commercial activities and the new development required to meet all future demands would place stress on the visual resources in the Stehekin Valley. In the short term, there are sufficient areas of low sensitivity, where visual resource constraints are minimal, to accommodate this demand. As the demand increased and development followed that demand, the possibility of development affecting visual resources also increases. In addition, more and more people would be encountered on the road, on trails, and at viewpoints and historic sites, thus affecting the visual experience.

Cultural resource management actions and their impacts would be the same as those under alternative B.

A wide spectrum of visitors would have diverse means of access to prime natural, cultural, scenic, and recreational resources

with some impacts on park resources and the experiences of other visitors.

Major increases in visitor arrivals (105%-110%) would cause substantial increases in vehicular congestion, noise, and potential accidents in the national recreation area compared to existing conditions. Increased use would require increased maintenance of facilities, roads, and trails. New or improved facilities would be needed at the Landing to meet the additional demand. Alternative C would have the highest positive impacts on the regional economy. By 2007 visitor arrivals and lodging spaces would increase. Visitor expenditures are also the largest among the five alternatives. The total direct, indirect, and induced activities are projected to generate workers, earnings, and output at more than double those of 1992.

The net fiscal impacts on the Chelan County general and road funds would have a higher surplus in 2007 than in 1992. The school district is expected to have 32 pupils in 2007.

Service demands and costs would increase for the Chelan-Douglas Health District and Chelan County PUD No. 1, although these are funded by fees. NPS-provided services and costs would also expand substantially.

Community effects would reflect less stringent NPS policies regarding commercialization of visitor services, resource use compatibility, and land purchase. Local residents would have greater business opportunities, but might face competition from outsiders.

PUBLIC COMMENT ON THE DRAFT DOCUMENT

The *Draft General Management Plan / Implementation Plan Alternatives / Environmental Impact Statement* for Lake Chelan National Recreation Area was made available for public review from August 26, 1994, to November 1, 1994. Approximately 750 copies of the document were distributed to agencies, elected officials, organizations, and individuals. In addition, three public hearings were held in Chelan, Seattle, and Stehekin, Washington, in October 1994. Approximately 950 comment letters and 107 oral comments were received during the comment period. The letters and transcripts of oral comments of agencies, elected officials, and organizations are reprinted in volume 2, *Comments and Responses,* of this final EIS, and responses from the National Park Service are included where appropriate. Letters and transcripts from individuals that raised substantive comments are also reprinted, with NPS comments where needed.

CONTENTS

Purpose of and Need for the Plans

Introduction 3
- Purpose and Need 3
- Brief Description of the Area 3
- Purpose of the National Recreation Area 4
- Significant Resources 4
- Constraints 4

Issues and Concerns 8
- Natural Resources 8
- Cultural Resources 10
- Transportation 10
- Valley Growth and Development 12
- Land Use and Development 12
- Provision of Services 13 Recreation 13 Quality of Life for Stehekin Valley Residents 13
- Related Issues and Concerns 13
- Issues Beyond the Scope of the General Management Plan 14

Alternatives, Including the Proposed Action

Introduction 17

Proposed Action 19
- Alternative Concept 19 Natural Resource Management 19 Water Quality 19 Fish 20
  - Stehekin River 20 Wetland, Floodplain, Shoreline, and Riparian Areas 23
  - *Sand, Rock, and Gravel Plan Elements* 23 Geohazards 24
  - *Forest Fuel Reduction I Firewood Management Plan Elements* 24
- Other Energy Sources 26 Threatened, Endangered, and Rare Species; Nonnative Species 27
- Scenic Resources 27 *Wilderness Management Plan Elements* 28
- Cultural Resource Management 28
- Visitor Experience 29
- Interpretation and Information 31
- Land Use and Development 32
  - *Transportation Plan Elements* 32
  - *Stehekin Landing and Airstrip Area Development Concept Plans Elements* 34 *Land Protection Plan Elements* 40
- Park Operations 47

No-Action/Minimum Requirements Alternative 51
- Alternative Concept 51 Natural Resource Management 51 Water Quality 51 Fish 51
  - Stehekin River 52 Wetland, Floodplain, Shoreline, an Riparian Areas 52
  - *Sand, Rock, and Gravel Plan Elements* 55 Geohazards 55
  - *Forest Fuel Reduction I Firewood Management Plan Elements* 55 Other Energy Sources 56 Threatened, Endangered, and Rare Species; Nonnative Species 56
- Scenic Resources 56
  - *Wilderness Management Plan Elements* 57
- Cultural Resource Management 57
- Visitor Experience *57* Interpretation and Information 59 Land Use and Development 60 *Transportation Plan Elements* 60 *Stehekin Landing Development Concept Plan Elements* 61 *Land Protection Plan Elements* 62 Park Operations 67

Alternative A 69
- Alternative Concept 69
- Natural Resource Management 69
  - Water Quality 69
  - Fish 69
  - Stehekin River 70

Wetland, Floodplain, Shoreline and Riparian Areas 70
Sand, Rock, and Gravel Plan Elements 70
Geohazards 73
Forest Fuel Reduction I Firewood Management Plan Elements 73
Other Energy Sources 74
Threatened, Endangered, and Rare Species; Normative Species 74
Scenic Resources 74 *Wilderness Management Plan Elements* 75
Cultural Resource Management 75
Visitor Experience 75 Interpretation and Information *77* Land Use and Development 78 *Transportation Plan Elements* 78 *Stehekin Landing Development Concept Plan Elements* 79 *Land Protection Plan Elements* 80
Park Operations 89

Alternative B 91
Alternative Concept 91 Natural Resource Management 91 Water Quality 91 Fish 91
Stehekin River 92 Wetland, Floodplain, Shoreline, and Riparian Areas 92
Sand, Rock, and Gravel Plan Elements 95 Geohazards 95
Forest Fuel Reduction I Firewood Management Plan Elements 95
Other Energy Sources 97
Threatened, Endangered, and Rare Species; Normative Species 97
Scenic Resources 98 *Wilderness Management Plan Elements* 98
Cultural Resource Management 98
Visitor Experience 99 Interpretation and Information 101 Land Use and Development 102 *Transportation Plan Elements* 102 *Stehekin Landing and Airstrip Area Development Concept Plans Elements* 103 *Land Protection Plan Elements* 104
Park Operations 114

Alternative C 117
Alternative Concept 117 Natural Resource Management 117 Water Quality 117 Fish 117
Stehekin River 118 Wetland, Floodplain, Shoreline, an Riparian Areas 118
Sand, Rock, and Gravel Plan Elements 118 Geohazards 121 *Forest Fuel Reduction Firewood Management Plan Elements* 121 Other Energy Sources 122 Threatened, Endangered, and Rare Species; Normative Species 123 Scenic Resources 123 *Wilderness Management Plan Elements* 123
Cultural Resource Management 124
Visitor Experience 124 Interpretation and Information 126 Land Use and Development 128 *Transportation Plan Elements* 128 *Stehekin Landing, Rainbow Falls, and Airstrip Development Concept Plans Elements* 129 *Land Protection Plan Elements* 130 Park Operations 142

Affected Environment

Biological and Physical Environment 173
Introduction 173
Ecosystem Processes and Community-Level Biodiversity 173
River Processes and Aquatic Communities 173
The Stehekin River 173
Wetlands 178
Terrestrial Processes/Communities 179
Riparian/Upland Communities 179
Sensitive Communities 184
Existing and Past Human Disturbances 184 Plant Succession and Natural Disturbance - River Dynamics/Wildland Fire 187

Nonnative Plant Species 188
Ecosystem Components and Species-Level Biodiversity 188 Fish 188 Endangered Threatened, and Sensitive Species 191
Abiotic Ecosystem Conditions 197 Water Quality 197 Air Quality 199

Cultural Resources 202
Archeological Resources 202
Ethnographic Resources 203
Historic Resources 203

Visual/Scenic Resources 208 Introduction 208 Definition of Key Terms and Concepts Used in Analysis of Visual Resources 208 Regional Landscape 209 Visual Inventory and Analysis 209
Landscape Types 209
Sensitivity Matrix 212
Principal Viewer Groups and Selected Viewpoints 215
Landscape Units 215

Access and Transportation 220
Commercial Transportation 220
Private Transportation 223
Hiking/Trail Access 224
Transportation Facilities 225 Stehekin Marinas /Boat Docks 229 National Park Service Shuttle Bus System 229 Concessioner Transportation Services 231 Nonconcessioner Transportation Services 231 Stehekin Valley Ranch Transportation 231 Private and National Park Service Vehicles 231
Bicycles 232

Visitor Use/Experience 233
Overview 233 Getting There 233 Who Visits Lake Chelan National Recreation Area? 234
Why Do They Come? 234
When Do They Visit? 238
What Do They Do? 238
What Do They Know? 240
Residents 240
Campfires and Horse Grazing in Wilderness 242

Socioeconomic Profile 243
Area Description 243
Population 243 Area Households 244
Economy 245 Visitor Use Services and Expenditures 247
Public Services 258

Environmental Consequences

Introduction 271
Summary of General Methodology 271
Impact Topics 271
Derivation of Impact Topics 272
Impact Topics Dismissed from **Further** Analysis 273

Impacts of Proposed Action 274
Impacts on Stehekin River and Floodplain 274 Impacts on Wetlands 278 Impacts on Riparian Communities 281 Impacts on Upland Communities 285 Impacts on Native Fish 288 Impacts on Threatened, Endangered, or Rare Species 290 Impacts on Water Quality 298 Impacts on Air Quality 300
Impacts on Cultural Resources 302
Impacts on Visual/Scenic Resources 304
Impacts on Access/Transportation 306
Impacts on Visitor Experiences 308
Impacts on the Regional Economy **310**
Unavoidable Adverse Impacts and the Relationship between Short-Term Use of the Environment and Maintenance and Enhancement of Long-Term Productivity 315 Irreversible and Irretrievable Commitments of Resources 315

Impacts of No-Action/Minimum Requirements Alternative 317
Impacts on Stehekin River and Floodplain 317 Impacts on Wetlands 318 Impacts on Riparian Communities 320 Impacts on Upland Communities 321 Impacts on Native Fish 322 Impacts on Threatened, Endangered, or Rare Species 322 Impacts on Water Quality 324 Impacts on Air Quality 325 Impacts on Cultural Resources 326 Impacts on Visual/Scenic Resources 326 Impacts on Access/Transportation 328 Impacts on Visitor Experiences 328 Impacts on the Regional Economy 329 Unavoidable Adverse Impacts and the Relationship between Short-Term Use of the Environment and Maintenance and Enhancement of Long-Term Productivity 331 Irreversible and Irretrievable Commitments of Resources 331

Impacts of Alternative A 332
Impacts on Stehekin River and Floodplain 332 Impacts on Wetlands 333 Impacts on Riparian Communities 334 Impacts on Upland Communities 335 Impacts on Native Fish 336 Impacts on Threatened, Endangered, or Rare Species 336 Impacts on Water Quality 338 Impacts on Air Quality 339 Impacts on Cultural Resources 339 Impacts on Visual/Scenic Resources 340 Impacts on Access/Transportation 341 Impacts on Visitor Experiences 341 Impacts on the Regional Economy 342 Unavoidable Adverse Impacts and the Relationship between Short-Term Use of the Environment and Maintenance and Enhancement of Long-Term Productivity 344 Irreversible and Irretrievable Commitments of Resources 344

Impacts of Alternative B 345
Impacts on Stehekin River and Floodplain 345 Impacts on Wetlands 347 Impacts on Riparian Communities 348 Impacts on Upland Communities 349 Impacts on Native Fish 351 Impacts on Threatened, Endangered, or Rare Species 351 Impacts on Water Quality 353 Impacts on Air Quality 353 Impacts on Cultural Resources 353 Impacts on Visual/Scenic Resources 354 Impacts on Access/Transportation 355 Impacts on Visitor Experiences 356 Impacts on the Regional Economy 356 Unavoidable Adverse Impacts and the Relationship between Short-Term Use of the Environment and Maintenance and Enhancement of Long-Term Productivity 358 Irreversible and Irretrievable Commitments of Resources 358

Impacts of Alternative C 359
Impacts on Stehekin River and Floodplain 359 Impacts on Wetlands 361 Impacts on Riparian Communities 363 Impacts on Upland Communities 363 Impacts on Native Fish 365 Impacts on Threatened, Endangered, or Rare Species 365 Impacts on Water Quality 368 Impacts on Air Quality 368 Impacts on Cultural Resources 369 Impacts on Visual/Scenic Resources 369 Impacts on Access/Transportation 371 Impacts on Visitor Experiences 372 Impacts on the Regional Economy 373 Unavoidable Adverse Impacts and the Relationship between Short-Term Use of the Environment and Maintenance and Enhancement of Long-Term Productivity 374 Irreversible and Irretrievable Commitments of Resources 374

Consultation and Coordination / Preparers

Consultation and Coordination 377
Preparers, Contributors, and Consultants 382

Appendixes / Bibliography / Index

Appendixes
A: Enabling Legislation 387
B: Consent Decree 395
C: A Discussion of Laws and Policies Affecting the Administration of Lake Chelan National Recreation Area 410
D: General Methodology 422
E: Future Development and Energy Scenarios 444
F: Lands Considered for Exchange 453 G: Company Creek Road Maintenance 459 H: Cost Estimates for Alternatives 460 I: Statement of Findings on Floodplains and Wetlands 468
J: Calculations for Air Quality Analysis 473
K: Future Transportation Scenarios for Year 2007 475

Bibliography 477

Glossary 484 Index

489

MAPS

Region 5
Proposed Action - Stehekin Valley 21
Proposed Action and Alternative B - Stehekin Landing Development Concept Plan 35 Proposed Action and Alternative C - Airstrip Area Development Concept Plan 37 No-Action/Minimum Requirements Alternative - Stehekin Valley 53
Alternative A - Stehekin Valley 71
Alternative A - Stehekin Landing Development Concept Plan 81
Alternative B - Stehekin Valley 93
Alternative B - Airstrip Area Development Concept Plan 105 Alternative C - Stehekin Valley 119 Alternative C - Stehekin Landing Development Concept Plan 131
Alternative C - Rainbow Falls Development Concept Plan 133 Principal Existing Disturbed Areas - Stehekin Valley 185
High Visual Sensitivity Areas 213 Proposed Action & Alternative B, Resource Protection Analysis - Stehekin Valley 425
No-Action/Minimum Requirements Alternative, Resource Protection Analysis - Stehekin Valley 427
Alternative C, Resource Protection Analysis - Stehekin Valley 429 Proposed Action & Alternative B, Future Development Scenario - Stehekin Valley 447 No-Action/Minimum Requirements Alternative, Future Development Scenario - Stehekin Valley 449
Alternative C, Future Development Scenario - Stehekin Valley 451 Proposed Action and Alternatives B & C, Possible Exchange Lands - Stehekin Valley 455 No-Action/Minimum Requirements Alternative, Possible Exchange Exchange Lands - Stehekin Valley 457
Wetlands and Corresponding Vegetation Affected by the Stehekin Airstrip 469

TABLES

1: Summary of Alternatives 144
2: Summary of Environmental Consequences of Alternatives 162
3: Largest Floods on Record for the Stehekin River 175 4: Ownership, Disturbance, and Areas in 100-Year Floodplain and High Flood Influence Area 177 5: Ownership, Disturbance, and Area in or Near Wetlands 179 6: Acreages of Vegetation/Land Cover Classes in the Valley Floor Study Area 180 7: Endangered, Threatened, and Sensitive Species 193 8: Temperate and Precipitation Data, Stehekin 200
9: Sensitivity Matrix 212 10: Description of Viewpoints 216 11: Passenger Arrivals (One-Way) at Stehekin by Mode (1969-1992) 220
12: Typical Passenger Composition - Chelan Airways 223 13: Campfire and Grazing Restrictions in Stehekin River Drainage 242 14: Population in Chelan County and City of Chelan, 1960-1992 244 15: Personal Income Growth, 1980-1990 245 16: Chelan County Employment by Industry Sector, 1985 and 1990 246 17: Chelan County Covered Employment and Payrolls by Industry Sector, 1990 (July Employment; Annual Wages) 247
18: Arriving Visitors at Stehekin by Month, 1990-1992 251
19: Visitor Use at Stehekin, 1969-1992 252
20: Visitor Activity Counts by Month, 1990 and 1991 253
21: Visitor Expenditures, 1992 254 22: Economic Activity by Industry Section (IMPLAN), 1992 (Visitor Related), Lake Chelan NRA 256

TABLES (CONT.)

23: Direct Employment and Earnings by Industry Sector (IMPLAN), 1992 (Visitor Related), Lake Chelan NRA 256
24: Total Employment, Earnings, and Output Multipliers (IMPLAN) for Chelan County 257
25: Total Employment, Earnings, and Output, 1992 (Visitor Related), Lake Chelan NRA 257
26: Chelan County Government Historical Revenue 261
27: Chelan County Government Historical Expenditure 262
28: Chelan County Road Fund Historical Revenue and Expenditures 263
29: Stehekin Impacts - County General Fund (Revenue by Source) 264
30: Stehekin Impacts - County General Fund (Expenditures by Function) 265
31: Stehekin Impacts - County Road Funds 266
32: Stehekin School District No. 69 Baseline Revenues and Expenditures 267
33: Measured Impacts, 100-Year Floodplain - Proposed Action 276
34: Measured Impacts, Wetlands - Proposed Action 280
35: Measured Impacts, Riparian Communities - Proposed Action 283
36: Forest Fuel Reduction Areas - Proposed Action 283
37: Measured Impacts, Upland Communities - Proposed Action 286
38: Measured Impacts, 100-Year Floodplain - No-Action Alternative 317
39: Measured Impacts, Wetlands - No-Action Alternative 319
40: Measured Impacts, Riparian Communities - No-Action Alternative 320
41: Measured Impacts, Upland Communities - No-Action Alternative 321
42: Measured Impacts, 100-Year Floodplain - Alternative A 332
43: Measured Impacts, Wetlands - Alternative A 334
44: Measured Impacts, Riparian Communities - Alternative A 335
45: Measured Impacts, Upland Communities - Alternative A 335
46: Measured Impacts, 100-Year Floodplain - Alternative B 345
47: Measured Impacts, Wetlands - Alternative B 347
48: Measured Impacts, Riparian Communities - Alternative B 349
49: Measured Impacts, Upland Communities - Alternative B 350
50: Measured Impacts, 100-Year Floodplain - Alternative C 359
51: Measured Impacts, Wetlands - Alternative C 361
Measured Impacts, Riparian Communities - Alternative C 363
53: Measured Impacts, Uplands Communities - Alternative C 363
Resource Protection Priorities for EIS Analysis 424
55: Land Protection Analysis - Proposed Action 432
56: Land Protection Analysis - Alternative B 436
57: Land Protection Analysis - Alternative C 440

FIGURES

1: Passengers Arriving Uplake at Stehekin by Commercial Transportation (1990) 221
2: Transportation Facilities at Stehekin Landing 226
3: Parking Areas at Stehekin Landing 228
4: Visitor Ages 235
5: Number of First-Time Visitors 235
6: Visitor Group Sizes 236
7: Visitor Group Types 236
8: Visitors' Reasons for Visiting Stehekin 237
9: 1993 Recreation Visits 237
10: Programs, Services, and Facilities Used in the Park 241
11: Information Sources for Reservation Systems 241
12: Mode of Transportation Used by Visitors Arriving at Stehekin, 1969-1992 250

PURPOSE OF AND NEED FOR THE PLANS

INTRODUCTION

PURPOSE AND NEED

The purpose of the federal action is to manage visitor use, natural and cultural resources, development, and operation of Lake Chelan National Recreation Area (NRA) according to the enabling legislation and other laws and regulations affecting management of the NRA (see appendix A). The general management plan (GMP) and implementation plans that result from this environmental impact statement process will guide the management of the NRA for the next 10 to 15 years. The GMP will replace those portions of the 1988 North Cascades National Park, Ross Lake National Recreation Area, and Lake Chelan National Recreation Area GMP that deal with Lake Chelan NRA. The implementation plans listed below will either replace existing plans or provide guidance for topics that do not currently have implementation plans.

Sand, Rock, and Gravel Plan Forest
Fuel Reduction / Firewood
Management Plan
Wilderness Management Plan
Transportation Plan Stehekin
Landing and Valley
Development Concept Plans
Land Protection Plan

Preparation of this final environmental impact statement (final EIS), with the inclusion of alternatives for the GMP and implementation plans specified above, is required by, and adheres to the consent decree. On April 22, 1991, a consent decree (see appendix B) was approved by and entered in the United States District Court for the Western District of Washington. The decree specified actions agreed to for resolving the dispute between the plaintiff, North Cascades Conservation Council, and defendants, Manuel Lujan, secretary of the United States Department of the Interior, James M. Ridenour, director of the United States National Park Service, Charles H. Odegaard, regional director of the United States National Park Service, Pacific Northwest Region, and John R. Earnst, superintendent of the North Cascades National Park Complex. The consent decree resulted from a lawsuit filed by the North Cascades Conservation Council (Civil Case No. C-89-1342D).

The final EIS analyzes the environmental consequences of the proposed action alternative, a no-action/minimum requirements alternative, and three other general management plan and implementation plan alternatives for management and use of Lake Chelan NRA. The document provides a full discussion of the environmental impacts associated with the alternatives. Technical preparation of the environmental impact statement has been in compliance with the requirements of the National Environmental Policy Act and the regulations of the Council on Environmental Quality. Other laws and executive orders that have directed this effort are described in the document text where ^appropriate.

BRIEF DESCRIPTION OF THE AREA

Lake Chelan NRA is located in northwestern Washington and adjoins North Cascades National Park to the south (See the Region map). The contiguous Lake Chelan NRA, North Cascades National Park, and Ross Lake NRA are located deep in the wild, northernmost reaches of the Cascade Range. The park and recreation areas are surrounded by 2 million acres of national forest lands, more than half of which are designated wilderness. Lake Chelan is a natural lake that developed within a broad glacial trough. In the 1920s it was dammed to increase its capacity and to provide power for the development of northwestern industries.

PURPOSE OF THE NATIONAL RECREATION AREA

Public Law 90-544 established Lake Chelan National Recreation Area on October 2, 1968, "to provide for the public outdoor recreation use and enjoyment of portions of the Stehekin River and Lake Chelan, together with the surrounding lands, and for the conservation of the scenic, scientific, historic, and other values contributing to public enjoyment of such lands and waters" (see appendix A). In 1988 56,335 acres of the 63,090-acre Lake Chelan NRA were designated as wilderness. An additional purpose of the unit, based on NPS statutory policy, is to preserve for future use and enjoyment the character and values of the designated wilderness.

SIGNIFICANT RESOURCES

The most significant resource values of Lake Chelan NRA include

- an uncommon diversity of vegetation types resulting from the distinct climatic regimes and topography, which provide essential habitat for a large number of dependent wildlife species, including rare and sensitive species
- natural hydrologic processes and excellent water quality of the Stehekin River and its tributaries, supporting a diverse riparian community and providing essential habitat for native fish species
- a large wilderness area with the values of silence, solitude, and opportunities for primitive recreation; with spectacular pinnacles, massifs, and spires bounded by glaciers, snowfields, and alpine meadows
- excellent air quality, expansive vistas, and pristine views of impressive glacier-carved mountains and valleys, glaciers, many vegetative communities with contrasting colors and textures, cascading waters of the Stehekin River and its tributaries, Lake Chelan, and many high mountain lakes
- historic structures and settings associated with early settlement and recreation of the Stehekin Valley, including sites such as the Courtney cabin, the Buckner homestead and orchard, Stehekin school, and the Golden West Lodge complex
- pictographs and scattered archeological sites associated with early Native American Indian use and occupation

CONSTRAINTS

The enabling legislation (as amended) placed the following constraints on the management of the national recreation area (also see discussion of laws, policies, and other documents affecting administration of Lake Chelan NRA in appendix C).

The secretary of the interior may acquire lands, waters, and interests therein by donation, purchase with donated or appropriated funds, or exchange, except that he may not acquire any such interests within the recreation areas without the consent of the owner, so long as the lands are devoted to uses compatible with the purposes of the act.

The secretary will administer the recreation area in a manner which in his judgment will best provide for (1) public outdoor recreation benefits; and (2) conservation of scenic, scientific, historic, and other values contributing to public enjoyment. Within that portion of Lake Chelan NRA that is not designated as wilderness, such management, use, and disposal of renewable natural resources and the continuation of existing uses and developments as will promote or are compatible with, or do not significantly impair, public recreation and conservation of the scenic, scientific, historic, or other values

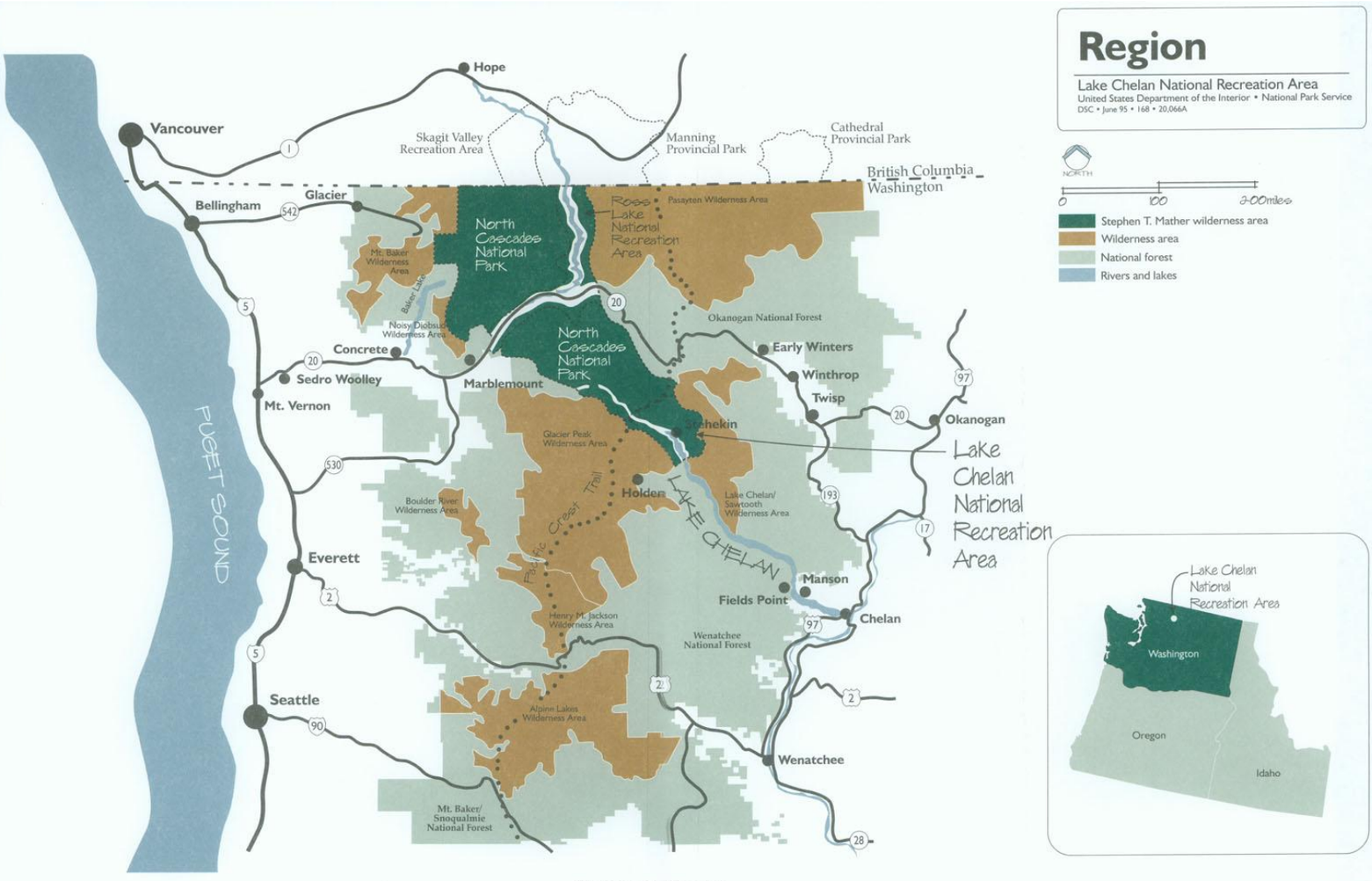


Figure p5: Region

contributing to public enjoyment, are authorized.

The secretary will permit hunting and fishing on lands and waters under his jurisdiction within the boundaries of the recreation area in accordance with applicable laws of the United States and of the state of Washington, except that the secretary may designate zones where, and establish periods when, no hunting or fishing will be permitted for reasons of public safety, administration, fish and wildlife management, or public use and enjoyment.

The secretary will not permit the construction or use of any road within the park that would provide vehicular access from the North Cross State Highway to the Stehekin Road.

The lands within the recreation areas, subject to valid existing rights, are hereby withdrawn from all forms of appropriation or disposal under the public land laws, including location, entry, and patent under the United States mining laws, and disposition under the United States mineral leasing laws, provided, however, that within that portion of the Lake Chelan National Recreation Area that is not designated as wilderness, sand, rock, and gravel may be made available for sale to the residents of Stehekin for local use so long as such sale and disposal would not have significant adverse effects on the administration of the recreation area.

These constraints, along with the applicable laws and policies of the National Park Service (see appendixes A and C), provide the parameters (or framework) within which the proposed action and the three alternatives were developed in this EIS.

ISSUES AND CONCERNS

The issues and concerns addressed in this document were identified in public scoping meetings at Stehekin, Chelan, and Seattle, Washington (for more information see the "Consultation and Coordination" chapter) and in the consent decree (see appendix B).

NATURAL RESOURCES

Air Pollution and Acid Precipitation

Lake Chelan NRA lies within the path of prevailing winds of several large urban-industrial centers, all within 150 miles. Recent acid precipitation monitoring indicates abnormal amounts of pollutants being carried over the North Cascades with unknown impacts on recreation area resources such as vegetation, wildlife, water, and visibility.

There are also concerns about the effects of air pollutants from sources in the valley including firewood burning, vehicle emissions, and emissions from the diesel-powered portion of the electrical generation plant.

Stehekin River Management

The lower portion of the Stehekin River flows through a mix of private and NPS lands. Historically the river has meandered over many sections of the valley that are now developed with homesites and public and private roads. Private individuals as well as the National Park Service have attempted to control bank erosion and river movements. Many consider the Stehekin River worthy of wild and scenic river designation and want the river's "pristine" values and natural processes and habitat protected. The major concerns about management of the Stehekin River include the following:

effects caused by river channel modifications including riprapping, removal of tree and woody debris, and diversions of the Stehekin River on both federal and nonfederal land

effects caused by development in the floodplain on the river's flooding characteristics and hazards, pristine scenic qualities, and water quality

effects on sand, rock, and gravel resources and financial costs to continually protect and maintain roads and property from natural river processes

potential damage to existing development caused by flooding of the Stehekin River

Wetlands and Water Quality

Wetlands in the Stehekin Valley cover a mix of federal and privately owned lands. **Past** development, including roads, buildings, and water diversion structures has occurred in or near wetlands in the Stehekin Valley. Many private residents, businesses, and NPS facilities located near water use individual onsite sewage systems. Chelan County regulates private land use and has responsibilities for ensuring the protection of wetlands and water quality. Major concerns about wetlands and water quality include the following:

- effects caused by existing or new development including riprap, fill, material extraction, and construction
- effects on human health and aquatic life caused by poorly designed or malfunctioning septic systems
- effects caused by Chelan County granting variances to or lack of
-

enforcement of its private land use regulations designed to protect water quality and wetlands

effects of river erosion control efforts and structures

Sand, Rock, and Gravel Use

Sand, rock, and gravel in Lake Chelan NRA is allowed for NPS administrative use and for sale to the residents of Stehekin for local use. These materials are used primarily for road repairs and maintenance. Concerns about the use of sand, rock, and gravel by the National Park Service and private landowners in the recreation area include the following:

- potential impacts on vegetation, wildlife, and scenic quality caused by extraction of material
- importance of evaluating the amount of material required and conservation measures for sand, rock, and gravel before committing resources for construction and repairs
- need to consider alternatives other than extracting materials from within the national recreation area
- amounts of sand, rock, and gravel available for private use
- impacts of sand, rock, and gravel extraction in permanently altering landforms
- reclaiming and revegetating gravel pits no longer used

Forest Fire Management

Natural fire has an important role in the forest ecosystem found in Stehekin Valley. Lightning-caused fire historically maintained natural fuel loads, forest openings, and habitat diversity. Fire suppression began with the settlement of the valley in the early 1900s and has allowed unnatural fuel accumulations and changes in the vegetative communities. Many are concerned about the forest fuel accumulations and the potential threat to human life and/or property if a forest fire were to occur.

Energy Use

Firewood. Firewood use is currently managed in the recreation area under the *Firewood Management Plan* (NPS 1987). Concerns about the practice of supplying firewood to NPS personnel and to local residents include the following:

- The National Park Service may not have the responsibility to provide firewood to any party.
- The present level of firewood use and the cutting of green trees from a woodlot may be contrary to the NPS mandate to protect the natural environment.
- Cutting green trees from a woodlot is uncommon in the National Park Service.
- Consumption of local wood degrades natural and scenic qualities.

Some local residents contend that the *Firewood Management Plan* is too restrictive because of the following:

- it limits the gathering of dead or downed wood on public land to only areas designated by the National Park Service
- it does not help reduce fire hazards from accumulated woody debris
- firewood users prefer to use dead wood over green wood from the woodlots

- taking dead and downed trees within only 100 feet of roads is too limiting

Electrical Energy. The present supply of electricity requires import of diesel fuel and the continued use of a small hydroelectric facility. Concerns include the following:

- potential impacts of developing additional electrical generation facilities to meet increasing demands by local residents, NPS administration, and NPS staff
- potential influence of new electrical energy sources on growth and development in the valley and associated impacts
- increasing dependence on expensive and undesirable diesel generation of electricity

Threatened, Endangered, or Rare Species

Threatened, endangered, or rare species need special management considerations to ensure their protection as required under the Endangered Species Act and NPS policies. In and near the recreation area are several threatened or endangered species, including the northern spotted owl, bald eagle, grizzly bear, and gray wolf. Also, several candidate species under review for consideration as threatened or endangered occur in the area.

Nonnative Species

Natural fish-free lakes throughout the North Cascades Complex have been and continue to be stocked with salmonids by the Washington Department of Fish and Wildlife. Consequences of the stocking have affected these natural aquatic systems. Salmonids have been documented as spreading to connecting streams. Nonnative fish also have been introduced into Lake Chelan and the Stehekin River and might have contributed to the decline and possible extirpation of native fish populations. Knapweed, a highly competitive normative plant designated as a noxious weed, was accidentally introduced in the national recreation area and is rapidly spreading and displacing native plants. A major concern is the introduction of nonnative species through human activities such as vehicle and air transport and livestock grazing, and their spread through soil disturbance and other factors.

Wilderness Management

Much of Lake Chelan NRA and the Stehekin watershed are legislatively designated wilderness. Backcountry and wilderness issues identified include

- effects of grazing by horses on the natural vegetation
- effects of open campfires on meadow vegetation
- effects of removing dead standing and downed wood used for campfires

CULTURAL RESOURCES

Preservation of significant cultural resources in Lake Chelan NRA should consider historic viewsheds and other natural features in the historic districts.

TRANSPORTATION

Airstrip

Stehekin has an unpaved airstrip operated by the state of Washington. Specific issues and concerns identified with using or keeping an airstrip in the valley include the following:

- It could be used for search and rescue, fire control staging area, personal

medical emergencies, or emergency landings.

- It provides a special recreational experience.
- It provides reasonable access to the valley.
- Floatplanes, helicopters, boats, and other methods provide adequate access to the valley, including for emergency services.
- Its design and physical and geographic limitations raise serious safety concerns.
- Its large size is highly visible and is an unnatural cut in the forest canopy.
- It could have past, present, and future environmental impacts on wetlands.
- It has resulted in the introduction of aggressively competitive normative plants that are listed as noxious weeds.
- Airplanes using the airstrip detract from the natural sights and sounds that most visitors come to the recreation area to experience.

Aircraft, Boats, and Vehicle Use

Private fixed-wing and military aircraft frequently fly at low levels over Lake Chelan NRA. Aircraft and watercraft are the primary means of transportation to and from the area. Most boat, floatplane, and automobile traffic is concentrated at Stehekin Landing, the primary access point. A variety of goods, some that are hazardous, are transported to the recreation area through the Landing. Concerns about aircraft, boats, and automobile use include the following:

- impacts on natural sights and sounds caused by private and commercial boats, planes, and floatplanes, and military planes

impacts on park operations, community development, and visitors caused by changes in commercial boat schedules

lakeshore erosion caused by boats and floatplanes

impacts on visitor experience caused by concentrated, long-term parking of private vehicles in high visitor use areas, such as Stehekin Landing

potential environmental impacts caused by accidental spills or leakage from transporting petroleum products and other toxic substances on Lake Chelan and recreation area roads

number of vehicles, types of vehicles permitted, unsafe vehicles (not licensed or inspected), inoperable and abandoned vehicles, and the need for fuel to operate vehicles

Roads

The Stehekin Valley road system is not connected to any road system outside the valley. Segments of the roads are subject to periodic washouts and relocations. Some are concerned that improving or repairing the existing Stehekin Valley road system would cause additional roadside disturbance, increase sand, rock, and gravel use, and increase private car use and speed. There is a concern about road maintenance practices including adopting practices that conserve gravel, such as pulling it back into the road before grading; the need to water the gravel during grading to reduce dust; and the need to compact the gravel.

The most controversial road issue is the upper Stehekin Valley road. The National Park Service and some visitors want the upper Stehekin Valley road closed to vehicular traffic above either Bridge Creek or High Bridge because of the following:

- It is costly in terms of both financial and natural resources to maintain a road that winds through rugged terrain with severe erosion problems.

- The existing upper road conditions are unsafe for motorized vehicle use.

- The sights and sounds of vehicles on the upper road detract from the visitor's wilderness experience

Others want the upper road to remain open and improved because it allows more visitors and residents to experience the upper valley, and it allows them to hike over Cascade Pass in one day.

Some want road sections affected by river erosion (e.g., Company Creek road and section 8-Mile of the Stehekin Valley road) to be relocated to conserve sand, rock, and gravel, and reduce maintenance costs.

VALLEY GROWTH AND DEVELOPMENT

Major concerns about past or potential growth and development in the Stehekin Valley by both the National Park Service and private landowners include the following:

- changes in the size and character of the Stehekin community

- damage to sensitive and scenic natural areas, particularly the lakeshore, road corridors, and riverbanks

- effects of increasing demands on limited valley resources

- potential effects of the increasing availability of modern conveniences, such as communication technology and electricity, on the rate and direction of development in the Stehekin Valley

LAND USE AND DEVELOPMENT

Land Protection Plan

The 1988 *Lund Protection Plan* identifies what lands or interests in land need to be in public ownership, and sets priorities for allocating funds to protect resources, scenery, and visitor access. Issues and concerns relating to protection methods and priorities in the plan include the following:

- restrictions on NPS condemnation authorities

- degree of cooperation from the local community and county in developing **a** program of use and regulations

- restrictions on acquiring lands or interests in lands by classifying some parcels as "no interest" priority

- need for consistent application of environmental and visitor use protection priorities to all parcels

- need to fully evaluate the method of acquiring parcels by exchanging for other federally owned lands, and need for alternatives to that method

Compatibility Standards

In 1982 the National Park Service developed, with public review, standards for compatible land use in Lake Chelan NRA (see the "No-Action/Minimum Requirements Alternative" section in the "Alternatives, Including the Proposed Action" chapter). Potential growth and development problems and resource protection in the national recreation area need to be addressed in compatibility standards that are enforceable.

Land Use Regulations

Many believe there is a need to enforce existing federal regulations related to land use, and to encourage Chelan County to enforce its zoning regulations.

PROVISION OF SERVICES

A controversial topic focuses on the provision of visitor services or facilities by the National Park Service, its concessioners, and those operating privately. Some local residents are concerned that the existing contract between the Park Service and its concessioner unfairly limits their business opportunities. Others are concerned about the possibility of allowing the development of competing public and private services or facilities because of the following:

- potential increases in landscape disturbance and demand for resources caused by overbuilding of competing facilities
- possible loss or degradation of necessary visitor services that competing businesses could not provide without NPS subsidies
- potential cost increases to administer competing services or facilities

There are also concerns about environmental impacts and costs of human and financial resources to the National Park Service in providing or not providing general services, such as sewage, water, toilets, garbage, recycling, road maintenance, and communications, as well as emergency and other services to residents and visitors.

RECREATION

- Appropriate levels and types of recreational activities allowed within the national recreation area

QUALITY OF LIFE FOR STEHEKIN VALLEY RESIDENTS

- Need to have a minimum number of acres and land parcels in private ownership for a viable community to exist
- The importance of allowing the necessary types of activities and opportunities to preserve the Stehekin way of life

RELATED ISSUES AND CONCERNS

Relationship of the Plans to Other Federal, State, and County Organizations

The Stehekin Valley is an unincorporated area and the private lands are, therefore, subject to the land use regulations of Chelan County. The county adopted a General Use District zoning classification in the 1950s that applies to the Stehekin area. Currently, there is no adopted comprehensive plan for the Stehekin Valley. However, a Citizens Advisory Committee has prepared a draft "Stehekin Comprehensive Plan." At the time of printing, this plan has not been finalized by Chelan County, and is in a review process at the county and state level in conjunction with the Washington State Growth Management Act. Enacted in 1990, the Washington State Growth Management Act requires cities and counties, including Chelan County, to adopt comprehensive plans and development regulations. The comprehensive plans are to include several mandatory elements, including land use, housing, capital facilities planning, utilities and transportation.

The county has developed floodplain delineation regulations and has adopted a shoreline master program under the Shoreline Management Act. Special districts that have jurisdiction within and are affected by activities at the Lake Chelan NRA include Chelan-Douglas Health District, Stehekin School District No. 69, and Chelan County

Public Utility District (PUD). The school district provides primary and secondary (through grade 8) education services to the school-aged children of the Stehekin area. The Chelan County PUD owns and operates the electrical generation and distribution system in the Stehekin Valley. The health district provides physical health services to the population within its service area, but, also is a regulatory agency with jurisdiction over environmental aspects such as water supply, sanitation, and land use development.

Lake Chelan NRA is bordered on the east by the Lake Chelan/Sawtooth Wilderness area administered by the Okanogan National Forest under the guidance of the 1990 *Land and Resource Management Plan for the Okanogan National Forest.* The recreation area is bordered on the south by the Wenatchee National Forest and on the west by the Glacier Peak Wilderness Area, both administered by the Wenatchee National Forest under the guidance of the 1990 *Land and Resource Management Plan for the Wenatchee National Forest.* Management of both national forests and wilderness areas are subject to the 1994 *Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl.*

The U.S. Army Corps of Engineers and the U.S. Fish and Wildlife Service also have jurisdictions and responsibilities over certain activities within Lake Chelan NRA. The Corps of Engineers has regulatory authority over Section 404 of the Clean Water Act. The Fish and Wildlife Service has responsibilities under the Endangered Species Act as well as other federal statutes.

ISSUES BEYOND THE SCOPE OF THE GENERAL MANAGEMENT PLAN

Other issues and concerns that were raised during the public involvement process were considered beyond the scope of this general management plan or were inappropriate given the legislative mandate for Lake Chelan NRA. Suggestions included turning the recreation area over to another agency, sell previously privately owned land back to the private sector, open the lakeshore trail between Stehekin and Prince Creek to motorized trail bikes, do not allow floatplanes in the recreation area, and consider the impact of modern conveniences on development in the Stehekin Valley. Many suggestions have been passed on to field managers for their consideration, but they have not been considered in this plan.

Another issue raised during scoping that is considered to be beyond the scope of the general management plan is the minimum number of acres and land parcels in private ownership required for a viable community to exist. The National Park Service recognizes this as an important topic of concern, but knows of no way that community viability can be guaranteed through a specified minimum number of private parcels. During the same time period that approximately 95 private parcels comprising 1,100 acres were purchased by the National Park Service, most common indicators of community viability (population, number of homes, number of private businesses, number of jobs, school students, etc.) have increased.

ALTERNATIVES, INCLUDING THE PROPOSED ACTION

INTRODUCTION

This chapter of the document contains five alternatives, including a proposed action and a no-action/minimum requirements alternative, for guiding visitor use, natural and cultural resource management, development, and operation of Lake Chelan National Recreation Area.

A narrative of the five alternatives is provided with maps of the alternatives for Stehekin Valley and development concept plans for Stehekin Landing, Rainbow Falls, and the airstrip area. It includes descriptions of the alternatives, management objectives, and actions.

Alternatives for the implementation plans, called for in the consent decree (see appendix B), are presented under separate headings, but these sections are integrated in logical order with the topics for the GMP alternatives. Topic headings for sections that present alternatives for the implementation plans are italicized. Those sections are as follows:

Sand, Rock, and Gravel Plan Forest Fuel Reduction / Firewood Management Plan Wilderness Management Plan Transportation Plan Stehekin Landing and Valley Development Concept Plans Land Protection Plan.

The numbers in parentheses under the no-action alternative refer to page numbers in the 1988 *General Management Plan*. Also, when an action item for the no-action/ minimum requirements alternative is followed by the word "assumption" in parentheses, that action item does not appear in the 1988 plan; however, it is assumed to be consistent with the philosophy of that plan, and is included to provide a comparison with action items for the other alternatives.

Common to all alternatives is the requirement to conduct an analysis of resource opportunities and constraints. The methodology used to determine these resource opportunities and constraints (also referred to as carrying capacity) is not prescribed by NPS policy, but is determined in response to individual NPS unit issues and needs. In this GMP/EIS, a methodology was chosen that extensively inventoried sensitive resources, established resource management objectives, and analyzed a wide range of reasonable alternatives. Each alternative has incorporated the best available information about resources of concern and how these resources would be affected given alternative management actions. This plan and associated data provide the baseline for future monitoring of park resources and public use activities and the effects of those activities on the resources and visitor experience. Carrying capacity is simply one tool used in the overall planning process for an NPS unit. Other tools used in this document included consideration of federal and state planning and regulatory constraints, legal mandates for resource protection, and extensive public input on resource issues and concerns.

These alternatives were developed through a process that first analyzed appropriate legal mandates, including the enabling legislation, to establish boundaries within which all alternative actions must be contained. Significant natural and cultural resources and visitor experience opportunities were identified. Public meetings were held, the consent decree was analyzed, and input from NPS staff was sought to identify issues and concerns. From the identified resources and visitor experience opportunities, and issues and concerns, alternative national recreation area goals or concept statements were developed. Sets of alternative objectives and action items were then developed, each set consistent with an appropriate alternative recreation area goal or concept statement.

The alternative objectives and action items were developed to address the goals and to resolve issues and address concerns. In so doing, each issue and concern is addressed by at least one action item.

Two tables follow the narrative section of the alternatives. Table 1 provides a summary comparison of the alternatives, and table 2 provides a summary comparison of the environmental impacts of the alternatives. Cost estimates for the alternatives are provided in appendix H.

PROPOSED ACTION

ALTERNATIVE CONCEPT

The rustic setting of Lake Chelan NRA would be part of a transition from the downlake recreational, residential, agricultural, and industrial setting to the very wild and natural North Cascades National Park, Lake Chelan NRA wilderness area, and adjacent U.S. Forest Service administered wilderness areas. The national recreation area would be managed as part of the larger ecosystem and socioeconomic region. The use of national recreation area resources by visitors and residents would be managed in order to preserve the natural, scenic, and cultural values of the area. Existing levels of NPS development and special uses would be reduced or relocated to less sensitive sites and vacated sites restored to natural conditions. Outstanding natural processes, natural resources, and cultural resources would be preserved and protected, and biodiversity would be maintained. Visitors would experience a harmony between the natural and human environment and be provided with low impact recreational opportunities. They would be assisted in their discovery of the area and be able to explore the valley independently as well.

See the accompanying Stehekin Valley map for a graphic portrayal of the proposed action.

NATURAL RESOURCE MANAGEMENT

Management Objective. Manage Lake Chelan NRA as an integral part of a larger regional ecosystem, and protect and restore the components and processes of naturally evolving park ecosystems, including the natural abundance, biodiversity, and ecological integrity of plants, animals, water, and soil to the extent public safety considerations permit.

Water Quality

Management Objective. Strive to preserve or restore water quality to natural conditions and maintain or restore minimum stream flows needed to protect dependent biota.

Actions. The National Park Service would work with county, state, and other federal agencies to monitor and protect water quality and to promote enforcement of regulations. Also, the National Park Service would work with the Chelan County PUD to mitigate shore erosion on Lake Chelan, and to ensure that upon renewal of their Federal Energy Regulatory Commission (FERC) license, Chelan County PUD continues to protect water quality.

Baseline water resource parameters would be inventoried. Adjacent land uses and their effects on water resources would be monitored in order to develop management strategies for minimizing impacts. Property owners would be encouraged to minimize impacts on water quality. The National Park Service would take action where adverse actions occur that violate the Clean Water Act and threaten water resources.

The best pollution control measures would be implemented to minimize the risk of water pollution by providing adequate sewage treatment and disposal for all public use and administrative facilities, controlling human-caused erosion on public lands, and carefully managing toxic substance use and transportation.

Actions would be monitored and appropriate measures implemented to minimize water pollution from fuel-burning watercraft, marina operations, and other activities with high potential for polluting water. Visitors would learn about proper boating and facilities practices that protect water quality.

Protection of water resources would be promoted for all of Lake Chelan through cooperation with other agencies and organizations that affect the management of Lake Chelan (e.g., U.S. Forest Service, state, county, city of Chelan, local interest groups).

Fish

Management Objective. Preserve existing native fish populations and strive to restore viable native fish populations to levels where all endemic species are represented in Lake Chelan NRA; preserve or restore the opportunity for anglers to fish for native fish species and to enjoy and learn about the natural aquatic environment.

Actions. Resource inventory, monitoring, and research programs would be pursued to enhance the knowledge of native fish populations and their habitat to determine and evaluate change in response to habitat dynamics, normative fish species, recreational fishing, land use, and management actions.

The impacts of fish stocking in naturally fish-free lakes would continue to be researched, and management recommendations would be developed to minimize impacts.

Stocking in selected high lakes with minimal potential for adverse impacts would be allowed according to the 1988 supplemental agreement with the Washington Department of Fish and Wildlife. Upon completion of research, the current program would be reviewed and modified or a new program would be developed by the year 2000. Fish stocking of the Stehekin River and streams would be limited to endemic species (endemic genotype only, if possible) into their historic habitat.

Normative fish species would be controlled to allow recovery of viable populations of native species in at least portions of their historic range. Retention of the state's catch and release policy for native species (e.g., as in Ross Lake) would be encouraged, and the values of native fish populations and naturally functioning aquatic ecosystems would be interpreted.

The state and Chelan County PUD would be encouraged to develop a fisheries management plan. The National Park Service would take the lead in development of a fisheries management plan for upper Lake Chelan and the lower Stehekin River.

Stehekin River

Management Objective. Preserve and restore the free-flowing character and natural processes of the Stehekin River and its tributaries with consideration for protecting the public road system.

Actions. The National Park Service would not manipulate the Stehekin River to protect federal property except roads and bridges according to the following criteria. Existing public roads would be protected in erosion/river conflict zones only if (1) there are no feasible alternatives, (2) funds are available, (3) proposed actions would have lesser impacts than other alternatives, and (4) the proposed actions are permitted by the county, state, and other federal agencies. No new road construction would be proposed in active river/erosion conflict zones.

Previously manipulated sites that do not meet the above criteria for future manipulation would be restored to approximate natural conditions.

The Park Service would not manipulate the river to protect private property. No action would be taken to prevent private owners from manipulating the river on their land to protect their property unless such actions would significantly harm recreation area resources or were in violation of local, state, or federal ordinances, regulations, or laws. Such actions would not be encouraged, however.

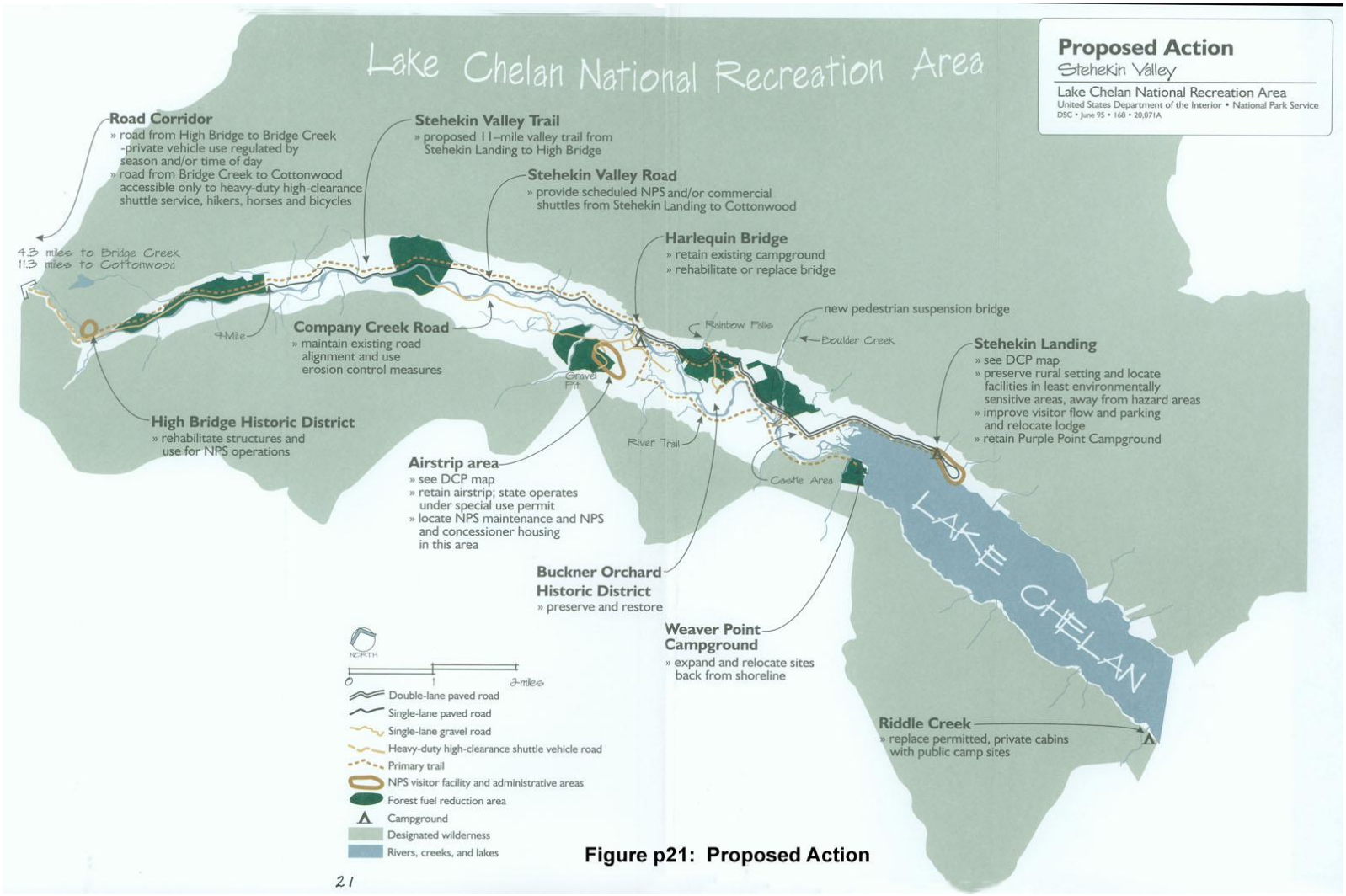


Figure p21: Proposed Action

NPS structures that could be threatened by river processes would be relocated.

The National Park Service would manipulate woody debris in the Stehekin River or its tributaries only to protect public roads and bridges according to the criteria above. Woody debris could also be trimmed or turned in the lower 9 miles of the Stehekin River to allow safer recreational use of the river for rafting, kayaking, and canoeing if it did not alter the function or stability of woody debris accumulations and was permitted by the appropriate regulatory agency. Woody debris would not be removed from the river system in any case. The Park Service would not remove or manipulate woody debris on public land or water to protect private property, and it would take no action to prevent private owners from removing or manipulating woody debris on their land to protect their property, unless these actions would significantly harm recreation area resources or were in violation of local, state, or federal ordinances, regulations, or laws. Such actions would not be encouraged.

The National Park Service would work with the county to encourage private property owners to protect natural river processes. Private alteration of river process would be opposed through cooperation with county, state, and federal agencies that have appropriate authorization to take action. The highest priority would be placed on acquiring lands, through exchange or purchase, that are threatened by or where development threatened natural river processes.

River processes would be inventoried, researched, and monitored to evaluate and mitigate impacts of recreation and other land uses.

The suitability of the Stehekin River would be studied for designation as a wild and scenic river.

Wetland, Floodplain, Shoreline, and Riparian Areas

Management Objective. Preserve or restore ecological processes and conditions in wetland, floodplain, shoreline, and riparian areas.

Actions. Existing NPS development on public wetland, appropriate regulatory floodplain, shoreline, and riparian areas (except significant cultural resources) would be relocated to suitable sites and the disturbed sites restored to natural conditions. Recreational use and access would be allowed in designated nonsensitive sites for camping, fishing, lakeshore campgrounds, etc. Campgrounds in regulatory floodplains would be brought into compliance with floodplain guidelines. Trails and sites would be designed and located to mitigate impacts (e.g., hardening high traffic areas).

Property owners would be encouraged to minimize impacts on wetland, floodplain, shoreline, or riparian areas. The National Park Service would take appropriate measures where actions threatened to cause significant impacts on wetland, floodplain, shoreline, or riparian areas.

Sand, Rock, and Gravel Plan Elements

Management Objective. Allow mining of sand, rock, and gravel in Stehekin Valley but restrict mining to the Company Creek borrow pit for NPS maintenance and public use and minor reconstruction only; allow for importing of material from outside the valley for new construction.

Actions. All borrow pits, other than the Company Creek borrow pit, would be examined and rehabilitated to natural-like contours and vegetative cover as appropriate. Mined portions of the Company Creek borrow pit would be reclaimed as new mining of sand, rock, and gravel occurs in order to maintain the active sand, rock, and gravel pit at less than or near its current size.

No new borrow sites would be allowed. Compliance with NPS "Administrative Use of In-park Borrow Materials Guidelines" (Special Directive 91-6, 8/5/91) would be met.

Sand, rock, and gravel would be conserved and recycled whenever possible (e.g., consider conservation through maintenance and road system design). No sand, rock, or gravel would be removed from the 100-year floodplain of the Stehekin River or its tributaries.

Material for new public or private construction would be barged into Stehekin Valley. Guidelines would be developed in a new sand, rock and gravel management plan to remove nonnative species and other foreign materials before the sand, rock, and gravel was barged.

For routine public and private maintenance needs (e.g., road repair, leachfield repair, foundation repair), a limited amount of material would be stockpiled at the active gravel pit. A portion of the stockpiled material would be crushed. Some crushed material would be made available to local residents. Instead of uncontrolled access to sand, rock, and gravel in the Stehekin River floodplain, the National Park Service would determine in a new sand, rock, and gravel management plan, among other issues, an operating procedure for keeping the active gravel pit near its present size (as new material is mined, the previously disturbed area would be rehabilitated). The gravel pit is currently near its maximum size including the excavated surface and operations floor (space for stockpiling materials and equipment maneuvering).

The plan would use a practical method for allocating sand, rock, and gravel for public use while not depleting the supply for NPS maintenance work. It would also provide for the sale of sand, rock, and gravel at fair market value to local residents only, and regulate the use of this material through the following criteria: (1) the applicant's use must be for maintenance projects only (those not requiring a building permit under county laws and regulations); (2) the applicant's use will be within Stehekin Valley; and (3) the applicant's maintenance project will not have a significant adverse effect on the purposes of Lake Chelan NRA as defined by the general management plan.

Geohazards

Management Objective. Recognize and avoid hazards of natural geological processes, such as snow avalanches, debris torrents, and rockfalls.

Actions. New NPS developments and recreational facilities would be sited to avoid geohazards, and existing NPS/concession facilities would be relocated away from geohazards.

The National Park Service, through cooperative efforts with state and local agencies, would oppose private commercial visitor facilities in geohazard areas. The county would be advised of the location of geohazards.

Forest Fuel Reduction I Firewood Management Plan Elements

Management Objective. Use fire suppression, prescribed natural fire, management-ignited prescribed fire, and selective manual fuel reductions to improve wildland fire protection for human life and property; to manage for late-succession stage in ponderosa pine/Douglas fir forest; and to monitor and evaluate manual thinning and prescribed fire effects over time.

Actions. Hazard forest fuel surveys would be conducted near government-owned buildings, and the hazards removed by the pruning and cutting of trees and shrubs to create more defensible space for fire suppression near these structures in the event of wildfire.

Hazard forest fuel surveys on private property would be conducted free of charge upon the request of private property owners and recommendations made to create more defensible space around these structures.

Human- and lightning-caused fires on the valley floor would be suppressed for the protection of human life and property. This is a recognized suppression zone in the fire management plan.

Prescribed natural fire would be used beyond the valley floor, when conditions were appropriate, to maintain the natural role of fire on mountain slopes and upstream from High Bridge (above 1,640-foot elevation).

Selective manual thinning and management-ignited prescribed fire would be used in forest fuel reduction areas to accomplish the following objectives:

- to reduce the amount of fuel in strategically located sites for more effective fire protection
- to strive for a 40%-60% forest canopy cover in some areas based on the mature forest component
- to perpetuate a multiaged ponderosa pine/Douglas fir forest
- to restore the effects of low-intensity fire
- to provide firewood for Stehekin residents from surplus logs as a secondary objective, contingent upon meeting the other objectives

Selective manual thinning would precede management-ignited prescribed fire treatment in some of the forest fuel reduction areas. Coniferous trees may be thinned in riparian communities within the fuel reduction areas. Trees would be selected and marked by a silviculturalist before any thinning activity. Manual thinning in easy access zones (150-250 feet from a road) could be done by individual woodcutters with a woodcutting permit. More remote zones in the forest fuel reduction areas would be thinned by contractors or licensees experienced with low-impact logging methods.

The wood produced through selective manual thinning would be used as firewood, but the production of firewood would be a result, not a primary objective of these wildfire management actions.

Manual thinning in forest fuel reduction areas would

- predominantly be from green trees less than 110 years old
- scatter slash from tree cutting or make slash piles for later burning, or chipping and mulching
- be cut in ponderosa pine/Douglas fir forest type only
- remove selected trees using an in-series or sequential strategy to maximize fire protection
- leave snags, dead and downed logs, and other woody debris in the forest fuel areas except along the perimeters

Vehicle access would be only on existing roads and 15 old road segments. Eight of these roads would be closed and revegetated after initial thinning operations. Additional old road segments within the areas and the old woodlots would also be revegetated. Removal of logs for firewood would either be by hand (close to roads) or by mechanized equipment. Generally, if mechanized equipment is used, most activity would be restricted to winter, with at least 2 feet of snow cover on the ground.

The practice of woodlot cutting for firewood would be phased out over a two-year period to enable the establishment of long-term monitoring plots and resource baseline data

collection in the forest fuel reduction areas. No green trees would be cut in the woodlots during this period. Woodcutting would concentrate in the 150- to 250-foot woodcutter's zone along the Stehekin Road within the Orchard/Rainbow and Boulder Creek forest fuel reduction areas during the two-year transition period. No other woodcutting would occur until the monitoring plots were established and a program created to continue monitoring and evaluation. Other sources of firewood (see below) would still be available.

When available, firewood would be provided from the following sources:

- hazard trees that are pruned or removed in accordance with an approved hazard tree management plan
- blowdown trees in developed areas
- trees removed to restore historic landscapes in historic districts
- trees removed because of new development
- trees pruned or removed for fire protection as a result of hazard fuel surveys for government-owned structures
- driftwood within the high-pool limits of Lake Chelan
- trees removed from forest fuel reduction areas by selective manual thinning

Firewood would be provided at fair market value. There would be no guarantee of firewood cordage per year. The firewood supply probably would diminish over the long term, but ultimately the amount of government-supplied firewood would be significantly reduced.

Residents with a woodcutter's permit would be able to obtain firewood from designated areas for personal, family, and business use. Residents not wishing to obtain their own firewood would be required to purchase it from the NPS contractor. If contractor-supplied firewood is not available, residents may have other persons cut and haul their firewood.

Private firewood users of public firewood would be required to use efficient woodstoves. Where the National Park Service uses firewood, the agency would provide efficient woodstoves. Most existing NPS firewood use would be converted to other energy sources. Existing private firewood users would be encouraged to use other energy sources.

Firewood barged to Stehekin from other areas (Northwest Energy Services, Inc. 1993: 51 ff) should be treated to eliminate potential nonnative pest species.

Driftwood from the lake would be available for firewood, but logs and other woody debris would not be removed from the Stehekin River, to protect the diversity of fish and wildlife habitat. Firewood would be obtained from Stehekin Valley only, not from wilderness or the park.

Other Energy Sources

Management Objective. Create an optimal system of efficient energy use with a mix of efficiency and economic viability.

Actions. Energy conservation would be encouraged in all fields, such as the following:

- use of sustainable construction and insulation materials, state-of-the-art lighting, efficient woodstoves
- elimination of NPS woodstoves as primary heat source
- conversion of NPS electric space heating to more efficient systems

- conversion to propane, or other more efficient and less polluting systems, for private and concession water and space heating needs
- conversion of NPS and concession vehicles to propane
- exploration of the viability of solar space heating
- collaboration between the National Park Service, Chelan County PUD, and Chelan County to institute measures and provide technical assistance
- promotion of energy conservation for all new private uses through design guidelines and modest economic incentives.

Threatened, Endangered, and Rare Species; Nonnative Species

Management Objective. Preserve and restore, where feasible, species and ecological relationships that would exist were it not for human impacts including control of nonnative species, and comply with federal, state, and local laws and guidelines.

Actions. The National Park Service would monitor and attempt to protect incoming gravel, soil, and firewood from nonnative plants, and would control selected nonnative species (e.g., knapweed, common mullein, knotweed, rush skeletonweed) that threaten to spread and adversely affect national recreation area resources. The National Park Service would educate and cooperate with private landowners and other agencies (e.g., planning commission) to encourage use of native species.

The National Park Service would work with the U.S. Fish and Wildlife Service (USFWS) and other agencies to define and properly manage important habitats in an ecosystem context. The Park Service would pursue resource inventory, monitoring, and research programs to enhance knowledge of biological communities and natural processes and to evaluate trends.

Human-disturbed sites would be actively revegetated, or natural revegetation with native species would be allowed to occur on a case-by-case basis. Species recovery plans would be implemented as approved.

Scenic Resources

Management Objective. Maintain existing levels of natural scenic quality and views and restore cultural scenes.

Actions. The current character of the road from the Landing to Harlequin Bridge and from 9-Mile to High Bridge would be maintained. A hardened, single lane road with pullouts visible from each other would be provided from Harlequin Bridge to 9-Mile, and a heavy-duty, high-clearance shuttle vehicle road would be maintained between High Bridge and Cottonwood.

The natural character of the lake and river edge on public lands (includes areas within 200 feet of the lake and river shoreline) would be restored. NPS structures would be removed from the shoreline, where appropriate, and no new NPS structures would be constructed on the shoreline. The "fairways" would be restored to natural conditions as appropriate.

All existing native vegetation would be retained except as specified in such plans as the forest fuel reduction plan. The open character of the pastures would be retained. Only limited vista clearing would be done to maintain the historic scene, improve safety, or meet specific interpretive objectives.

The outpost community image of the area would be maintained. Design guidelines would identify a crafted, step-back-in-time image. Historic attributes, particularly those of the Buckner orchard, would be highlighted. Where feasible, structures would be

relocated away from environmentally sensitive areas.

In cooperation with Chelan County PUD and in compliance with state and federal requirements, power lines would be buried where feasible.

Adjacent wilderness lands have been designated a class I area, the highest air quality standard. Retention of the high quality visibility within the Stehekin Valley is also important. For these reasons, the National Park Service would work cooperatively with the Chelan County PUD to reduce particulate emissions from diesel generators that augment power demand within the valley.

Wilderness Management Plan Elements

Management Objective. Direct and manage human activities in the wilderness in accordance with the Wilderness Act to minimize human impacts on wilderness resources and ecosystem processes and to provide high quality wilderness experience.

Actions. The actions that follow apply to wilderness areas.

Horse grazing — Grazing in the national recreation area portion of the Stephen Mather Wilderness would continue to be permitted. All use would continue to be monitored, and grazing would be restricted to the dry period of the summer, which generally begins about July 15. Only certified, weed-free, processed feed would be allowed. Grazing would continue to be prohibited within the national park.

Party size — The maximum party size would continue to be 6 pairs of eyes (human or stock) in the cross-country zone and 12 pairs otherwise. The existing commercial stock user may be permitted to exceed this limit at historic levels (up to 30 pairs of eyes four to six times per year) after individual trip requests are reviewed for potential resource impacts and conflicts. No additional oversized stock party permits would be issued. The maximum party size at Juanita Lake camp would be 12 pairs of eyes (human or stock) for all users. Grazing would continue to be prohibited within .25 mile of Juanita Lake. No oversized stock party exemptions would be considered for this site.

Campfires — Open campfires in subalpine zones and firewood gathering in subalpine zones and some other sensitive areas would be prohibited based on impact analysis.

CULTURAL RESOURCE MANAGEMENT

Management Objective. Protect and interpret the park's archeological, historic, and ethnographic resources. Treatment of historic properties would be undertaken in accordance with NPS policies and the park's cultural resource management plan in consultation with the Washington state historic preservation officer, the Advisory Council on Historic Preservation, and other interested persons as appropriate pursuant to 36 CFR 800. The cultural resource management plan would address both short- and long-range management of cultural resources within the national recreation area, including ongoing survey and inventory of archeological, historic, and traditional cultural properties and landscapes.

Actions. The cultural property inventory for the Stehekin area would be updated on a 10-year cycle and the National Register of Historic Places nomination for the park complex would be amended to incorporate new eligible resources.

The Golden West Lodge would be rehabilitated and used for NPS administrative purposes, a visitor center, an interpretive center, and minimal storage for some of the Buckner collection. The High Bridge Historic District would be rehabilitated and reused for NPS administrative purposes. The rehabilitation of historic structures would be,

done in accordance with the *Secretary of the Interior Standards for the Treatment of Historic Properties* (revised 1992),

The Buckner homestead and orchard would be preserved, and items associated with the farming operation would be restored on a priority basis if owned by the National Park Service. Most of the buildings would be closed to the public; however, a low level of interpretation would be provided. The genetic stock of the Buckner orchard would be maintained.

Significant parts of the Buckner collection should be acquired and some artifacts should be maintained onsite for interpretive purposes. Additional items should be stored in a collection storage/museum curatorial facility that would be constructed outside Stehekin Valley, but within Chelan County.

A historic landscape report for the Buckner orchard that includes historic crops and uses and a Buckner homestead and orchard management plan that guides decisions concerning agricultural uses should be developed. The vegetation management and the historic management plans must be consistent with each other, and they will provide the baseline data from which an agricultural use permitting system would be developed.

VISITOR EXPERIENCE

Management Objective. Emphasize selected opportunities that focus on natural, cultural, and recreational values, through both structured and unstructured ways and both solitary and social means. Visitors encounter facilities and services in a rural community context where needs are balanced with preservation of a nearly pristine natural environment.

Encourage visitor cooperation in resource preservation through interpretation, protection, design, and example. Visitors' typical perceptions of wilderness thresholds are the side walls of the valley and beyond High Bridge.

Pace and Access

Actions. Visitors would be provided with opportunities to enjoy a relaxed, leisurely pace, and to have several choices of access to a variety of feature locations.

Speed limits should be kept at low levels. Shuttle buses, operated by the National Park Service and/or the private sector, would become the primary motorized form of transportation (shuttles, including the Landing to Cottonwood shuttle, should be operated on schedules). Wherever appropriate, interpretation would be provided on shuttles (i.e., where there are important and interesting stories about sites visited or seen).

Visitors would be encouraged to use nonmotorized forms of transportation, e.g., walking, riding bicycles or horses, and renting boats and canoes, within the national recreation area. Seating would have access to views and provide for relaxation.

Recreational Activities

Actions. Visitors would be provided with opportunities to engage in a variety of recreational activities, including but not limited to, hiking, backpacking, camping, bicycling, boating, canoeing, kayaking, sailing, rafting, cross-country skiing, snowshoeing, fishing, hunting, horseback riding, photography, guided walks, exploring, and lounging. Recreational access for visitors with disabilities would be enhanced.

All recreational activities would be managed to prevent impacts on resources and to minimize conflicts among users. Activities that infringe on the solitude and natural beauty of the national recreation area or cause unacceptable impacts on resources

would be discouraged or prohibited. These would include bungee jumping, flying ultralights, parasailing, waterskiing, jet-skiing, and using offroad vehicles (ORVs) or mountain bikes on trails.

Circulation

Actions. Enjoyable and efficient transportation would be provided from the Landing to Bridge Creek and to features and lodging. This would be achieved by providing a linear road spine from the Landing to Cottonwood. The road would have a "country lane" character through speed limits, design, and use patterns.

The Stehekin Valley road would be paved from the Landing to 9-Mile, gravel between 9-Mile and High Bridge, and a heavy-duty, high-clearance shuttle vehicle road from High Bridge to Cottonwood.

Pedestrian and horseback riding loops would be provided off the road spine at feature areas. Access to the lake and around the Landing would be included, as well as a river access route from the "Castle" area, across a pedestrian suspension bridge over the Stehekin River (just below Boulder Creek confluence) to the river trail that runs from Weaver Point to Harlequin Bridge area. Access to Buckner homestead, Rainbow Falls, and High Bridge and road access to lodgings would be retained.

The use of bicycles on roads would be encouraged, but they would not be allowed on pedestrian trails except on connections to features and some campgrounds.

Overnight Uses

Actions. The National Park Service would provide camping areas. The private sector also could provide camping areas. Concession lodging facilities would be provided. The private sector should make available both separated (cabins, huts, tent cabins, houses) and clustered (traditional mountain lodge or hostel with central gathering space, or bed-and-breakfast) lodging experiences. Facility and landscape designs must be consistent with resource and visitor experience values.

Lake

Actions. The head of Lake Chelan would be managed to encourage a leisurely, peaceful ambience, through the use of speed limits, boat permits, and no-wake zones. The floatplane takeoff area would be recon-figured downlake to reduce noise and maintain safety.

Marina services would be provided for both day and long-term users (e.g., fuel, time-limited boat moorage, boat and canoe rentals, water taxi, fishing equipment rental and sales, and dump station), and would be concentrated at the Landing.

The lake edge would be designed to allow picnicking, swimming, walking, and sitting, within and complemented by the restoration and maintenance of natural systems. The levels of types of recreational activities would not impair the overall natural, pastoral feeling of the lake and environs.

River

Actions. The Stehekin River would be managed as a dynamic natural system and as one of the major scenic attractions in the valley. Opportunities for visitors to appreciate the power and intricacy of the river as a natural system would be enhanced.

River-related activities such as hiking, picnicking, fishing, rafting, kayaking, canoeing, and photography would be included. Access would be designed to avoid harmful impacts on critical areas, yet give visitors opportunities to appreciate and experience significant resource values.

Rafting, kayaking, and canoeing would be allowed but at the visitor's own risk. Snags and woody debris would not be cleared from the river for rafting, kayaking, and canoeing purposes. Motorized boat use on the Stehekin River would not be allowed.

Visitor Use and Resource Protection

Actions. The impacts of human activity on natural and cultural systems (e.g., Stehekin River, Lake Chelan, wetlands, camping and picnic areas, trails) would be monitored to ensure protection of the resources.

The National Park Service would participate in Resource Conservation and Development District activities to help address lakewide resource and visitor use issues. A forum consisting of Stehekin residents, environmental groups, Chelan County, the Public Utility District, U.S. Forest Service, National Park Service, and other agencies would be developed to adopt or modify a framework such as limits of acceptable change to set goals, standards, and monitoring and corrective strategies for recreational and other human activities in and around the national recreation area. The cumulative effects of activities on the Lake Chelan watershed would be considered.

INTERPRETATION AND INFORMATION

Management Objective. Encourage visitors to experience and appreciate the natural, cultural, and recreational resources of the valley by using a variety of media and approaches. Visitors would be able to understand primary interpretive themes, resource management and safety issues, Lake Chelan NRA purpose and role in greater ecological and recreational complexes, and the roles of NPS and private sector in recreational opportunities.

Orientation

Actions. Information would be made available before visitors have to make decisions. This information would help visitors learn about the resources and experiences that would be available, the behaviors that would be expected (and why), and the skills that are needed for different activities. Information on safety in the national recreation area should be introduced before visitor arrival, emphasized upon visitor arrival, and reinforced prior to visitor initiation of activities.

Visitors would be encouraged to try new activities that are within their capabilities. At contact stations at Chelan and Fields Point, orientation would be provided through telephone inquiries and personal contacts, exhibits, waysides, and printed materials. Boat passengers could read printed materials and talk to and hear presentations by boat crew or NPS interpreters to learn of recreational opportunities and resource information. At Stehekin Landing, visitors would be provided with information about recreational options, how to structure their visits, and the national recreation area in general. Wayside exhibits, a small community-staffed information area, a roving NPS interpreter, NPS and private brochures, and a bulletin board would be used. At the Golden West visitor center, orientation would be provided, using exhibits, audiovisual, publications, attended information desk, and through the private sector.

Interpretation

Actions. The National Park Service would take the lead role in planning, managing, and providing information and interpretive services, and would plan, design, and implement optimum actions to meet interpretive goals. The Park Service would provide the following:

- introduction to interpretive stories at staging areas, including Chelan and Fields Point, using exhibits, wayside exhibits, publications, and personal services

- personal services interpretation and publications on commercial boats in cooperation with Lake Chelan Boat Company and U.S. Forest Service

- major rehabilitation of the Golden West visitor center, including exhibits, audiovisual programs, and information services

- interpretive programs and media that focus on primary interpretive themes, emphasizing natural history, ecology, and prehistory of the area

- offseason information and informal interpretation at Stehekin Landing and on boats during layovers

- assistance to private providers of interpretation in training, planning, marketing, and quality assurance

During the summer guided walks, talks, evening programs, children's programs, roving interpretation, seminars, and shuttle bus programs would be provided, and during the winter, talks at the Landing and on boats, cross-country ski and snowshoe programs, and information services at the visitor center would be provided. The frequency of activities would be based primarily on staffing levels, resource sensitivity, and visitor numbers and interest. In all programs, recreation area resource values would be emphasized.

The Stehekin community might provide additional interpretive services, including programs and tours focusing on local history and culture (might be free or fee) and information in conjunction with rental or hiring of recreational services and equipment (e.g., guided canoe, bicycle, or horseback riding trips, shuttle buses, and camping and lodging services). Local initiatives would be complemented through NPS interpretation of local history and culture at the visitor center, contact stations, etc., in which local non-NPS residents could also be involved as noted elsewhere.

Facilities

Actions. Orientation and other visitor services and interpretation of primary interpretive themes and resource management issues would be provided at the Golden West visitor center. The interpretive media and information services would be upgraded, including new exhibits and audiovisual programs, and an auditorium for personal and audiovisual programs. The first and second floors of the building would be made accessible to visitors in wheelchairs from the Landing.

The interpretive media at Chelan and Fields Point contact stations would be evaluated and upgraded as needed to meet visitor needs. The wayside exhibits in the valley would be upgraded only where needed. New waysides would be installed where significant views or sites should be interpreted and where visual and other impacts would be minimal. The Henry M. Jackson Memorial area near the Landing would be landscaped with native plants. To take advantage of the site's interpretive potential, one or more waysides would interpret the natural history (geology) of the scene.

LAND USE AND DEVELOPMENT

Transportation Plan Elements

Management Objective. Provide transportation and access to, from, and within the national recreation area to accomplish a quality visitor experience, fulfill resource management objectives, and meet local community needs.

Actions. Action items are as follows.

Getting there — Visitation would be accommodated to approximately the current level of present maximum boat capacity and include interpreters on all peak season commercial ferries.

The airstrip would be retained and operated under a special use permit with the Washington State Department of Transportation, Aeronautics Division, for noncommercial public use on a "use at your own risk" basis. The permittee would keep the airstrip and the approaches equipped and maintained in accordance with the requirements of the Washington State Department of Transportation, and would ensure that all aircraft operations were conducted in accordance with requirements for state-operated emergency airstrips. There would be no expansion of the permitted area beyond that identified in the current permit. Camping would not be permitted within the land area authorized by the permit.

The Washington State Department of Transportation, Aeronautics Division, would be required to prepare a plan and conduct noxious weed control measures within the area under permit as approved by the National Park Service. An annual maintenance and operating plan will be prepared by the Aeronautics Division and submitted for review and approval by the National Park Service. The Washington State Department of Transportation, Aeronautics Division, would assume full responsibility and liability associated with the maintenance and operation of the airstrip. If it decides that the airstrip no longer meets their purposes and needs and does not renew the permit, the state will be responsible for compliance with regulatory processes associated with the closure of the airstrip. The National Park Service will be responsible for returning the area to a natural condition.

Commercial floatplanes would be allowed to continue flying at present capacity and with similar flight patterns for landings. Takeoffs would be far enough downlake to preserve the natural quiet of the national recreation area.

An aircraft noise study would be conducted with emphasis on floatplanes, which would monitor flight frequency and time of day, and help identify the quietest flight patterns.

Once there — Nonmechanized (e.g., walking, hiking, horseback), mechanized (e.g., bicycles), and motorized (e.g., cars, shuttles, motorbikes) methods of transportation would be accommodated in the recreation area.

Self-guided and organized tours would be available. Tours organized around natural, historic, and cultural features that use transportation methods other than car, shuttle, or bus (e.g., walking/bicycle tours) would be encouraged.

Snowmobile use would be limited to existing roads below High Bridge. Interpretive and cross-country ski tours would be encouraged during the winter season.

Abandoned vehicles would be removed from public lands.

Roads and trails — The road system would not be expanded. Unnecessary roads would be eliminated and the areas restored to natural conditions.

The current character (slow leisurely pace) and surface (chip seal) of the main valley road from Landing to Harlequin Bridge would be maintained.

Between Harlequin Bridge and 9-Mile, the road width would be paved and reduced to a single-lane (12-14 feet wide) with pullouts that would be visible from both directions (18 feet wide; 30-35 feet long). The road between 9-Mile and High Bridge would be maintained as a single-lane gravel road. Roadsides with excessive gravel would be rehabilitated to natural vegetation.

Unconstrained private vehicle use would end at High Bridge. Private vehicle use from High Bridge to Bridge Creek would be allowed, but traffic flow would be regulated by season of year and/or hour of day. Public shuttle service would be provided from the Landing to Cottonwood. Only the public shuttle service, hikers, horses, and bicycles would be allowed to use the road from Bridge Creek to Cottonwood. The National Park Service would seek a concessioner to replace the NPS-operated public shuttle service. Frequency of shuttle service would be increased over the current rate. Fare structure would provide discounts for frequent public shuttle users. The section of road from High Bridge to Cottonwood would be maintained for heavy-duty, high clearance shuttle vehicles. When needed, a site plan would be developed for the area immediately before High Bridge to provide adequate turnaround and parking.

Company Creek road would be maintained in its current alignment and condition. Three erosion control systems along the upper Company Creek road would be removed and replaced. The structures would be designed to keep the road from eroding during frequently recurring flood events (i.e., 10- to 25-year recurrence interval), and they would be made from rock, soil, and native vegetation.

Some old and abandoned road alignments would be converted to new trail loops in the lower valley, if appropriate.

An 11-mile pedestrian and horseback trail would be developed from the Landing to High Bridge; sensitive areas would be avoided to minimize impacts. It would be marked and maintained as a cross-country ski route as well. A pedestrian and horseback riding trail system that connects key lower valley features to the Stehekin Valley road would also be developed.

A trail from the Castle area to the river trail would be developed, including a suspension bridge just below the confluence of Boulder Creek. (The existing river trail connects the Weaver Point and Harlequin Bridge areas).

Stehekin Landing and Airstrip Area Development Concept Plans Elements

Management Objective. Preserve the rural setting through sustainable design for development, including historic and contemporary structures, and locate facilities in suitable and least environmentally sensitive areas possible.

For a graphic portrayal of the development concept plans for the proposed action, see the accompanying Stehekin Landing and Airstrip Development Concept Plan maps.

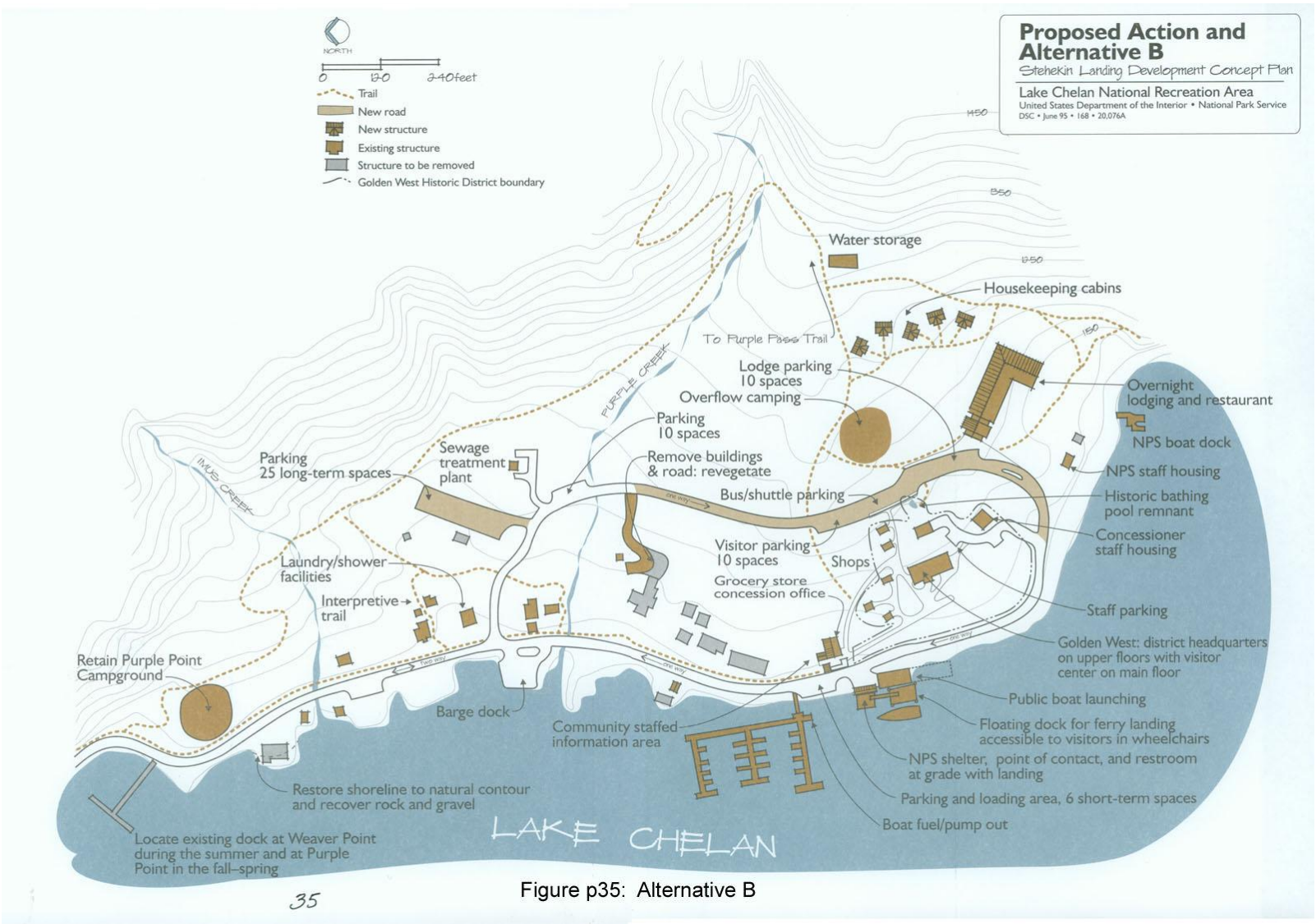
Actions. The level of NPS developments for visitor use would be kept similar to existing conditions. However, some structures may be rehabilitated for new uses, removed, or replaced with new facilities. Lodging would be relocated away from geohazards and re-styled.

Visitor flow and parking would be improved at the Landing. The Landing would become the focal point for visitor dispersement to lodging, tours, transportation systems, and other recreational opportunities. A bus loading/unloading area would be provided.

A heated area protected from the weather and within sight of the ferry docking area would be provided for people meeting the ferry. Restroom facilities would be expanded, and the shower and laundry facility would be relocated within the expanded restroom facilities. Structures along the lakeshore would be removed where feasible.

Weaver Point dock facilities would be improved to accommodate the Purple Point dock and allow seasonal moving of the dock between Purple Point and Weaver Point.

Transportation services — Adequate and safe commercial boat docking must be ensured to meet safety requirements. The bulkheads



35

Figure p35: Alternative B

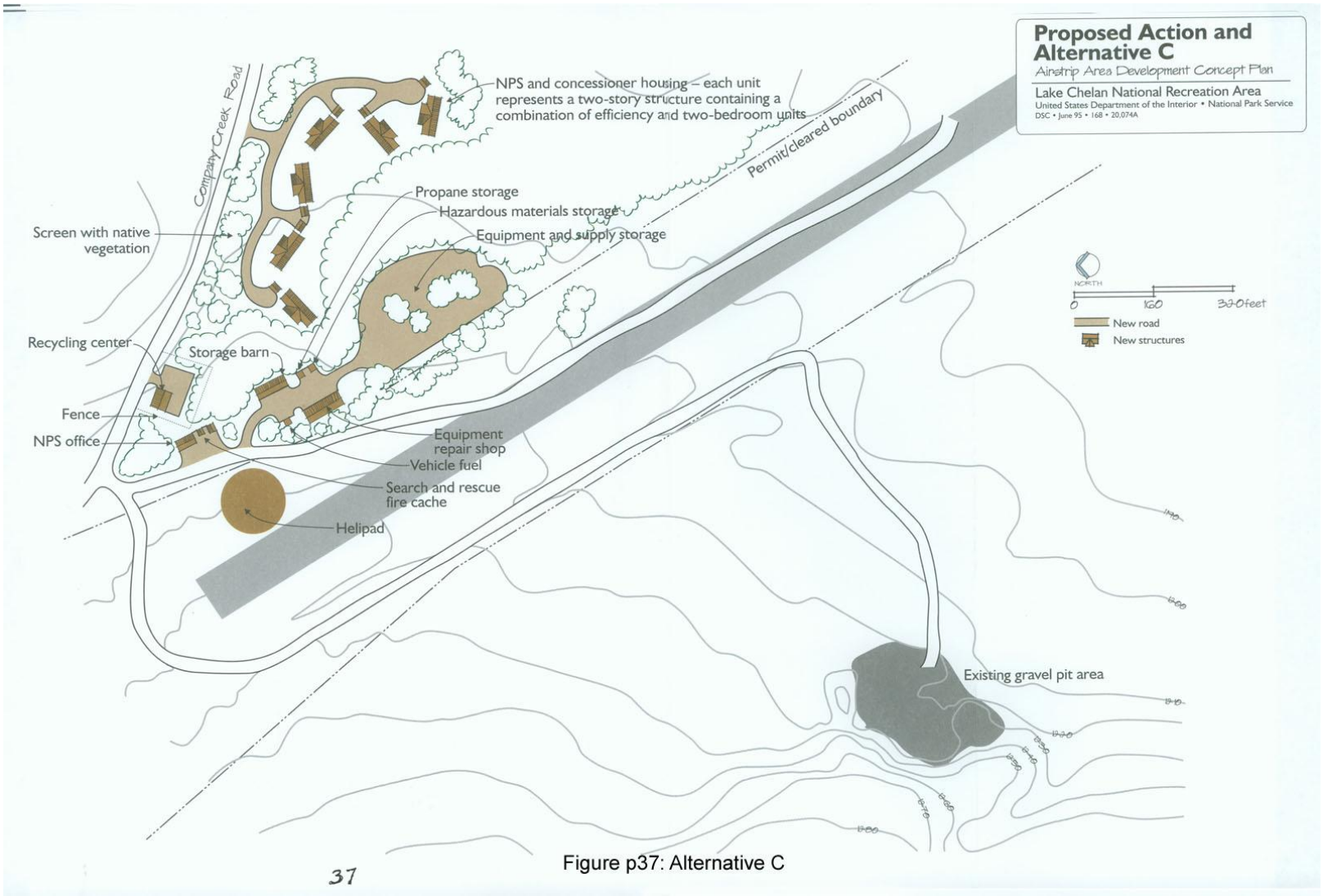


Figure p37: Alternative C

would be repaired. The moorage would be reconfigured to accommodate various uses, including small boats, overnight use, freight, and haul-out for long-term boat storage elsewhere in the valley.

Fuel and a sewage dump station would continue to be provided at the marine service center.

The floatplane tie-up would be retained, but takeoffs would be designated farther downlake.

Visitor lodging and campgrounds — Existing lodging would be phased out at present locations as the lifecycle of the buildings was reached. New facilities, including some winterized units, would be located at the Landing away from all hazards. Housekeeping facilities would be included. The present total of beds would increase somewhat. Summer lodging upvalley could be expanded by the private sector on private lands compatible with such uses. The Riddle Creek cabins would be removed and the area converted to public campsites.

All NPS campgrounds would be retained. Camping opportunities would be available at a variety of sites in the lower valley. The sites would be low density, unobtrusive, and well screened from the road. Water would be provided at the Purple Point and Weaver Point campgrounds. All sites would have access to pit or composting toilets. Sites would be set back from the lake and removed from hazardous areas as necessary. The Purple Point campground would be retained for hikers/climbers. The Weaver Point campground would be expanded.

At least two campgrounds have facilities that would be accessible to visitors in wheelchairs. The Weaver Point campground would be used for boat-in camping. Park management may determine which sites need to be managed on a reservation basis. The privately owned Riddle Creek cabins would be removed, and public campsites would be located here.

NPS and concession housing — Some NPS and concession housing would be consolidated in clustered sites beside the airstrip, based on environmental parameters and in compliance with compatibility criteria (see the "Land Protection Plan Elements" section for criteria). Also, some NPS and concession housing would remain dispersed.

NPS housing would be available for 9 permanent employees, 15 seasonal employees, and 10 transients. Concession housing would be available for 10 permanent and 20 seasonal employees.

Food service — A restaurant, a deli, and a grocery store would be provided to respond to the style of lodging (year-round lodging might be offered) and the need for lunch options created by the ferry schedule. The deli and grocery store would be designed for year-round use.

Administrative/office facilities — NPS headquarters and office space for valleywide needs, post office, etc. would be retained at the Landing.

Commercial retail/services — A commercial center would be established at the Landing with the grocery store and deli provided by the National Park Service/concessioner, and craft shops, outdoor supply, bike rentals, guide service, and other appropriate retail and services provided by local residents. Historic structures would be adaptively used for commercial purposes. Commercial services and locally operated shops upvalley would be increased. Structures and uses would be consistent with the compatibility criteria.

Utilities — Propane and gasoline would be stored in a safe area. NPS vehicle fuel storage/dispensing would be relocated to the redesigned airstrip.

Unnecessary power lines would be removed, and all other lines would be buried where feasible, especially in areas with high visitor use.

NPS maintenance — Maintenance facilities would be located near the airstrip.

Land Protection Plan Elements

Management Goal. Make sure that land uses on public and private lands are compatible with the purposes of Lake Chelan NRA, emphasizing those uses that protect natural and cultural resources and natural processes, and provide for safe visitor facilities and services.

Management Objectives. The six principal management objectives are as follows:

- Protect the national recreation area from land use and development that are incompatible with the purpose of the national recreation area.
- Actively support local government in its regulation of nonfederal land within the Stehekin Valley, which places primary reliance on adopted Chelan County zoning ordinances, subdivision, and other applicable ordinances. Support regulations that ensure that the public health and safety of Stehekin Valley residents and visitors are maintained and enhanced.
- Encourage a formal process by which Stehekin Valley residents can actively participate in and provide meaningful input to the Chelan County land use decision process regarding the regulation of private lands.
- Ensure that applicable laws and policies of the state of Washington, including health and safety regulations and Washington State Growth Management Act provisions, are followed.
- Provide a basis for meaningful and constructive NPS review of proposals for land use change on private land within the Stehekin Valley in order to ensure that all uses and land developments are compatible with the purposes of the national recreation area.
- Maintain an effective NPS capability to acquire or exchange for full or partial interests in private lands, conducted on a willing buyer /willing seller basis, to augment the land protection measures provided by county land use authority and compatibility determinations.

Guidelines. Based on the land protection goal and objectives, the following guidelines form the basis for the land protection plan, which is being prepared in conjunction with this general management plan. The land protection plan further defines specific land protection strategies that are to be employed relative to private property within the Stehekin Valley. In addition to incorporating all pertinent elements included in this section of the proposed action, the land protection plan would also provide a tract by tract listing of landownerships, identifying the approximate area of each tract that has a high priority for resource protection (see appendix D).

- Place emphasis on local zoning and other land use authorities of county and state government to regulate private land uses within the Stehekin Valley (see "Local Zoning/Land Use Regulations" and "Stehekin Valley Overlay District" sections).
- Provide opportunities for local review of Stehekin Valley land use proposals, and an appropriate forum to provide this input to Chelan County government.
- Accept new residential and other private land uses that are compatible with the purposes of the national recreation area (see "National Park Service Land Use Compatibility Criteria" section).
- Accept new commercial uses on private lands that provide visitor and resident services and that are compatible with

the purposes of the national recreation area.

- Accept new industrial uses on private lands that are typical of and compatible with historical industrial uses within the Stehekin Valley and that are compatible with recreation area purposes.

- Encourage land uses that consume a low level of resources, and that conserve both renewable and nonrenewable resources.

- Encourage new construction and conversion of existing facilities that adhere to sustainable design principles (NPS 1993e).

- Identify those properties with areas that have a high priority for resource protection, and where a public interest in land is necessary to protect recreation area resources, based on resource sensitivity and values, or to provide for compatible visitor use and public community needs consistent with the purposes of the national recreation area and other legislated mandates. Resources that have a high priority for protection under the proposed action are high flood influence, wetland, riparian, and high visual sensitivity areas.

- Continue willing buyer/willing seller acquisitions for properties with areas that have a high priority for resource protection, or for which public needs have been identified, when appropriated funds are available for such purposes or appropriate lands are available for exchange. The National Park Service will consider other factors on a case-by-case basis in making final determinations to purchase parcels. Private lands within areas that have a low priority for protection are not proposed for acquisition, but willing seller opportunities would be considered when funds are available.

- Use land exchanges, as natural, cultural, and scenic conditions allow, within the national recreation area by offering to exchange private lands having resources with high priority for protection for public land from previously acquired private parcels having resources with **a** low priority for protection.

- Emphasize, where appropriate, with the cooperation of the landowner, opportunities for easement purchases and other less-than-fee (e.g., conservation easements) interests for resource protection and public use. This will allow greater flexibility in the protection of high priority resources, including scenic areas, and could provide an alter native method of achieving public nonmotorized recreational trail access to lakes, rivers and streams and other sites within the national recreation area.

- Exercise the use of eminent domain procedures only to prevent imminent resource degradation of recreation area values by incompatible uses on private land, and only as a last resort where other prudent and reasonable measures to protect recreation area resources by eliminating or mitigating the resource degradation have been exhausted.

Disclaimer. Nothing in this plan constitutes an offer to purchase private property, a taking of private property, or a usurpation of the responsibility of the state of Washington and Chelan County to regulate the use of private land within the Stehekin Valley.

Local Zoning/Land Use Regulations. Complementary actions by local authorities would include the following:

- application by Chelan County of adopted local controls, including zoning ordinances, shoreline management master programs, Growth Management Act comprehensive plan, and sub division regulations, and other land use

authorities to regulate land use and development within the Stehekin Valley

- adherence to adopted Chelan County and Washington State building codes, health and safety, and other applicable standards by valley residents and uniform enforcement by county and state officials

Because the state of Washington already has a relatively sophisticated regime of land use controls and planning, the National Park Service, acting through the superintendent, strongly encourages use of local authorities and existing land controls for regulation of private land within Lake Chelan NRA. Therefore, as part of this, the National Park Service proposes that the county adopt a new zoning code chapter establishing an overlay district for review of proposed uses and developments on private lands within the Stehekin Valley. This would be in addition to enforcement of applicable state laws and local controls, including the Washington State Growth Management Act, Chelan County zoning ordinance, subdivision regulations, and shoreline management master program.

To be consistent with PL. 90-544 and the purposes for which Lake Chelan NRA was established, the National Park Service will propose that the overlay district, modeled after the Icicle Valley Overlay District in Chelan County Zoning Code (Chelan County Code, chapter 11.39B), meet the following standards:

- Be applicable to all properties in Stehekin that are subject to county jurisdiction.

- Preserve the recreational, scenic, and historic values and general character of the valley setting through review standards for frontage, setback, density, height, sustainable design, size, materials, nonconforming uses, and new subdivisions.

- Discourage variances or exceptions for any new use or additional development that does not meet established controls or overlay review standards or NPS compatibility criteria.

- Recognize formally the role of the superintendent of the North Cascades National Park Service Complex, or his/her designees, in participating in all proceedings before the county concerning land use or developments that may have an effect on NPS lands and resource values and /or the visitor experience within Lake Chelan NRA.

- Provide that the superintendent be given timely prior written notice of all proposed changes to any Chelan County plans, ordinances or regulations affecting the Stehekin Valley, and of all applications for permits or approvals within the national recreation area or related areas of concern.

- Demonstrate a clear and consistent commitment to sound land use principles and a method of enforcement by local authorities and, where applicable, the National Park Service.

Stehekin Valley Overlay District. In keeping with these standards, the National Park Service has prepared a draft of a proposed overlay district ordinance for the national recreation area for consideration by Chelan County to adopt as part of their review of land use actions on private land within the Stehekin Valley.

The proposed Stehekin Valley overlay district would have a review board made up of area residents and other interested parties, with *ex-officio* participation by the National Park Service. This board would review all land use development proposals for private lands within the area and would make recommendations to Chelan County regarding the appropriateness of each land use proposal.

1. Objectives. Design review for the Stehekin Valley is intended to accomplish the following objectives:

(a) Encourage uses on public and private lands that can be developed and used compatibly with the purposes of the Lake Chelan National Recreation Area, emphasizing those uses that protect area natural processes and resources and provide for safe visitor facilities and services.

(b) Maintain the current level of services for visitors, allowing the private sector to augment services to meet additional demand, on lands determined suitable for such uses.

(c) Maintain compliance with Chelan County and NPS objectives for the area as described in local and state controls and plans, including the Chelan County Zoning Code, Chelan County Shoreline Master Program, Chelan County Sensitive Areas Ordinances, National Park Service Architectural Character Guidelines and Management Objectives-Lake Chelan National Recreation Area, National Park Service Compatibility Standards, Chelan-Douglas Health District Design Guidelines for Septic and Drainfield Systems, Chelan-Douglas Health District On-site Sewage Disposal System Rules and Regulations, and other local, state, and federal laws and regulations.

(d) Facilitate recreational opportunities while conserving the scenic, scientific, historic, and other values contributing to public enjoyment.

(e) Promote the management, use, and disposal of renewable natural resources and development that, are compatible with, or do not significantly impair public recreation and conservation of the scenic, scientific, historic, or other values contributing to public enjoyment and community vitality of the district.

2. Applicability

[The formal legal description of the subject area will be presented here.]

3. Design Review Committee. For the Stehekin Valley Design Review Overlay District, the Design Review Committee will consist of five voting members who will be registered voters and/or property owners within the planning area. The five voting members will be appointed as follows: three members appointed by the Chelan County Commissioners, one appointed by the Chelan County PUD, and one appointed by the Commissioner of Public Lands. They will be assisted by expert, *ex-officio* (no-voting) members, including a professional hydrologist and a public health sanitarian (both designated by Chelan County), a planner employed by Chelan County, an NPS resource specialist, a planner or landscape architect affiliated with or designated by the National Park Service, and a wildlife biologist designated by the National Park Service. All members will be appointed and will serve in accordance with this ordinance, except that *ex-officio* members affiliated with the National Park Service will be appointed by the park superintendent.

4. Review Responsibilities. The Stehekin Valley Design Review Committee will review and make recommendations on all land use and development matters within the district subject to Chelan County jurisdiction, including but not limited to:

- grading, building, and other related permits and approvals
- conditional use permits
- variances
- zone changes
- planned unit developments
- shoreline substantial development permits
- comprehensive plan modifications
- short and long subdivisions
- minimum lot sizes and densities

5. All Uses Conditional. In the Stehekin Valley Design Review Overlay District, all otherwise permitted uses will be deemed conditional uses. The recommendation of the Design Review Committee on such uses will be given substantial weight by the zoning adjustor, Board of Adjustment, Board of County Commissioners, and other bodies in deciding applications within the district. Uses appropriate in one area of the district may be subject to conditioning or denial in another (e.g., siting of commercial facility in inappropriate scenic area).

All applications will be reviewed on the following criteria:

(a) Consistency with the objectives for the district will be sought.

(b) Early termination of uses inconsistent with the objectives of the district will be encouraged.

(c) Otherwise permitted development will not be approved if clearly inconsistent with adopted NPS compatibility standards (e.g., development in areas designated as having resources with high priority for protection).

(d) Degradation of critical/sensitive natural resources will not be permitted.

(e) Suitability of location in light of objectives for the district will be encouraged.

(f) Arrangements for use by general public consistent with objectives of the district will be encouraged.

(g) Uses that result in less consumption of resources and conservation of both renewable and nonrenewable resources will be encouraged over more consumptive alternatives.

(h) Conversion of existing facilities to uses compatible with the purposes of the district will be encouraged.

(i) Uses that may result in degradation of water quality or pollution will be discouraged.

(j) The construction or siting of building on slopes with gradient greater than 20% without assurances of acceptable mitigation measures will be discouraged to minimize the potential for erosion; hazards to public safety and health; and any adverse impacts on the recreation, scenic, scientific, and historic values of the area.

(k) The clustering of structures is encouraged in order to promote open space scenic quality, resource conservation, and the efficient provision of visitor services. In developing overnight visitor accommodations, the combining of accommodation units may also be permitted.

6. Specific Uses

(a) Permitted Conditional Uses. When consistent with the above criteria, permitted conditional uses at appropriate locations will include:

- small-scale visitor lodging and/or campgrounds
- NPS and concession housing
- food service
- administrative and office facilities for governmental purposes
- commercial and retail services consistent with the purpose of the area
- utility facilities and ancillary services
- private residential uses

(b) Restricted Uses. In addition to restrictions noted above, the following additional restrictions apply to uses specified below:

(1) Applications for construction of multifamily dwellings will not be approved unless they would facilitate achieving otherwise permitted residential density while avoiding construction in critical or sensitive areas.

(2) Manufacturing or industrial uses not historically typical of the lower Stehekin Valley will not be permitted.

(3) Mining, except for limited extraction of sand, rock, and gravel for local maintenance use in accordance with an NPS-approved sand, rock, and gravel plan, will not be permitted.

(4) For all proposals that would entail the use or consumption of federal property or resources, no approval will be granted unless prior federal approval has been obtained.

National Park Service Land Use Compatibility Criteria. The National Park Service will adopt a revised approach for a determination of compatibility regarding proposed use and development of private and nonfederal lands within the national recreation area to ensure that such uses are compatible with the purposes for which Lake Chelan NRA was established. Where proposed uses are not adequately addressed by county and state land use authorities, the application of compatibility criteria would be the basis for a case-specific compatibility analysis by the National Park Service. The limitations of the previous compatibility standards, and their approach to specific land use standards in regulatory language, have been removed.

P.L. 90-544, which established the Lake Chelan National Recreation Area, provided that the secretary of the interior may "acquire lands, waters and interests therein by donation, purchase with donated or appropriated funds, or exchange, except that he may not acquire any such interests within the recreation areas without the consent of the owner, so long as the lands are devoted to uses compatible with the purposes of this act." **(emphasis added)**

Therefore, in accordance with the applicable provisions of P.L. 90-544, these compatibility criteria establish the basis for identifying which land uses within the Stehekin Valley are inconsistent with the protection of natural, recreational, scenic, scientific, and historic values of Lake Chelan National Recreation Area. They also identify land uses that are incompatible with the purposes of Lake Chelan NRA. This could subject the property that is proposed for the incompatible use to potential acquisition via the use of federal eminent domain powers where all other prudent and reasonable attempts to remove or mitigate the incompatibility have failed.

These compatibility criteria are not intended to duplicate county zoning standards or other applicable land use practices that are the proper purview of local government, and that would be related more to the protection of the life, health, and safety of Stehekin Valley residents. Instead, these NPS criteria are intended to guide both park management and Stehekin Valley residents in determining which land use proposals and practices are in harmony with the resource values of the national recreation area and which are not. The criteria are resource-based, and have been developed to ensure the long-term protection of the natural, recreational, scenic, scientific, and historic values of the area.

The following purposes provide further guidance in the application of the compatibility criteria, the adherence to compatible uses by Stehekin Valley landowners, and the application of criteria by park management.

- To identify uses that would harm, degrade, or adversely affect resource values of Lake Chelan NRA.
- To identify proposed types and levels of land uses that would harm resources when cumulative effects are considered in the context of previously established uses.
- To encourage uses that would enhance resource values and the general character of the valley.

- To encourage conversion from a higher impact land use to a lower impact land use.

I. COMPATIBILITY CRITERIA

A. General Criteria

The alteration, development, and use of all public and private properties within Lake Chelan NRA must comply with applicable federal laws, rules, and regulations, and must be compatible with the congressionally designated purposes of Lake Chelan NRA.

B. Incompatible Uses of All Property within Lake Chelan NRA

The following uses of all public and private property within the Stehekin Valley are incompatible with the purposes of Lake Chelan NRA:

1. Any subdivision of land that was not in effect prior to the adoption of these compatibility criteria, except as permitted through the Chelan County Subdivision Regulations and as consistent with Chelan County health standards.

2. The siting or construction of any building, including but not limited to, residential, commercial, and industrial buildings, in an identified:

    - high flood influence area
    - wetland
    - riparian area

3. Any dredging or filling of Lake Chelan or the Stehekin River without full compliance with the U.S. Army Corps of Engineers permitting process.

4. The cutting of timber for sale or transport outside the Stehekin Valley.

5. The cutting of timber by any means other than selective tree harvesting, except as required by Washington State Department of Natural Resource regulations.

6. The mining of sand, rock, or gravel for sale or transport outside the Stehekin Valley.

C. Incompatible Uses of Public Property Within Lake Chelan NRA

In addition to those uses listed in section B. above, the following use of all public property within the Lake Chelan NRA is incompatible with the purposes of the area. While these standards have not been applied to private lands within the Stehekin Valley, it is highly recommended they be adopted by Chelan County within the county zoning ordinances and the proposed Stehekin Valley Overlay Zone.

The National Park Service will not site any building or structure in an identified:

- 100-year flood plain, unless used for nonhuman occupancy and with conditions on specific uses or mitigation

- wetland soils, and those soils not conducive to building foundations, leachfield percolation, or site drainage

- geohazard areas

- areas with slopes greater than 20% gradient

- areas of high visual sensitivity, except where specific design mitigation measures can successfully be used

D. Effective Date of the Compatibility Criteria

Upon adoption, these compatibility criteria will supersede those standards promulgated in 1988 and updated in 1992. Adoption will be official upon the signing of the Record of Decision by the regional director, National Park Service, Pacific Northwest Region.

E. Request for Determination of Compatibility

The Lake Chelan NRA legislation does not grant the secretary of the interior zoning authority. However, it does impose the responsibility to ensure that existing uses are compatible and that proposed land uses will be compatible with the purposes for creation of the national recreation area. The current zoning ordinances of Chelan County have been found to substantially satisfy the intent of the Lake Chelan NRA legislation, and therefore constitute the primary basis for implementing these compatibility criteria.

Landowners or other interested or affected parties can make a written request to the superintendent for a determination as to whether an existing or proposed use is in compliance with the compatibility criteria. Generally, the superintendent will find that existing and proposed land uses are compatible if such uses conform to applicable local, state, and federal laws and are not specifically sited within incompatible use areas as described in section B.2. above.

Requests for a determination of compatibility must be made in writing to the superintendent and include the following information:

1. Description/location of the property and the applicable county or local zoning classification, e.g. rural residential, conservation, general.
2. Existing use and/or development being proposed on the property.
3. Statement as to whether the county or local zoning for the property will allow for the proposed use or development without the need for a variance.
4. Statement as to how the use or proposed development will comply with compatibility criteria.

The superintendent will review the request and notify the landowner in writing within 45 days after receiving a request for determination whether the existing use or proposed development and use is in compliance with the compatibility criteria. The superintendent may need to extend the schedule for making a determination of compatibility by 30 days if additional information is needed.

In the event the superintendent determines an existing or proposed use or development is not in compliance or not compatible based on the supplied information and a field check by NPS staff, the superintendent will give the landowner written notice of the manner and nature of the incompatibility. To the extent practicable, the notice will include suggestions or alternatives for working with landowners to achieve compatibility.

PARK OPERATIONS

Concessions, Contracting, Special Use Permits, and Private Enterprise

Management Objective. Increase the capacity of some concession services for food and lodging. Encourage private parties to provide for additional demand in both food and lodging.

Actions. Some increase in concession services for food and lodging would be provided. The concessioner would be encouraged to use the local workforce as much as possible. Private parties operating (consistent with applicable county, state, and federal regulations) on private land would be encouraged to also provide additional food and lodging.

Services and facilities/programs would be provided by a mix of entities including the National Park Service, concessioners, and private enterprise.

A lakewide business forum arrangement would be used to assist, guide, and promote commercial visitor services and community enterprises by promoting, disseminating information, developing facilities, and monitoring the quality of the visitor experience, especially as these relate to concessions, permits, and private enterprise.

NPS Provision of Services to Private Landowners

Management Objective. Provide services essential for resource protection and visitor health and safety. Continue NPS services and/or reasonably expand to include private land uses that support visitor experience with minimal impact on resources. Use private contracts, where appropriate, and apply a fair-share charge for these services.

Actions. Technical assistance would be provided as requested for planning, design, and construction of facilities, and visitor programs.

The National Park Service would provide wildfire protection (through reimbursable agreement between U.S. Forest Service and Washington State Department of Natural Resources) and cooperative structural fire protection.

Solid waste disposal would be provided under user-fee basis through private contracts, and possibly on private land, in accordance with regulations. The National Park Service would provide boat sewage disposal at no cost and limited moorage with moorage fees for overnight use.

The National Park Service would provide road maintenance for all designated public roads including the Stehekin Valley road to Cottonwood (including snow removal 9 miles up valley).

The post office (through an agreement with the U.S. Postal Service) would be in an existing building or perhaps in a newly constructed building.

An existing NPS building would be provided for community use under a permit system.

Concurrent National Park Service/Chelan County law enforcement would be secured.

NPS Staffing

Management Objective. Through NPS presence, be responsive to visitor demands balanced with resources/visitor management objectives.

Actions. There would be fewer than current levels of permanent and seasonal employees.

Cooperative Relationships with Others

Management Objective. Strengthen working relationships with others, defining shared objectives and developing strategies that lead to cooperative agreements for the management of natural, scenic, cultural, and recreational resources of Lake Chelan NRA.

Actions. The National Park Service would work with county, state, and federal agencies for enforcement of existing ordinances and regulations.

Cooperative management would be pursued with the U.S. Forest Service (e.g., wildlife, wilderness, Fields Point); Washington Department of Natural Resources, Department of Ecology, Department of Fish and Wildlife; Chelan County (e.g., law enforcement, search and rescue, land uses); Chelan County PUD.

The National Park Service would build cooperative relationships with county, state and federal agencies; the private sector; and the public through constant communication to involve them in all efforts to facilitate resource protection and visitor enjoyment. Also, the Park Service would facilitate setting up and coordinating a lakewide business forum, and would participate in other lakewide planning efforts.

NO-ACTION/MINIMUM REQUIREMENTS ALTERNATIVE

ALTERNATIVE CONCEPT

Lake Chelan NRA would be a rural resort community where resources are used, within limits, by an expanding residential presence. Visitors would encounter an array of services and activities that guide them to cultural sites, natural wonders, and activity outlets. Opportunities would encourage appreciation of the cultural heritage and understanding of the natural ecosystem. This would be accomplished in accordance with the 1988 *General Management Plan* (GMP) and supporting plans — the 1987 *Firewood Management Plan* (FMP), the 1988 *Land Protection Plan* (LPP), the 1989 *Forest Fire Hazard Reduction Plan* (FFHRP) and the 1989 *Wilderness Management Plan* (WMP). Other applicable documents include the 1982 *Compatibility Standards,* the 1986 "Landscape Analysis: Stehekin Landing," the 1988 *Resources Management Plan* (RMP), and the 1992 concession contract.

NOTE: The number(s) in parentheses refer to page numbers in the 1988 GMP. Also, when an action item is followed by the word "assumption" in parentheses, that action item does not appear in the 1988 GMP; however, it is assumed to be consistent with the philosophy of that plan. Abbreviations of plans (e.g., RMP, GMP) refer to specific plans cited above.

For a graphic portrayal of the no action/ minimum requirements alternative, see the accompanying Stehekin Valley map.

NATURAL RESOURCE MANAGEMENT

Management Objective. Conserve the scenic and the primary natural resources and balance ecological relationships and processes with recreational activities in order to maintain the closest natural resource condition consistent with recreational use and existing power development. (62)

Water Quality

Management Objective. Strive to preserve or restore water resources to natural conditions. (Assumption)

Actions. The National Park Service would work with county, state, and other federal agencies to monitor and protect water quality and to promote enforcement of regulations. (RMP)

The National Park Service would encourage property owners to protect water resources. (Assumption)

It would be the responsibility of the Chelan County PUD to mitigate shore erosion on Lake Chelan.

The National Park Service would inventory and monitor water quality to evaluate changes and ensure compliance with standards. (RMP)

Under the no-action/minimum requirements alternative, there would be no restrictions on lake use. (Assumption)

Water resources protection would be promoted for all of Lake Chelan through cooperation with other agencies and organizations that affect the management of Lake Chelan (e.g., USFS, state, county, city of Chelan, and local interest groups).

Fish

Management Objective. Protect sensitive native fish populations and comply with the Endangered Species Act and state regulations and guidelines. (RMP)

Actions. Resource inventory, monitoring, and research programs would be pursued to enhance the knowledge of native fish populations and their habitat, and to

evaluate effects of angler harvest and management actions. (RMP)

The impacts of fish stocking in naturally fish-free lakes would continue to be researched. (Assumption)

The stocking of selected high lakes would be allowed according to the 1988 supplemental agreement with the Washington Department of Wildlife until the year 2000; then the program would be reviewed based on research. (RMP)

Normative fish species that threaten existing native fish populations would be controlled.

Harvest levels of native species would be optimized based on biological balance and integrity. Fisheries in interjurisdictional waters would be managed to maintain optimum sustainable harvest of game species. (Assumption)

The National Park would coordinate the development of a fisheries management plan for upper Lake Chelan and the lower Stehekin River with state agencies sharing responsibility. (RMP)

Stehekin River

Management Objective. Maintain as natural a stream course as feasible for the Stehekin River. (RMP)

Actions. River erosion and flooding would be controlled only to protect life, health, existing public roads, and bridges; erosion caused by visitor activities along the shoreline would be mitigated; immediate flood hazard to private development in the floodplain would be alleviated using minimum actions (13, 45); and specific streambank protection measures would be evaluated and appropriate visitor facilities recommended. (RMP)

Research would be conducted to evaluate stream resource use impacts and to recommend streambank protection measures that minimize impacts. (RMP)

On a case-by-case basis, removal of fallen trees in the lower 10 miles would be considered under certain conditions. Previously manipulated sites (including control structures) would not be restored to natural conditions. (Assumption)

Roads would be removed as property was acquired to avoid active erosion/river conflict such as Company Creek. (Assumption)

Acquisition priorities as stated in 1988 *Land Protection Plan* would be maintained. (Assumption)

The suitability of the Stehekin River for designation as a wild and scenic river would be studied. (13)

Wetland, Floodplain, Shoreline, and Riparian Areas

Management Objective. Manage wetlands in accordance with existing regulations and policies. (Assumption)

Actions. The National Park Service would take no action that supports further development of the 100-year floodplain (45); developments would not be removed from wetlands. (Assumption)

The shoreline between the Landing and head of the lake would be restored to natural conditions and made available for public recreation. (35)

Property would be acquired, with the consent of the owners, with the highest priority given to those properties that have the most significant or sensitive resources. Property owners would be encouraged to protect wetland, floodplain, shoreline, and riparian areas. (Assumption)

Figure p53: No Action

Sand, Rock, and Gravel Plan Elements

Management Objective. Manage sand, rock and gravel through regulations that would be developed to allow for resident's use in a manner that does not have a significant adverse effect on resource values. (45)

Actions. The existing pit would be recovered as new excavation occurred; the size of the pit would remain constant. New pits would be established should the existing pit become depleted. (Assumption)

Valley sources would be used for new construction. The sand, rock, and gravel should be treated to eliminate normative species, toxic materials, etc. (Assumption)

Mining of sand, rock, or gravel from the river would be allowed only if there are no adverse impacts. (Assumption, RMP)

The gravel should be crushed and stockpiled to meet needs. Washout gravel should not be recycled. (Assumptions)

Geohazards

Management Objective. Allow measures that protect life and property from natural geological processes, such as snow avalanches, debris torrents, and rockfalls. (Assumption)

Actions. New NPS developments and recreational facilities would be sited to avoid geohazards, and existing NPS/concession development would be relocated away from geohazards. These actions are the same as the proposed action, and they are considered as assumptions under the no-action/ minimum requirements alternative.

Existing private development would be protected from geohazards or relocated. (Assumption)

Forest Fuel Reduction I Firewood Management Plan Elements

Management Objective. Maintain as near natural an environment as is consistent with protection of private and public development in keeping with the mandate of the enabling legislation to conserve the scenic, scientific, and other values of the area; to reduce hazardous fuel accumulation in order to prevent the spread of wildfire and to eliminate the resulting impact on public and private developments. (12) (FFHRP)

Manage firewood as per the 1987 FMP. (45)

Actions. Where feasible, federal lands would be treated with prescribed fire to reduce fine, fast burning fuels and ladder fuels to reduce possibility of a crown fire. Other areas would require mechanical removal of fuels. (FFHRP)

Naturally ignited fires burning under prescribed conditions would be suppressed in the lower Stehekin valley.

A program would be implemented to reduce hazardous fuels adjacent to developments and private land. Information on actions property owners can take to protect their homes would be made available to Stehekin residents. (FFHRP)

Those fuels removed mechanically for fuel breaks and fuel hazard reduction near structures would be considered as administrative wood. (FMP)

The National Park Service would harvest 1-acre woodlots managed on an 80-year rotation for sustained-yield production. (12)

Administrative surplus trees cut by the National Park Service and driftwood from the lake would be used as firewood. (45)

Fallen trees might be collected if they are within 100 feet of the road. (FMP)

As in the proposed action, private firewood users would be required to use efficient woodstoves. (FMP)

The National Park Service would slowly reduce its use of firewood, as is currently underway. (Assumption)

As in the proposed action, firewood would be obtained from Stehekin Valley only, not from wilderness or the park. (FMP).

Hazard trees would be removed on a case-by-case basis. (Assumption)

Other Energy Sources

Management Objective. Manage energy based on economic criteria. (Assumption)

Actions. No specific conservation measures would be employed except for the FMP's requirement for efficient woodstoves. (Assumption)

Economic forces would be allowed to control energy sources. (Assumption)

Energy conservation would be voluntary. (Assumption)

Threatened, Endangered, and Rare Species; Nonnative Species

Management Objective. Aggressively restore and protect all native species and habitats, including the removal of all nonnative plants and animals. Conserve and restore candidate and listed species in accordance with state and local law. (Assumption)

Actions. Selected nonnative plants would be controlled through monitoring and mitigation, including biological control agents, herbicides, and mechanical means. (RMP)

The U.S. Fish and Wildlife Service would define critical habitats. (Assumption)

The National Park Service would expand its resource inventory, monitoring, and research programs. This would include improving the status of threatened, endangered, and sensitive species through monitoring and mitigation. (RMP)

Revegetation efforts would be limited to subalpine, backcountry sites. (RMP)

As in the proposed action, the National Park Service would educate and cooperate with private landowners and other agencies (e.g., planning commission) to encourage use of native species. (Assumption)

Scenic Resources

Management Objective. Maintain existing levels of natural scenic quality, including rural and pastoral images. (Assumption)

Actions. Roads would remain in their current condition. (30, Assumption)

The natural character of the lake edge (includes areas within 200 feet of shoreline) would be restored. Structures would be removed from the shoreline, and no new docks or new structures would be built there. The "fairways" would not be restored. (35)

The vegetation management plan should include a vista clearing component. (Assumption)

The outpost community image of the area would be maintained. Design guidelines would identify a crafted, step-back-in-time image. Historic attributes, particularly Buckner orchard, would be highlighted. (Assumption)

Existing power lines would remain aboveground. There would be no change in the Chelan County PUD diesel generator operations. (Assumptions)

Wilderness Management Plan Elements

Management Objective. Manage human activities in the wilderness to allow a full spectrum of compatible uses. (Assumption)

Actions. The actions that follow apply to wilderness areas.

Horse grazing — Limited grazing would continue to be allowed in national recreation area wilderness but would be prohibited in the park. (WMP)

Only certified weed-free, processed feed and nongrass grains would be permitted.

The maximum party size allowed would be 6 pairs of eyes (human or stock) in cross-country area, 12 pairs on trails and established camps, and oversized parties of up to 30 pairs of eyes at designated sites. (WMP)

Campfires — Campfires would be allowed in grates in designated sites only. (WMP)

Boundary changes — No changes would be recommended in the wilderness boundaries. (Assumption)

CULTURAL RESOURCE MANAGEMENT

Management Objective. Identify and evaluate the cultural resources under NPS stewardship and preserve them in a manner consistent with the purpose and requirements of the National Historic Preservation Act and NPS policy. In recognition of the cultural values inherent in the valley community, cooperate with the residents and property owners to facilitate the continued existence and character of the Stehekin community. (62)

Actions. Inventories of the cultural properties in the Stehekin area would continue to be updated on a regular cycle and the existing national register nomination would be amended to incorporate any additional eligible properties.

The Golden West Lodge would be rehabilitated, following the *Secretary of the Interior's Standards for the Treatment of Historic Properties,* and used as a year-round visitor center/district office facility. (16)

The High Bridge Historic District would be used as a ranger station. (Assumption)

The Buckner homestead and orchard **would** be preserved. (29)

Items associated with the farming operation would be restored on a priority basis. A limited amount of the Buckner collection should be acquired for interpretive purposes, and a small collection storage facility should be provided in the Golden West Lodge or some other existing NPS structure in Stehekin Valley for temporary storage of collection items. (16, 17)

Current levels of grazing and haying in the lower valley would be allowed to continue. (Assumption)

VISITOR EXPERIENCE

Management Objective. Help visitors take advantage of recreational opportunities while conserving the scenic, scientific, historic, and other values contributing to public enjoyment; enjoy the natural and cultural surroundings free from mechanized equipment and imposing structures; become participants rather than just spectators, to participate in a unique lifestyle, and explore the national recreation area environment. (18, 23, **26, 29)**

Pace and Access

Actions. As in the proposed action, visitors would be provided with opportunities to enjoy a relaxed, leisurely pace, and to have several choices of access to a variety of feature locations (assumption).

Speed limits should be kept at low levels. Shuttle services (might or might not be operated by the National Park Service) should be continued between the Landing and High Bridge and to Cottonwood Camp. Pedestrian trails to the river and lake would be added as private properties became available. Roads would be maintained at 1988 conditions. (30, 31)

To support a relaxed pace, visitors would be encouraged to use nonmotorized forms of transportation - e.g., walking, riding bicycles and horses, and renting boats and canoes. (Assumption)

Recreational Activities

Actions. Visitors would have opportunities to engage in a variety of recreational activities, including but not limited to, hiking, bicycling, boating, canoeing, sailing, rafting, cross-country skiing, snowshoeing, snowmobiling, fishing, hunting, horseback riding, photography, guided walks, exploring, and lounging. (Assumption)

All recreational activities would be managed to prevent impacts on resources and minimize conflicts among users. (Assumption)

Circulation

Actions. Enjoyable and efficient transportation would be provided from the Landing to Cottonwood Camp and to features and lodging. This would be achieved by providing a linear road spine from the Landing to Cottonwood Camp. The road would have a "country lane" character through speed limits, design, and use patterns. (Assumption)

The double-lane paved road for 4 miles from the Landing, the double-lane gravel road to 9-Mile, and the single-lane gravel road between 9-Mile and Cottonwood Camp would be maintained. (Assumption).

Road access would be retained to the Buckner homestead, Rainbow Falls, and High Bridge, and to lodgings. A new 11-mile valley trail leading from the Landing to High Bridge, generally paralleling the road, would be constructed. (Assumption) (31)

As in the proposed action, the use of bicycles on roads would be encouraged, but they would not be allowed on pedestrian trails on connections to features and some campgrounds. (Assumption)

Overnight Uses

Actions. The community would provide overnight accommodations, including cabin camps, bed-and-breakfasts, houses, and cabins. In addition, the concessioner would provide overnight lodging, food service, and a general store near the Landing. (30)

Lake

Actions. The head of Lake Chelan should be characterized by a mixture of motorized and nonmotorized uses. Several transportation and recreation options should be used, with visual and auditory impacts ranging from minimal to significant. (Assumption)

Marina services — fuel, time-limited boat moorage, boat and canoe rentals, water taxi, fishing equipment rental and sales, and dump station — would be included. (Assumption)

Boat and canoe camping would be available. The shoreline between the Landing and head of the lake would be restored. (30)

River

Actions. The Stehekin River would be managed as a scenic attraction and a modified natural system. (Assumption)

River-related activities such as hiking, sitting, fishing, photography, and rafting would be available. Access would be limited, however. Rafting would be allowed only when river levels permit safe transit. (Assumption)

Snags and woody debris would be cleared from the river to improve rafting safety, to protect public roads or bridges, and to enhance recreational opportunities. (Assumption)

Visitor Use and Resource Protection

Actions. Backcountry visitor use and resource impacts would be monitored. (WMP)

The National Park Service would participate in Resource Conservation and Development District activities to help address lakewide resource and visitor use issues. Recreational use levels would be limited primarily by the availability of lodging and other facilities and services and by public interest. (Assumption)

INTERPRETATION AND INFORMATION

Management Objective — Provide visitors with basic information necessary to experience and appreciate the natural, cultural, and recreational resources of the valley using a limited variety of media and approaches. Visitors would be able to understand primary interpretive themes, resource management and safety issues, the Lake Chelan NRA purpose and role in greater ecological and recreational complexes, and the roles of NPS and private sector in recreational opportunities. (63)

Orientation

Actions. Information would be provided, in staged sequences, through personal services and interpretive media. Prior to their arrival, visitors would be provided with information about the resources and experiences that would be available to them (orientation also provided by North Cascades National Park visitor centers and Pacific Northwest Regional Office). Information on safety in the national recreation area should be introduced upon visitor arrival. (Assumption)

As in the proposed action, orientation would be provided at contact stations at Chelan and Fields Point through telephone inquiries, personal contacts, and printed materials. Boat passengers could read printed materials, talk to and hear presentations by boat crew or NPS interpreters to learn of recreational opportunities and resource information. At Stehekin Landing, visitors would be provided with information about recreational options, how to structure their visits, and the national recreation area in general. Wayside exhibits, a roving NPS interpreter, NPS and private brochures, and a bulletin board would be used. At the Golden West visitor center, orientation would be provided using exhibits, audiovisual, publications, attended information desk, and through the private sector. (Assumption)

Interpretation

Actions. The National Park Service would take the lead role in planning, managing, and providing information and interpretive services, and would plan, design, and implement optimum actions to meet interpretive goals. The Park Service would provide the following:

- minimal introduction to interpretive stories at staging areas, including Chelan and Fields Point, using publications, exhibits, bulletin boards, and personal services

- personal services interpretation and publications on commercial boats in cooperation with Lake Chelan Boat Company and U.S. Forest Service

- locally produced exhibits at the Golden West visitor center, as well as an audiovisual program and information services
- interpretive programs and media that focus on primary interpretive themes that include natural history, ecology, and prehistory of the area
- offseason information and informal interpretation at Stehekin Landing and on boats during layovers
- assistance in training, planning, marketing, and quality assurance (Assumptions)

The National Park Service would provide guided walks, talks, evening programs, children's programs, roving interpretation, seminars, and shuttle bus programs during the summer, and talks at the Landing and on boats and information services at the visitor center during the winter. The frequency of activities generally would be less than visitor interest. All programs would emphasize national recreation area resource values (Assumption)

As with the proposed action, the Stehekin community might provide additional interpretive services, including programs and tours focusing on local history and culture (might be free or fee charged) and information in conjunction with rental or hiring of recreational services and equipment (e.g., guided canoe, bicycle, or horseback riding trips, shuttle buses, and camping and lodging services). Local initiatives would be complemented through NPS interpretation of local history and culture at the visitor center, contact stations, etc. (64)

Facilities

Actions. Orientation and other visitor services and interpretation of primary interpretive themes and resource management issues would be provided at the Golden West visitor center. Interpretive media and information services would continue to be provided at the visitor center. People in wheelchairs would continue to use the first floor of the building for access from Landing only with assistance. (Assumption)

Publications and personal information services would continue to be offered at Chelan and Fields Point contact stations. (26)

Wayside exhibits should be installed in the valley where there are significant views or sites to be interpreted, and where visual and other impacts would be minimal. (Assumption)

LAND USE AND DEVELOPMENT

Transportation Plan Elements

Management Objective. Ensure transportation and access to, from, and within the national recreation area are provided to accomplish a quality visitor experience, fulfill resource management objectives, and meet local community needs. (Assumption)

Actions. The actions that follow apply to transportation and access.

Getting there — The number of visitors and trips on commercial ferries would be limited to 1992 levels, dependent on impact analysis. (Assumption)

The airstrip would be retained as is - a state airstrip. The Washington State Department of Transportation, Aeronautics Division, would maintain the airstrip by permit. Clearing limits would not be enlarged. The National Park Service might consider closure of the facility in the future. (31)

No changes would be made in floatplane use. (Assumption)

Once there — An NPS-operated shuttle bus service would be provided to Cottonwood Camp. (Assumption)

Nonmechanized (e.g., walking, hiking, horseback), mechanized (e.g., bicycles), and motorized (e.g., cars, shuttles) methods of transportation would be accommodated in the national recreation area. (Assumption)

Self-guided tours would be provided. (29)

Cross-country skiing would be encouraged. (Assumption)

Snowmobile use would be limited as per 36 CFR 7.62.

No action would be taken on abandoned vehicles. (Assumption)

Roads and trails — The current length, width, character, and surface of the road between the Landing and Harlequin Bridge would be maintained. (30)

Between Harlequin Bridge and Bridge Creek, the 14-foot width and current gravel surface would be maintained. Above Bridge Creek, the road would be maintained in a primitive condition that still allows safe vehicle passage. (30, 31)

Stehekin Valley road at 8-Mile and Company Creek road would be maintained in its current condition. Emergency repairs and reopening of the road following flood damage would be performed. (Assumption)

The present road system would not be expanded. Unnecessary roads would be eliminated and the areas restored to natural conditions. (Assumption)

Old and abandoned alignments would be used, if appropriate, for a new 11-mile trail from the Landing to High Bridge. (Assumption).

The bike rental system would be maintained as is. (Assumption)

*Stehekin Landing Development Concept **Plan** Elements*

Management Objective. Manage new development as per the 1986 "Landscape Analysis: Stehekin Landing." (30)

Actions. Most existing developments at the Landing would be maintained, with some modifications. Landing circulation would be maintained, with minimal pedestrian changes (Landscape Analysis; Stehekin Landing)

Transportation services — Bulkheads would be repaired. (30) Small boat moorage expansion would be allowed based on demand. (Assumption)

Fuel and sewage dump station would be provided at the marine service center, (assumption)

The floatplane tie-up would be retained.

Visitor lodging and campgrounds — Existing lodging at the Landing would be upgraded and expanded by 60% (15 new units). The restaurant and gift shop would be retained. (29)

Permits would be renewed for the Riddle Creek cabins.

Similar to the proposed action, camping opportunities would be available at a variety of sites in the lower valley. These sites would be low density, unobtrusive, and safe, with ample screening. Water would be provided at the Purple Point and Weaver Point campgrounds. All sites would have access to pit or composting toilets.

At least two campgrounds would be accessible to visitors in wheelchairs. The Weaver Point campground would be used for boat-in camping. Park management would determine which sites were available through reservation.

NPS and concession housing — Existing staff housing at the Landing would be retained. (Assumption)

NPS housing would be available for 11 permanent employees, 20 seasonal employees, and 6 transients. Concession housing would be available for 15 employees.

Food service, administrative/office facilities, and commercial retail/services — All existing services at the Landing would be retained. (Assumption)

Utilities — Power lines would remain aboveground. (Assumption)

NPS maintenance — The maintenance facility in the old "fairways" would be retained.

Land Protection Plan Elements

Management Objective. Land uses on public and private land are described by the 1988 GMP, 1988 LPP, and the 1988 compatibility standards.

Actions. The National Park Service would continue to acquire full or partial interests in private property on an opportunity purchase basis in accordance with the 1988 LPP.

The Park Service would support the use of private land for providing compatible public services and recreational opportunities for visitors.

Existing compatibility standards would be enforced.

I. COMPATIBILITY STANDARDS

In accordance with PL. 90-544, these compatibility standards establish the criteria for the use of property in Stehekin and provide the basis for determining which land uses are consistent with the recreation, scenic, scientific, and historic values of the Lake Chelan National Recreation Area, hereafter referred to as the recreation area. The compatibility standards take effect upon approval by the regional director, Pacific Northwest Region, National Park Service.

A. General Standards

The alteration, development, and use of all properties must comply with applicable federal, state, and local laws and regulations. Necessary permits must be obtained prior to the development or use of any property.

All new building and structure exteriors should be finished with wood, suitable wood-appearing substitutes, or stone, have nonreflective roofs and sidings, and be colored to blend with their surroundings. In structures which are designed and sited to utilize solar power as a major energy source, external solar devices will not be considered as siding so long as the structure meets all other requirements of the compatibility standards.

New structures will be screened so as to be unobtrusive from roads, trails, and viewpoints. This screening may be accomplished by any combination of native or native-appearing vegetation and topography, design, coloration, or location.

B. Incompatible Structures, Developments, or Uses of Property

The following structures, developments, and uses of property in Stehekin are incompatible with the purposes of the national recreation area.

1. Any subdivision of land that was not in effect prior to the adoption of these compatibility standards, except as permitted in section C. below.

2. The construction of any duplexes, apartments, condominiums, or other multifamily dwellings.

3. The siting or construction of any structure in an identified high flood influence area.

4. Any dredging or filling of Lake Chelan or the Stehekin River, within the recreation area, for the siting or construction of a building.

5. The construction or siting of any building or structure more than 35 feet high.

6. The cutting of timber for sale or transportation outside Stehekin. The cutting of timber by any means other than selective harvesting.

7. The siting, after adoption of the compatibility standards, of any recreation vehicles. The siting, after adoption, of any mobile or manufactured homes not certified as complying with applicable materials, safety, and set-up requirements of the Washington Department of Labor and Industries, the U.S. Department of Housing and Urban Development, and section (a) of these standards.

8. The construction or siting of structures on slopes greater than 20% without assurances acceptable to the superintendent that mitigation measures — to minimize the potential for erosion; hazards to public safety and health; and any impacts on the recreation, scenic, scientific, and historic values of the area — will be taken.

9. Any manufacturing operation employing or utilizing more than five persons.

C. The Subdivision and Use of Land in Lake Chelan National Recreation Area

In recognition of existing property rights, the importance of visitor and public outdoor recreation use, and the recreation, scenic, scientific, and historic values of the recreation area, parcels of land in Stehekin which existed (as shown on the official Chelan County land records) prior to the adoption of these standards may be subdivided and used as provided in this section.

1. Subdivision

(a) Existing parcels may be divided using the formula below, which is based on the square root of their area. In determining the sub-dividable area of an existing parcel, wetlands, submerged lands, and any land within a high flood influence area will be excluded before calculating the number of new buildable lots that can be created.

Existing Parcel	Total Number New Lots That May be Created by
less than 4 acres	0
4 to less than 9 acres	2
9 to less than 16 acres	3
16 to less than 25 acres	4
25 to less than 36 acres	5
36 to less than 49 acres	6
49 to less than 64 acres	7
64 to less than 81 acres	8
81 to less than 100 acres	9
100 to less than 121 acres	10
121 to less than 144 acres	11
144 to less than 169 acres	12

(b) All new buildable lots must have a minimum area of 2 acres and measure at least 200 feet along the narrowest side.

(c) No lot created after adoption of the compatibility standards may be further subdivided.

2. Use of Parcels and Lots

(a) Each parcel or buildable lot may have developed or sited upon it one building, and such associated structures as are appropriate, for only one of the following purposes: single family residential, commercial enterprise, public service, or community use. A portion of a single-family residence may also be put to one of the purposes listed below as a secondary use:

- commercial enterprise
- the rental of up to two rooms without cooking facilities
- public service or
- community use

Written authorization must be obtained from the superintendent before the siting or development of any secondary use building. All secondary uses must meet the requirements of the compatibility standards.

(b) To encourage the provision of visitor accommodations, each existing parcel or buildable lot with an area of three or more acres may have developed or sited upon it not more than two units of visitor accommodations for each three acres of size in place of the uses permitted in 2(a), above.

3. Clustering

The clustering of structures is encouraged in order to promote open space conservation and the efficient provision of visitor services. In developing overnight visitor accommodations, the combining of accommodation units may also be permitted. The subdivision of property is not required for clustering. The National Park Service will cooperate with landowners to facilitate the appropriate clustering of structures. Written authorization by the superintendent will be required for all cluster developments or the combining of visitor accommodation units.

D. Written Authorizations

As stated, written authorizations from the superintendent will be obtained before clustering structures or combining visitor accommodation units, or the siting or construction of any secondary use building.

Upon receiving written notification of a landowner's intent to initiate one of the actions described above, the superintendent will (1) examine the proposal to determine whether it meets the compatibility standards; (2) notify the landowner of what changes, if any, are needed to meet the standards; and (3) if the proposal is in compliance, issue the authorization. The superintendent will notify and invite comments from the Stehekin Community Council, Chelan County, and other interested parties before issuing or denying any special authorization. The superintendent may not authorize any action that is adverse to any provision of P.L. 90-544 or the compatibility standards. Authorizations will be approved or denied within 60 days of receipt of the written notification.

E. Existing and Nonconforming Use

1. Existing Use

For the purpose of these compatibility standards, any use, development, structure, or division of property in existence on the date the standards are adopted may be continued.

2. Nonconforming Use

Any existing use, development, or division of property that does not comply with the compatibility standards is a nonconforming use. A nonconforming use may not be altered, except to bring a property into compliance with the compatibility standards. Routine maintenance will be permitted.

F. Amending the Compatibility Standards

The National Park Service may, as necessary to continue implementation of PL. 90-544, amend the compatibility standards amendments to the standards which are proposed by the Stehekin Community Council, Chelan County, or other interested parties. The National Park Service will not amend any standard without providing 30 days notice and inviting comments from the interests identified above.

Nothing in the compatibility standards will preclude the National Park Service from fulfilling its responsibilities under P.L. 90-544 or other statutory authorities governing the national park system. These standards are not binding on any other unit of the national park system.

G. Exemptions

The regional director is authorized to approve exemptions from the requirements of the compatibility standards under special circumstances. The regional director may not approve any exemption which is adverse to any provision of P.L. 90-544 or the management and conservation of the public outdoor recreation, scenic, scientific, and historic values of the recreation area. The Stehekin Community Council, Chelan County, and other interested parties will be provided 30 days notice prior to the approval of any exemption.

H. Appeal of Administrative Decisions

Any party who is adversely affected by an administrative decision of the superintendent under the preceding standards may appeal that decision to the director, National Park Service. Such appeal will be made by filing with the Pacific Northwest Regional Director, National Park Service, within 30 days of the superintendent's decision. This written notice of appeal and a written statement shall set forth the reasons why the decision is contrary to or in conflict with the facts, P.L. 90-544, or the compatibility standards. A review and decision on the appeal will be made by the director or designated representative within 45 days.

II. Acquisition of Incompatible Properties

Property being used in accordance with the compatibility standards will not be acquired by the National Park Service without the consent of the owner.

Properties that are put to uses that do not comply with the compatibility standards are subject to acquisition. Prior to the initiation of any acquisition action, the superintendent will:

A. inform the landowner, community council, and the county, in writing, that the planned use or development of the property fails to meet the compatibility standards;

B. advise the landowner of what changes are needed to comply with the compatibility standards; and

C. attempt to resolve the situation in a manner that will avoid the property being put to a use that violates the compatibility standards.

Should the above efforts fail to maintain compliance with the compatibility Standards, the National Park Service will:

A. negotiate with the landowner for the purchase of the property, or necessary interests therein; and

B. acting only as a last resort, initiate condemnation proceedings.

III. LOCAL ZONING

The National Park Service, acting through the superintendent, wishes to rely to the maximum extent possible on local authorities to implement the compatibility standards. Therefore, Chelan County is urged to adopt a comprehensive plan and/or zoning ordinance applicable to Stehekin and consistent with these compatibility standards.

Property in the recreation area being used in accordance with a comprehensive plan and/or zoning ordinance, which have been determined by the superintendent to be consistent with these compatibility standards, will be in compliance with the compatibility standards. Such property will not be subject to acquisition by the National Park Service, except on a willing-seller, willing-buyer basis. Should there be a violation or the imminent threat of a violation of the consistent zoning ordinance, property will be subject to acquisition.

No comprehensive plan, zoning ordinance, or change thereto which contains any provision adverse to the purposes of, or does not prohibit uses that are incompatible with, P.L. 90-544 may be determined to be consistent with the compatibility standards.

In order to conform to P. L. 90-544 and be consistent with the compatibility standards, the comprehensive plan and/or zoning ordinance submitted by the county will meet the following criteria:

A. Be applicable to all land in Stehekin that is subject to county authority.

B. Preserve the recreation, scenic, scientific, and historic values of the area through the use of acreage, frontage, setback, density, height, design, size, materials, nonconforming use, or other requirements.

C. Provide that no variance or exception be granted without concurrence by the superintendent.

D. Require landowners to obtain all necessary permits before constructing, reconstructing, or changing the use of or dividing any property.

E. Be amendable to conform to any changes in P.L. 90-544.

F. Permit the superintendent to participate in all proceedings before the county which could affect property in Stehekin.

G. Provide that the superintendent be given prior written notice of all proposed changes to any county plans or ordinances affecting Stehekin and copies of all applications for county building permits.

H. Be enforceable.

The superintendent will notify the Stehekin Community Council and Chelan County, and other interested parties, within 60 days of submission, of the determination of consistency on any proposed comprehensive plan and/or zoning ordinance. If the plan and ordinance are not determined to be consistent with the compatibility standards, the superintendent will inform the county of the changes or additional information necessary to make the comprehensive plan and zoning ordinance consistent. The superintendent's determination of consistency will continue so long as the plan, zoning ordinance, and any amendments thereto remain in effect.

The standards for the compatible use of land in the Lake Chelan National Recreation

Area, Stehekin, are hereby approved and in effect.

PARK OPERATIONS

Concessions, Contracting, Special Use Permits, and Private Enterprise

Management Objective. Provide services to accommodate existing and reasonable demand for expanded recreational experiences. (Assumption)

Actions. The possibility of contracting some services should be studied. (45)

As in the proposed action, services and facilities/programs would be provided by a mix of entities including the National Park Service, concessioners, and private enterprise. Commercial uses would be allowed to continue to expand. (Assumptions)

NPS Provision of Services to Private Landowners

Management Objective. Provide services essential for resource protection and visitor health/safety. (Assumption)

Actions. The following services would be provided:

- limited technical assistance only to
- concessioner (Assumption)
- wildfire protection (through reimbursable agreement between U.S. Forest Service and Washington State Department of Natural Resources) and cooperative structural fire protection (Assumption)
- all solid waste disposal, boat sewage disposal, and moorage with moorage fees
- road maintenance
- law enforcement (45)
- post office space (Landscape Analysis: Stehekin Landing)
- building for community purposes available under permit (45)
- basic transportation system on a fee basis (Assumption)

NPS Staffing

Management Objective. Through NPS presence, be responsive to visitor demands balanced with resources/visitor management objectives.

Actions. Permanent and seasonal employee levels would be the same as current levels. All employees would be stationed at Lake Chelan NRA.

Cooperative Relationships with Others

Management Objective. Cooperate with all levels of government, the private sector, and the public to ensure that land uses are compatible with resource protection, visitor experience, and recreation objectives; manage vegetation, wildlife, and fisheries; and deal with other problems of mutual concern. (64)

Actions. The National Park Service would work with county, state, and federal agencies for enforcement of existing ordinances and regulations. Cooperative management would be pursued with the U.S. Forest Service (e.g., wildfire, wildlife, wilderness, Fields Point); Washington Department of Natural Resources, Department of Ecology, Department of Fish and Wildlife; Chelan County (e.g., law enforcement, search and rescue, land uses); Chelan County PUD. Existing relationships with county, state and federal agencies, private sector, and the public should be retained. (Assumptions)

ALTERNATIVE CONCEPT

Lake Chelan NRA would be a wild, natural area where resources and natural processes would be largely undisturbed and protected. Management would emphasize preserving the resources and scenery of this broad, glacial valley at the head of one of the deepest and most scenic lakes in North America. Natural forces would be allowed to slowly remove evidence of manmade occupation. Facilities would be minimized and designed to blend in and be subordinate to the natural environment. Visitors would experience the grandeur of the Cascades without the conveniences and distractions of development. They would discover this place individually and through their own methods.

See the accompanying Stehekin Valley map for a graphic portrayal of alternative A.

NATURAL RESOURCE MANAGEMENT

Management Objective. Manage Lake Chelan NRA as an integral part of a larger regional ecosystem, and protect and restore the components and processes of naturally evolving park ecosystems, including the natural abundance, biodiversity, and ecological integrity of plants, animals, water, and soil.

Water Quality

Management Objective. Strive to preserve or restore water quality to natural conditions.

Actions. As with the proposed action, the National Park Service would work with county, state, and other federal agencies to monitor and protect water quality and to promote enforcement of regulations. Also, the Park Service would work with Chelan County PUD to mitigate shore erosion on Lake Chelan, and to ensure that upon renewal of PUD's FERC license, PUD continues to protect quality.

Baseline water resource parameters would be inventoried and monitored to evaluate effects of land and water use, and to comply with standards and regulations.

Over time, all properties would be acquired with the consent of the owners; in the interim, property owners would be encouraged to minimize impacts on water resources.

Nonessential land and water uses that threaten water quality and quantity should be eliminated where feasible and the best management practices implemented where not feasible.

Under this alternative, commercial and private fuel-burning watercraft use would be limited to present levels, and waterskiing and jet skiing would be prohibited in order to protect water quality, wildlife, natural quiet, and scenic values.

As in the proposed action, water resource protection would be promoted for all of Lake Chelan through cooperation with other agencies and other organizations that affect the management of Lake Chelan (e.g., U.S. Forest Service, state, county, city of Chelan, and local interest groups).

Fish

Management Objective. Strive to preserve and restore native fish populations (endemic to Stehekin River and Lake Chelan) to historic levels and within historic range; preserve the opportunity for anglers to enjoy and learn about the natural aquatic environment.

Actions. Resource inventory, monitoring, and research programs would be pursued to enhance the knowledge of native fish populations and their habitat, and to evaluate effects of angler harvest and management actions.

As in the proposed action, the impacts of fish stocking in naturally fish-free lakes would continue to be researched, and management recommendations would be developed to minimize impacts.

Fish stocking would be limited to restoring endemic species (endemic genotype only, if possible) into their historic habitat. There would be no stocking of naturally fish-free waters. Nonnative fish species would be eliminated and native fish and their habitat restored throughout their range, wherever it is feasible. Only catch and release fishing would be allowed.

The state and Chelan County PUD would be encouraged to develop a fisheries management plan; The National Park Service should take the lead in development of a fisheries management plan for upper Lake Chelan and the lower Stehekin River.

Stehekin River

Management Objective. Preserve or restore the free-flowing character and natural processes of the Stehekin River and its tributaries.

Actions. The National Park Service would pursue the removal of existing river control structures (riprap, levee, cribbing, sheet piling, etc.), restore the shoreline and bank to natural conditions, and prohibit new river shoreline or bank protection structures on both federal and nonfederal lands.

The removal or manipulation of woody debris from the river would be prohibited.

Over time, all properties would be acquired, with the consent of the owners. As property was acquired, roads would be removed to avoid active erosion/river conflict such as Company Creek and 8-mile section of Stehekin Road.

As in the proposed action, river processes would be inventoried, researched, and monitored to evaluate and mitigate impacts of recreation and other land uses.

The National Park Service would seek wild and scenic river status for all of the Stehekin River, and designation of river segments under the most pristine categories possible.

Wetland, Floodplain, Shoreline, and Riparian Areas

Management Objective. Strive to preserve or restore natural ecological processes and conditions in all wetland, floodplain, shoreline, and riparian areas.

Actions. All nonessential development (except significant cultural resources) would be removed from public wetland, floodplain, shoreline, and riparian areas and the habitat restored to natural conditions. Over time, all properties would be acquired, with the consent of the owners.

Sand, Rock, and Gravel Plan Elements

Management Objective. Prohibit the mining of and conserve sand, rock or gravel within the valley.

Actions. All old borrow pits would be restored to natural contours and vegetative cover as appropriate. Sand, rock, and gravel should be barged in for minimal needs; it would be treated to eliminate exotic species, toxic materials, etc.

Sand, rock, and gravel should be conserved and recycled — close or relocate roads and trails to avoid washouts, close parts of all roads, etc..

Figure p71: Alternative A Valley

For emergency use (e.g., road or trail washout), the existing crushed rock stockpile would be used until exhausted; then sand, rock, and gravel should be stockpiled from outside sources. No sand, rock, or gravel would be removed from the 100-year floodplain of the Stehekin River or its tributaries.

Geohazards

Management Objective. Strive to preserve natural geological processes, such as snow avalanches, debris torrents, and rockfalls, while ensuring safety.

Actions. Minimal new NPS development proposed under this alternative would be sited to avoid geohazards. Any existing NPS or private development that is in geohazard areas or affects geological processes would be removed.

Forest Fuel Reduction I Firewood Management Plan Elements

Management Objective. Restore forest stand structure to a more natural configuration, and restore and replicate the natural role of fire. Discontinue cutting of wood for firewood on public lands.

Actions. Hazard forest fuel surveys would be conducted near government-owned buildings, and the hazards removed by the pruning and cutting of trees and shrubs to create more defensible space for fire suppression near these structures in the event of wildlife.

Hazard forest fuel surveys would be conducted free of charge at the request of private property owners and recommendations made to create more defensible space around these structures.

Human- and lightning-caused fires on the valley floor would be suppressed for the protection of human life and property.

Prescribed natural fire would be used beyond the valley floor, when conditions were appropriate, to maintain the natural role of fire on mountain slopes and upstream from High Bridge.

Under this alternative, the only criteria for selecting the hazard forest fuel reduction areas would be the opportunity to restore/maintain a naturally open stand structure in ponderosa pine/Douglas fir forest. A fire suppression strategy would be applied equally throughout the valley. Management-ignited prescribed fire would be the only tool used to achieve desired stand conditions. With little to no manual thinning, fire treatments would probably be more frequent initially and with higher fire intensity to achieve the desired tree mortality. The only firewood produced by this fire management option would be trees removed in the vicinity of NPS landing structures to create a defensible space, as previously mentioned.

Under alternative A, action items are similar to those for the proposed action. The practice of woodlot cutting for firewood would be stopped immediately.

Logs or wood derived from hazard trees would be used to restore disturbed sites, control soil erosion, maintain trails, and preserve historic structures. Firewood would not be provided.

Where the National Park Service uses firewood, the agency will provide efficient woodstoves. Most existing NPS firewood use would be converted to other energy sources. Existing private firewood users would be encouraged to use other energy sources.

Firewood barged to Stehekin from other areas (Northwest Energy Services, Inc. 1993: 51 ff) would be treated to eliminate potential nonnative pest species.

Other Energy Sources

Management Objective. Create an optimal system of efficient energy use and distribution.

Actions. Actions are similar to the proposed action. Energy conservation should be encouraged in all fields, such as the following:

- use of sustainable construction and insulation materials, state-of-the-art lighting, efficient woodstoves
- elimination of NPS woodstoves as primary heat source
- conversion of NPS electric space heating to more efficient systems
- conversion to propane, or other more efficient and less polluting systems, for private and concession water and space heating needs
- conversion of NPS and concession vehicles to propane
- exploration of viability of solar space heating
- promotion of energy conservation for all new private uses through design guidelines and modest economic incen tives.

Threatened, Endangered, and Rare Species; Nonnative Species

Management Objective. Aggressively restore and protect all native species and habitats, including the removal of all nonnative plants and animals. Conserve and restore candidate and listed species in accordance with state and federal law.

Actions. As many populations of nonnative plant and animal species as possible would be removed using practical control technology. As in the proposed action, the National Park Service would monitor and attempt to control incoming sources of nonnative plants, such as with gravel, soil, and firewood. It also would educate and cooperate with private landowners and other agencies (e.g., planning commission) to encourage use of native species.

Critical habitats should be defined to include at least those areas identified by the U.S. Fish and Wildlife Service for listed and sensitive species; access should be restricted to these areas.

As in the proposed action, the National Park Service would pursue resource inventory, monitoring, and research programs to enhance knowledge of biological communities and natural processes and to evaluate trends.

The revegetation program would be expanded to include all human-disturbed sites. The reintroduction or restoration of all native species should be pursued to the point of recovery.

Scenic Resources

Management Objective. Maintain or restore the high quality natural scene.

Actions. As property was acquired, roads would be removed to keep the visual experience primitive and trail-like. Motor vehicles would be reduced to the absolute minimum possible in the valley, and visitors would be encouraged to use transportation modes such as bicycles, walking, or horseback.

All human-disturbed sites including the "fairways" would be restored. All existing native vegetation would be retained, and no manipulation clearing or vista clearing would be done.

The overall image of wildlife would be determined by unmanipulated natural

systems. Unnatural influences — all structures, facilities, etc. — would be removed from environmentally sensitive areas such as riparian vegetation, wetlands, riverfront, and lakeshore.

The National Park Service would cooperate with Chelan County PUD to remove power lines and bury remaining power lines in road corridors. As in the proposed action, the PUD would be encouraged to limit particulates released from diesel generators; if particulates are increased, a permit should not be issued.

*Wilderness Management **Plan** Elements*

Management Objective. Direct and manage human activities in the wilderness in accordance with the Wilderness Act to minimize human impacts on wilderness resources and ecosystem processes and to provide high quality wilderness experience.

Actions. The actions that follow apply to wilderness.

Horse grazing — Grazing in national recreation area wilderness would be prohibited. Only certified weed-free, processed feed and nongrass grains would be allowed. The maximum party size allowed in any part of national recreation area wilderness would be six pairs of eyes (human or stock).

Campfires — Campfires would be prohibited and backcountry grates would be removed.

Boundary changes — Changes to the wilderness boundary should be recommended to include the closed road corridor above High Bridge and to be managed as a wilderness.

CULTURAL RESOURCE MANAGEMENT

Management Objective. Emphasize natural processes, while preserving a few selected national register properties; research, inventory, evaluate, and document other cultural resources.

Actions. The focus should be on national register sites while continuing to evaluate and document additional sites. The emphasis would be on recording and photographic documentation. Historic properties would be maintained as recommended in the 1987 *Historic Structure Preservation Guide.*

Under alternative A, the Golden West Lodge would be rehabilitated and used for NPS administration and as a visitor center. The associated historic cabins would be removed. The High Bridge Historic District would be rehabilitated and used as a ranger station. Rehabilitation of historic structures would be in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties.*

The historic landscape and structures at the Buckner orchard site would be documented, and natural processes allowed to reclaim the site.

All agricultural activities would be discontinued; soil compaction, noxious weeds, and tree diseases in national historic districts would be mitigated.

A minimum number of Buckner artifacts should be acquired for interpretive purposes, and the remaining artifacts removed from Stehekin Valley by the family.

VISITOR EXPERIENCE

Management Objective. Emphasize a self-reliant and solitary experience with minimal services where visitors interact with nature on its terms. Visitors encounter a primarily natural landscape with minimal development and facilities. Encourage visitor cooperation in resource preservation through interpretation, protection, design, and example. The threshold of wilderness would come down to the edge of developed areas.

Pace and Access

Actions. Visitors would have an opportunity to enjoy a slow pace. They would be encouraged to get around on their own, but NPS assistance in orientation, safety, resource management, and primary interpretive themes would be provided.

Nonmotorized forms of transportation such as walking, bicycling, and canoeing would be emphasized as much as possible. There would be no public transportation.

Recreational Activities

Actions. Visitors would be provided with opportunities to engage in a variety of recreational activities that are quiet, nonmotorized, and largely nonmechanized (e.g., hiking, bicycling, canoeing and kayaking on the lake only, fishing, hunting, photography, self-guided interpretive walks, and lounging). Equipment rental services would be available.

As in the proposed action, all recreational activities would be managed to prevent impacts on resources and to minimize conflicts among users. Activities that infringe on the solitude and natural beauty of the national recreation area and that cause unacceptable impacts on resources (e.g., bungee jumping, flying ultralights, parasailing, hang gliding, waterskiing, jet-skiing, and using ORVs) would be discouraged or prohibited.

Circulation

Actions. The National Park Service would assist visitors in wayfinding and exploration and would emphasize hiking.

The road from the Landing to High Bridge would be converted to a bicycle and pedestrian trail.

Pedestrian loops would be provided off the trail spine to feature areas. Access to the lake and around the Landing would be included as well as a river access route from the Castle area, across a pedestrian suspension bridge over the Stehekin River (just below Boulder Creek confluence) to the river trail that runs from Weaver Point to the Harlequin bridge area. Convert road access to trails to Buckner homestead, Rainbow Falls, and High Bridge.

Overnight Uses

Actions. No publicly provided lodging would be offered; however, primitive, rustic facilities might be available on private lands, out of hazard and sensitive resource areas.

Lake

Actions. The head of Lake Chelan would be managed to encourage a natural appearance and ambience. Most lakeside developments would be removed. Shoreline activities would be concentrated at the Landing (e.g., moorage, docking, visitor services); restrictions would be placed on boat and plane traffic, and the natural shoreline would be restored.

Visitor activities (e.g., canoeing, kayaking, rowing, and fishing) would be encouraged through orientation, rentals, and safety interpretation and patrols. The lake edge would be designed to allow limited walking, sitting, and observing, subordinate to the restoration and maintenance of natural systems. Limited picnicking and swimming facilities would be allowed. Recreational activities would not impair the overall natural appearance and serenity of the lake and environs.

River

Actions. The Stehekin River would be managed as a dynamic natural system, free

of human intrusions and developments, and as one of the major scenic attractions in the valley. Visitors would have opportunities to appreciate the power and intricacy of the river.

Low-impact river-related activities such as hiking, picnicking, sitting, fishing, and photography would be allowed. Access would be designed to avoid harmful impacts on critical areas, yet give visitors opportunities to appreciate and experience significant resource values. No boating or rafting would be allowed.

Natural river processes would be restored, but logs and other natural debris would not be removed from the river.

Visitor Use and Resource Protection

Actions. Visitation and activities would be managed to preserve opportunities for solitude and the natural appearance and processes of the national recreation area.

As in the proposed action, the National Park Service would participate in Resource Conservation and Development District activities to help address lakewide resource and visitor use issues. A framework such as limits of acceptable change would be developed to set goals, standards, and monitoring and corrective strategies for recreational and other human activities in and around the national recreation area.

INTERPRETATION AND INFORMATION

Management Objective. Encourage visitors to experience and appreciate the natural, cultural, and recreational resources of the valley on their own by providing them with the necessary information; use a limited number of media and approaches. Visitors would be able to understand primary interpretive themes, resource management and safety issues, Lake Chelan NRA purpose and role in greater ecological and recreational complexes, and the values of offering more primitive, low-impact visitor experiences.

Orientation

Actions. As in the proposed action, information would be made available to visitors before they have to make decisions. This information would help visitors learn about the resources and experiences that would be available, the behaviors that would be expected (and why), and the skills that are needed for different activities. Information on safety in the national recreation area would be introduced before visitor arrival and reinforced prior to visitor initiation of activities.

At the Chelan and Fields Point contact stations, orientation would be provided through telephone inquiries and personal contacts, exhibits, waysides, and printed materials. Boat passengers could read printed materials and talk to and hear presentations by boat crew to learn of recreational opportunities and resource information. At Stehekin Landing, visitors would be provided with information about recreational options, how to structure their visits, and the national recreation area in general. Wayside exhibits, a small community-staffed information area, a roving NPS interpreter, a park brochure, and a bulletin board would be included. An information kiosk would be installed at or near Stehekin Landing.

Interpretation

Actions. The National Park Service would plan, manage, and provide information and interpretive services that emphasize pre-arrival contacts, nonpersonal and informal personal media, and assisting individually directed activities. The Park Service would provide the following:

- introduction to interpretive stories at staging areas, including Chelan and Fields Point, using exhibits, wayside exhibits, publications, and personal services

- publications and interpretive training for boat crews on passenger boats in cooperation with Lake Chelan Boat Company and U.S. Forest Service

- interpretive programs and media that focus on resource preservation, low-impact recreation, and primary interpretive themes (including natural history, ecology, wilderness values, and area history and prehistory); small-scale interpretive programs; most people would be on their own

- off-season information and informal interpretation at Stehekin Landing and on boats during layovers

- assistance to private providers of interpretation in training, planning, marketing, and quality assurance.

Interpretation would be provided primarily in and around the Landing, through wayside exhibits, brochures, and personal services. Summer interpretive activities would include guided walks, evening campfire programs, and roving interpretation, and winter activities would include talks at the Landing. In all programs, recreation area resource values should be emphasized. The frequency of activities would be based on visitation levels and interest. The importance of visitor-directed activities and opportunities for solitude also should be emphasized.

There would be no private sector interpretation except what would be provided on passenger boats.

Facilities

Actions. The Golden West visitor center would be stabilized and a portion of the building used for offices and storage. A seasonally attended interpretive contact station/kiosk would be located near the Landing. It would feature wayside exhibits, publications, and limited exhibits (most publications and exhibits accessible only when staffed). Visitor services such as seating, shelter, water, and restrooms would be provided.

Exhibits and waysides at the Chelan and Fields Point contact stations would be upgraded. Wayside exhibits in the valley would be replaced if needed. New waysides would be installed where significant views or sites should be interpreted, but only in developed areas such as near the Landing or at trailheads.

LAND USE AND DEVELOPMENT

Transportation Plan Elements

Management Objective. Provide transportation and access to and from the national recreation area to accomplish a quality visitor experience and fulfill resource management objectives.

Actions. The actions that follow apply to transportation and access.

Getting there — The number of visitors and trips on commercial ferries would be limited to 1992 levels, dependent on impact analysis. The number, time, and place of floatplane landings would be limited to preserve the natural quiet of the national recreation area. The airstrip would be closed and the area restored to natural conditions.

Once there — Since no shuttle bus service would be provided, nonmechanized muscle power (e.g., walking, hiking) should be used. No snowmobile use would be allowed in the national recreation area, but cross-country skiing would be encouraged.

Self-guided tours would be available for visitors.

Abandoned vehicles would be removed.

Roads and trails — The present road system would not be expanded. Unnecessary side roads would be removed and the areas restored to natural conditions as soon as is possible. Old and abandoned roads would be converted to trails if appropriate.

After private property was acquired, valley roads between the Landing and Harlequin Bridge and those above Harlequin Bridge would be removed and the areas rehabilitated or converted to trails. The road between High Bridge and Cottonwood Camp would be converted to a pack trail. Also, Company Creek Road would be removed and rehabilitated or converted to a trail once the private property was acquired.

A trail system reusing and redesigning the Stehekin Valley road as a multipurpose trail would be established. Pedestrian and horseback riding loops would emanate from the new multipurpose trail at feature areas including the Landing. A trail would be developed from the Castle or Corral area to the Stehekin River without crossing private property, across the river with a pedestrian suspension bridge just below the confluence of Boulder Creek, to the river trail (from Weaver Point to the Harlequin Bridge area). Also, a trail would be developed on the historic road access from the valley road to the Buckner orchard as well as a trail connecting the Buckner orchard with Rainbow Falls.

Stehekin Landing Development Concept Plan Elements

Management Objective. Preserve the valley's natural character and naturally evolving ecosystem through sustainable design for development; and locate reduced facilities in the least environmentally sensitive areas possible.

For a graphic portrayal of the development concept plan for alternative A, see the accompanying Stehekin Landing Development Concept Plan map.

Actions. Visitor use developments at the Landing would be minimized; concession lodging would be removed. The absolute minimum of vehicles and parking would be allowed at the Landing.

Transportation services — Adequate and safe commercial boat docking must be ensured. Docking for the ferry would be improved. The moorage would be limited to small boats.

The marine service center would continue to provide fuel and a sewage dump station located away from geohazards.

The floatplane tie-up would be retained, but landings and takeoffs would be designated farther downlake.

Visitor lodging and campgrounds — All lodging would be removed, and the site of the Riddle Creek lakeshore cabins would be restored to natural conditions. The Weaver Point campground would be moved back from the shoreline.

As in the proposed action, camping opportunities would be provided at a variety of sites in the lower valley. The sites would be low density, unobtrusive, and safe, with ample screening. Running water would not be available, but access from all sites to pit or composting toilets would be retained. The sites would be set back from the lake and removed from hazardous areas as necessary. At least one campground would be accessible to visitors in wheelchairs. The Weaver Point campground would be used for boat-in camping. It would be moved back from the shoreline. Park management would determine which sites are available through reservation.

NPS and concession housing — Support housing would be minimized as the number of NPS employees was reduced to a minimum presence. Housing would be

located at the Landing away from geohazards.

NPS housing would be available for 5 permanent employees, 8 seasonal employees, and 8 transients. Concession housing would be available for 5 permanent and 10 seasonal employees.

Food service — Food services would include one small grocery/deli food function at the Landing for backcountry staging and day use.

Administrative/office facilities — NPS headquarters would be located in Chelan and the office space would be reduced at the Landing.

Commercial retail/services — Most commercial services would be eliminated except for a grocery store with wilderness supplies at the Landing.

Utilities — Minimal fuel needs (propane, gasoline) would be stored at and dispensed from the Landing.

Unnecessary power lines would be removed, and active lines would be buried where feasible.

NPS maintenance — A minimal maintenance facility would be located at the Landing.

Land Protection Plan Elements

Management Goal. Make sure that land uses on public and private lands are compatible with the purposes of Lake Chelan NRA, emphasizing those uses that protect area natural and cultural resources and natural processes, and provide for safe visitor facilities and services.

Management Objectives. The six principal management objectives are as follows:

- Protect the national recreation area from land use and development that are incompatible with recreation area purposes.
- Actively support local government in their regulation of nonfederal land within the Stehekin Valley, which places primary reliance on adopted Chelan County zoning ordinances, subdivision regulations, and other applicable ordinances and regulations that ensure that the public health and safety of Stehekin Valley residents and visitors are maintained and enhanced.
- Provide a formal process by which Stehekin Valley residents can actively participate and provide meaningful input to the Chelan County land use decision process regarding the regulation of private lands.
- Ensure that applicable laws and policies of the state of Washington, including health and safety regulations, and Washington Growth Management Act provisions, are followed.
- Provide a basis for meaningful and constructive NPS review of proposals for land use change on private land within the Stehekin Valley in order to ensure that all uses and land developments are compatible with the purposes of Lake Chelan NRA.
- Maintain an effective NPS capability to acquire all private lands, conducted on a willing buyer/willing seller basis.

Guidelines. Based on the land protection goal and objectives, the following guidelines form the basis for the land protection plan, which is being prepared in conjunction with this general management plan. The land protection plan further defines specific land protection strategies that are to be employed relative to private property within the Stehekin Valley.

- Place emphasis on local zoning and other land use authorities of county and

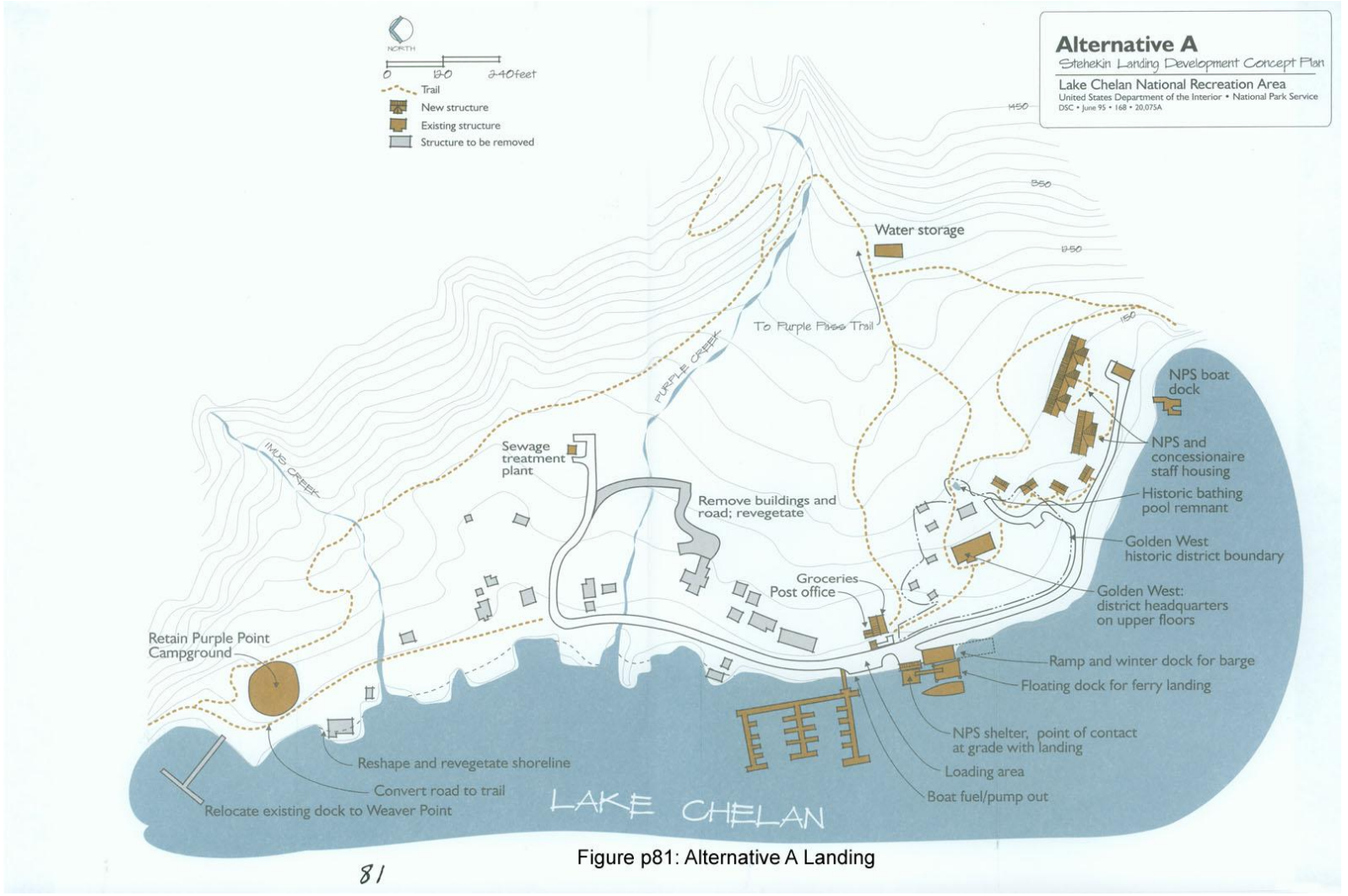


Figure p81: Alternative A Landing

state government to regulate private land uses within the Stehekin Valley (see "Local Zoning/Land Use Regulations" and "Stehekin Valley Overlay District" sections).

- Provide opportunities for local review of Stehekin Valley land use proposals, and provide an appropriate forum to provide this input to Chelan County government.

- Accept new residential and other private land uses that are compatible with the purposes of the national recreation area (see "National Park Service Land Use Compatibility Criteria" section).

- Accept new commercial uses on private lands that provide visitor and resident services and that are compatible with the purposes of the national recreation area.

- Accept new industrial uses on private lands that are typical of and compatible with historical industrial uses within the Stehekin Valley and that are compatible with the purposes of the national recreation area.

- Encourage land uses that consume a low level of resources, and that conserve both renewable and nonrenewable resources.

- Encourage new construction and conversion of existing facilities that adhere to sustainable design principles (NPS 1993e).

- Continue willing buyer/willing seller acquisitions for all private properties. The National Park Service will consider other factors on a case-by-case basis in making final determinations to purchase parcels.

- Use where appropriate, with the cooperation of the landowner, opportunities for easement purchases and other less-than-fee (e.g., conservation easements) interests for resource protection. This will allow greater flexibility in the protection of resources.

- Exercise the use of eminent domain procedures only to prevent imminent resource degradation of recreation area values by uses on private land, and only used as a last resort where other prudent and reasonable measures to protect recreation area resources by eliminating or mitigating the resource degradation have been exhausted.

Disclaimer. Nothing in this plan constitutes an offer to purchase private property, a taking of private property, or a usurpation of the responsibility of the state of Washington and Chelan County to regulate the use of private land within the Stehekin Valley.

Local Zoning/Land Use Regulations. Complementary actions by Local Authorities would include the following:

- application by Chelan County of adopted local controls, including zoning ordinances, shoreline management master programs, Growth Management Act comprehensive plan, and subdivision, and other land use authorities to regulate land use and development within the Stehekin Valley.

- adherence to adopted Chelan County and Washington State building codes, health and safety, and other applicable standards by valley residents and uniform enforcement by county and state officials.

Because the state of Washington already has a relatively sophisticated regime of land use controls and planning, the National Park Service, acting through the superintendent, strongly encourages USP of local authorities and existing local controls for regulation of

private land use within Lake Chelan NRA. Therefore, as part of this, the National Park Service proposes that the county adopt a new zoning code chapter establishing an overlay district for review of proposed uses and developments on private lands within the Stehekin Valley. This would be in addition to enforcement of applicable state laws and local controls, including the Washington Growth Management Act, Chelan County zoning ordinance, subdivision regulations, and shoreline management master program.

To be consistent with P.L. 90-544 and the purposes for which Lake Chelan NRA was established, the National Park Service will propose that the overlay district, modeled after the Icicle Valley Overlay District in Chelan County Zoning Code (Chelan County Code, chapter 11.39B), meet the following standards:

- Be applicable to all properties in Stehekin that are subject to county jurisdiction.
- Preserve the recreational, scenic, and historic values and general character of the valley setting through review standards for frontage, setback, density, height, sustainable design, size, materials, nonconforming uses, and new subdivisions.
- Discourage variances or exceptions for any new use or additional development that does not meet established controls or overlay review standards or NPS compatibility criteria.
- Recognize formally the role of the superintendent of the North Cascades National Park Service Complex, or his/her designees, in participating in all proceedings before the county concerning land use or developments that may have an effect on NPS lands and resource values and/or the visitor experience within Lake Chelan NRA.
- Provide that the superintendent be given timely prior written notice of all proposed changes to any Chelan County plans, ordinances, or regulations affecting the Stehekin Valley, and of all applications for permits or approvals within the national recreation area or related areas of concern.
- Demonstrate a clear and consistent commitment to sound land use principles and a method of enforcement by local authorities and, where applicable, the National Park Service.

Stehekin Valley Overlay District. In keeping with these standards, the National Park Service has prepared a draft of a proposed overlay district ordinance for Lake Chelan NRA for consideration by Chelan County to adopt as part of their review of land use actions on private land within the Stehekin Valley.

The proposed Stehekin Valley Overlay District would have a review board made up of area residents and other interested parties with *ex-officio* participation by the National Park Service, which would review all land use and development proposals for private lands within the area, and make recommendations to Chelan County regarding the appropriateness of each land use proposal.

1. Objectives. Design review for the Stehekin Valley is intended to accomplish the following objectives:

(a) Encourage uses on public and private lands that can be developed and used compatibly with the purposes of the Lake Chelan National Recreation Area, emphasizing those uses that protect area natural processes and resources and provide for safe visitor facilities and services.

(b) Reduce from the current level of services for visitors.

(c) Maintain compliance with Chelan County and NPS objectives for the area as described in local and state controls and plans, including the Chelan County Zoning Code, Chelan County Shoreline Master Program, Chelan County Sensitive Areas Ordinances, National Park Service Architectural Character Guidelines and Management Objectives-Lake Chelan National Recreation Area, National Park Service Compatibility Standards, Chelan-Douglas Health District Design Guidelines for Septic and Drainfield Systems, Chelan-Douglas Health District On-site Sewage Disposal System Rules and Regulations, and other local, state, and federal laws and regulations.

(d) Facilitate recreational opportunities while conserving the scenic, scientific, historic, and other values contributing to public enjoyment.

(e) Promote the management, use, and disposal of renewable natural resources and development that, are compatible with, or do not significantly impair public recreation and conservation of the scenic, scientific, historic, or other values contributing to public enjoyment and community vitality of the district.

2. Applicability

[The formal legal description of the subject area will be presented here.]

3. Design Review Committee. For the Stehekin Valley Design Review Overlay District, the Design Review Committee will consist of five voting members who will be registered voters and/or property owners within the planning area. The five voting members will be appointed as follows: three members appointed by the Chelan County Commissioners, one appointed by the Chelan County PUD, and one appointed by the Commissioner of Public Lands. They will be assisted by expert, *ex-officio* (no-voting) members, including a professional hydrologist and a public health sanitarian (both designated by Chelan County), a planner employed by Chelan County, an NPS resource specialist, a planner or landscape architect affiliated with or designated by the National Park Service, and a wildlife biologist designated by the National Park Service. All members will be appointed and will serve in accordance with this ordinance, except that *ex-officio* members affiliated with the National Park Service will be appointed by the park superintendent.

4. Review Responsibilities. The Stehekin Valley Design Review Committee will review and make recommendations on all land use and development matters within the district subject to Chelan County jurisdiction, including but not limited to:

- grading, building, and other related permits and approvals
- conditional use permits
- variances
- zone changes
- planned unit developments
- shoreline substantial development permits
- comprehensive plan modifications
- short and long subdivisions
- minimum lot sizes and densities

5. All Uses Conditional. In the Stehekin Valley Design Review Overlay District, all otherwise permitted uses will be deemed conditional uses. The recommendation of the Design Review Committee on such uses will be given substantial weight by the zoning adjustor, Board of Adjustment, Board of County Commissioners, and other bodies in deciding applications within the district. Uses appropriate in one area of the district may be subject to conditioning or denial in another (e.g., siting of commercial facility in inappropriate scenic area).

All applications will be reviewed on the following criteria:

(a) Consistency with the objectives for the district will be sought.

(b) Early termination of uses inconsistent with the objectives of the district will be encouraged.

(c) Otherwise permitted development will not be approved if clearly inconsistent with adopted NPS compatibility standards).

(d) Degradation of critical/sensitive natural resources will not be permitted.

(e) Suitability of location in light of objectives for the district will be encouraged.

(f) Arrangements for use by general public consistent with objectives of the district will be encouraged.

(g) Uses that result in less consumption of resources and conservation of both renewable and nonrenewable resources will be encouraged over more consumptive alternatives.

(h) Conversion of existing facilities to uses compatible with the purposes of the district will be encouraged.

(i) Uses that may result in degradation of water quality or pollution will be discouraged.

(j) The construction or siting of building on slopes with gradient greater than 20% without assurances of acceptable mitigation measures will be discouraged to minimize the potential for erosion; hazards to public safety and health; and any adverse impacts on the recreation, scenic, scientific, and historic values of the area.

(k) The clustering of structures is encouraged in order to promote open space scenic quality, resource conservation, and the efficient provision of visitor services. In developing overnight visitor accommodations, the combining of accommodation units may also be permitted.

6. Specific Uses

(a) Permitted Conditional Uses. When consistent with the above criteria, permitted conditional uses at appropriate locations **will** include:

- small-scale visitor lodging and/or campgrounds
- NPS and concession housing
- food service
- administrative and office facilities for governmental purposes
- commercial and retail services consistent with the purpose of the area
- utility facilities and ancillary services
- private residential uses

(b) Restricted Uses. In addition to restrictions noted above, the following additional restrictions apply to uses specified below:

(1) Applications for construction of multifamily dwellings will not be approved unless they would facilitate achieving otherwise permitted residential density while avoiding construction in critical or sensitive areas.

(2) Manufacturing or industrial uses not historically typical of the lower Stehekin Valley will not be permitted.

(3) Mining, except for limited extraction of sand, rock, and gravel for local maintenance use in accordance with an NPS-approved sand, rock, and gravel plan, will not be permitted.

(4) For all proposals that would entail the use or consumption of federal property or resources, no approval will be granted unless prior federal approval has been obtained.

National Park Service Land Use Compatibility Criteria. The National Park Service will adopt a revised approach for a determination of compatibility regarding

proposed use and development of private and nonfederal lands within the national recreation area to ensure that such uses are compatible with the purposes for which Lake Chelan NRA was established. Where proposed uses are not adequately addressed by county and state land use authorities, the application of compatibility criteria would be the basis for a case-specific compatibility analysis by the National Park Service. The limitations of the previous compatibility standards, and their approach to specific land use standards in regulatory language, have been removed.

P.L. 90-544, which established the Lake Chelan National Recreation Area, provided that the secretary of the interior may "acquire lands, waters and interests therein by donation, purchase with donated or appropriated funds, or exchange, except that he may not acquire any such interests within the recreation areas without the consent of the owner, so long as the lands are devoted to uses compatible with the purposes of this act." **(emphasis added)**

Therefore, in accordance with the applicable provisions of P.L. 90-544, these compatibility criteria establish the basis for identifying which land uses within the Stehekin Valley are inconsistent with the protection of natural, recreational, scenic, scientific, and historic values of the Lake Chelan NRA. They also identify land use impacts that are incompatible with the purposes of Lake Chelan NRA. This could subject the property that is proposed for the incompatible use to potential acquisition via the use of federal eminent domain powers where all other prudent and reasonable attempts to remove or mitigate the incompatibility have failed.

These compatibility criteria are not intended to duplicate county zoning standards or other applicable land use practices that are the proper purview of local government, and which would be related more to the protection of the life, health, and safety of Stehekin Valley residents. Instead, these NPS criteria are intended to guide both park management and Stehekin Valley residents in determining which land use proposals and practices are in harmony with the resource values of the national recreation area, and which are not. The criteria are resource-based, and have been developed to ensure the long-term protection of the natural, recreational, scenic, scientific, and historic values of the area.

The following purposes provide further guidance in the application of the compatibility criteria, the adherence to compatible uses by Stehekin Valley landowners, and the application of criteria by park management.

- To identify uses that would harm, degrade, or adversely affect resource values of Lake Chelan NRA.
- To identify proposed types and levels of land uses that would harm resources when cumulative effects are considered in the context of previously established uses.
- To encourage uses that would enhance resource values and the general character of the valley.
- To encourage conversion from a higher impact land use to a lower impact land use.

I. COMPATIBILITY CRITERIA

A. General Criteria

The alteration, development, and use of all public and private properties within Lake Chelan NRA must comply with applicable federal laws, rules, and regulations, and must be compatible with the congressionally designated purposes of Lake Chelan NRA.

B. Incompatible Uses of All Property within Lake Chelan NRA

The following uses of all public and private property within the Stehekin Valley are incompatible with the purposes of Lake Chelan NRA:

1. Any subdivision of land that was not in effect prior to the adoption of these compatibility criteria, except as permitted through the Chelan County Subdivision Regulations and as consistent with Chelan County health standards.

2. The siting or construction of any building, including but not limited to, residential, commercial, and buildings, in an identified:

    - high flood influence area
    - wetland
    - riparian area

3. Any dredging or filling of Lake Chelan or the Stehekin River without full compliance with the U.S. Army Corps of Engineers permitting process.

4. The cutting of timber for sale or transport outside the Stehekin Valley.

5. The cutting of timber by any means other than selective tree harvesting, except as required by Washington State Department of Natural Resource regulations.

C. Incompatible Uses of Public Property Within Lake Chelan NRA

In addition to those uses listed in section B. above, the following use of all public property within the Lake Chelan NRA is incompatible with the purposes of the area. While these standards have not been applied to private lands within the Stehekin Valley, it is highly recommended they be adopted by Chelan County within the county zoning ordinances and the proposed Stehekin Valley Overlay Zone.

The National Park Service will not site any building or structure in an identified:

- 100-year floodplain, unless used for nonhuman occupancy and with conditions on specific uses or mitigation
- wetland soils, and those soils not conducive for building foundations, leachfield percolation, or site drainage
- geohazard areas
- areas with slopes greater than 20% gradient
- areas of high visual sensitivity, except where specific design mitigation measures can successfully be used

D. Effective Date of the Compatibility Criteria

Upon adoption, these compatibility criteria will supersede those compatibility standards promulgated in 1988, and updated in 1992. Adoption will be official upon the signing of the Record of Decision by the regional director, National Park Service, Pacific Northwest Region.

E. Request for Determination of Compatibility

The Lake Chelan NRA legislation does not grant the secretary of the interior zoning authority. However, it does impose the responsibility to ensure that existing uses are compatible and that proposed land uses will be compatible with the purposes for creation of the recreation area. The current zoning ordinances of Chelan County have been found to substantially satisfy the intent of the Lake

Chelan NRA legislation, and therefore constitute the primary basis for implementing these compatibility criteria.

Landowners or other interested or affected parties can make a written request to the superintendent for a determination as to whether an existing or proposed use is in compliance with the compatibility criteria. Generally, the superintendent will find that existing and proposed land uses are compatible if such uses conform to applicable local, state, and federal laws and not specifically sited within incompatible use areas as described in section B.2. above.

Requests for a determination of compatibility must be made in writing to the superintendent and include the following information:

1. Description/location of the property and the applicable county or local zoning classification, e.g., rural residential, conservation, general.

2. Existing use and/or development being proposed on the property.

3. Statement as to whether the county or local zoning for the property will allow for the proposed use or development without the need for a variance.

4. Statement as to how the use or proposed development will comply with the compatibility criteria.

The superintendent will review the request and notify the landowner in writing within 45 days after receiving a request for determination whether the existing use or proposed development and use is in compliance with the compatibility criteria. The superintendent may need to extend the schedule for making a determination of compatibility by 30 days if additional information is needed.

In the event the superintendent determines an existing or proposed use or development is not in compliance or not compatible based on supplied information and a field check by NPS staff, the superintendent will give the landowner written notice of the manner and nature of the incompatibility. To the extent practicable, the notice will include suggestions or alternatives for working with landowners to achieve compatibility.

PARK OPERATIONS

Concessions, Contracting, Special Use Permits, and Private Enterprise

Management Objective. Provide only those services (facilities and programs) that promote solitude and primitive recreational experiences.

Actions. No new/expanded facilities or programs would be offered, and most existing facilities /programs would be downsized or eliminated.

Minimal concession services would be provided at the Landing. Commercial uses would not be encouraged.

NPS Provision of Services to Private Landowners

Management Objective. Provide services essential for resource protection and visitor health/safety.

Actions. Services that would be provided for by the National Park Service include wildfire protection (through a reimbursable agreement between the U.S. Forest Service and Washington State Department of Natural Resources), boat sewage disposal and moorage, and law enforcement.

Services that would not be provided include technical assistance, solid waste disposal (users responsible in accordance with

regulations), road maintenance (all roads would be removed except at the Landing), post office space, building for community use, and motorized transportation.

NPS Staffing

Management Objective. Through minimal NPS presence, accomplish resources/visitor management objectives.

Actions. There would be the fewest numbers of permanent and seasonal employees under this alternative. All employees would be stationed at Lake Chelan NRA.

Cooperative Relationships with Others

Management Objective. Maintain working relationships with all levels of government, the private sector, and the public, recognizing that NPS has primary responsibility for the management of resources (emphasis on preservation of natural and cultural resources).

Actions. Actions items for alternative A are the same as the proposed action. The National Park Service would work with county, state, and federal agencies for enforcement of existing ordinances and regulations. Cooperative management would be pursued with the U.S. Forest Service (e.g., wildfire, wildlife, wilderness, Fields Point); Washington Department of Natural Resources, Department of Ecology, Department of Wildlife (e.g., fish and wildlife); Chelan County (e.g., law enforcement, search and rescue, land uses); Chelan County PUD.

The National Park Service would build cooperative relationships with county, state and federal agencies; private sector; and the public through constant communication to involve them in all efforts to facilitate resource protection and visitor enjoyment. Also, the Park Service would facilitate setting up and coordinating a lakewide business forum, and would participate in other lakewide planning efforts.

ALTERNATIVE CONCEPT

Lake Chelan NRA would be a rural woodland gateway to the North Cascades where the use of resources by visitors and residents was limited in order to preserve the natural, scenic, and cultural values of the area. The recreation area would be managed to protect outstanding natural processes and resources, preserve cultural resources, and maintain biodiversity. Existing levels of development and special uses would remain, although relocated to less sensitive sites, and vacated sites would be restored to natural conditions. Visitors would experience a harmony between the natural and human environment and be provided with low impact recreational opportunities. They would be assisted in their discovery of the area and be able to explore the valley independently as well.

For a graphic portrayal of alternative B, see the accompanying Stehekin Valley map.

NATURAL RESOURCE MANAGEMENT

Management Objective. Protect and restore all significant and sensitive natural resources and processes.

Water Quality

Management Objective. Strive to preserve or restore water quality to natural conditions and maintain or restore minimum stream flows needed to protect dependent biota.

Actions. As in the proposed action, under this alternative the National Park Service would work with county, state, and other federal agencies to monitor and protect water quality and to promote enforcement of regulations. Also, the National Park Service would work with the Chelan County PUD to mitigate shore erosion on Lake Chelan, and to ensure that upon renewal of their FERC license, the Chelan County PUD continues to protect water quality.

As in alternative A, baseline water resource parameters would be inventoried and monitored to evaluate effects of land and water use, and to ensure compliance with standards and regulations.

Property owners would be encouraged to minimize impacts on water resources. The National Park Service would seek to acquire properties where land uses significantly threatened water resources.

The best pollution control measures — e.g., sewage treatment and disposal, erosion control, toxic substance management — would be implemented. Commercial and private fuel-burning watercraft use would be limited to present levels.

Water resources protection would be promoted for all of Lake Chelan through cooperation with other agencies and organizations that affect the management of Lake Chelan (e.g., U.S. Forest Service, state, county, city of Chelan, and local interest groups).

Fish

Management Objective. Preserve existing native fish populations and strive to restore viable native fish populations to levels where all endemic species are represented in Lake Chelan NRA; preserve or restore the opportunity for anglers to fish for native fish species and to enjoy and learn about the natural aquatic environment.

Actions. All actions for alternative B are the same as the proposed action. Resource inventory, monitoring, and research programs would be pursued to enhance the knowledge of native fish populations and

their habitat to determine and evaluate change in response to habitat dynamics, exotic fish species, recreational fishing, land use, and management actions.

The impacts of fish stocking in naturally fish-free lakes would continue to be researched, and management recommendations would be developed to minimize impacts.

Stocking in selected high lakes with minimal potential for adverse impacts would be allowed according to the 1988 supplemental agreement with the Washington Department of Fish and Wildlife. Upon completion of research, the current program would be reviewed and modified or a new program would be developed by the year 2000. Fish stocking of the Stehekin River and streams would be limited to endemic species (endemic genotype only, if possible) into their historic habitat.

Normative fish species would be controlled to allow recovery of viable populations of native species in at least portions of their historic range. Retention of the state's catch and release policy for native species (e.g., like Ross Lake) would be encouraged, and the values of native fish populations and naturally functioning aquatic ecosystems would be interpreted.

The state and Chelan County PUD would be encouraged to develop a fisheries management plan; the National Park Service would take the lead in development of a fisheries management plan for upper Lake Chelan and the lower Stehekin River.

Stehekin River

Management Objective. Balance free-flowing character and natural river processes with recreational opportunities and protection of public roads and facilities.

Actions. Suitable criteria would be developed for design of low-impact bank protection structures. Protection of existing improvements would be allowed only if there were no adverse impacts on the natural environment.

Roads in existing locations would be protected. There would be no new road construction in active river/erosion conflict zones.

On a case-by-case basis, the National Park Service would consider the removal of woody debris that was only a recreational hazard.

Previously manipulated sites would be restored to natural conditions.

River processes would be inventoried, researched, and monitored to evaluate and mitigate impacts of recreation and other land uses.

The National Park Service would work with Chelan County to encourage private property owners to protect natural river processes. Private properties would be acquired, with consent of the owners, where development would significantly threaten natural river processes.

The Stehekin River would be studied to determine its suitability for designation as **a** wild and scenic river.

Wetland, Floodplain, Shoreline, and Riparian Areas

Management Objective. Preserve or restore significant or sensitive ecological processes and conditions in wetland, floodplain, shoreline, and riparian areas.

Actions. As in the proposed action, existing NPS development on public wetland, appropriate regulatory floodplain, shoreline, and riparian areas (except significant cultural resources) would be relocated to suitable sites and the disturbed sites restored to natural conditions. Recreational use and

Figure p93: Altrnative B Valley

access would be allowed in designated nonsensitive sites.

Property owners would be encouraged to minimize impacts on wetland, floodplain, shoreline, or riparian areas. The National Park Service would seek to acquire properties that have significantly threatened wetland, floodplain, shoreline, and riparian areas.

Sand, Rock, and Gravel Plan Elements

Management Objective. Prohibit the mining of and conserve sand, rock, or gravel in the valley but allow material to be barged in from outside the valley.

Actions. All old borrow pits, other than the current pit, would be restored to natural contours and vegetative cover as appropriate. Sand, rock, and gravel should be barged in to meet needs; it should be treated to eliminate exotic species, toxic materials, etc.

Sand, rock, and gravel should be conserved and recycled whenever possible. For emergency use (e.g., road or trail washout), the existing crushed rock stockpile should be used until exhausted; then sand, rock, and gravel should be stockpiled from outside sources. No sand, rock, or gravel would be removed from the 100-year floodplain of the Stehekin River or its tributaries.

Geohazards Management

Objective

Recognize and avoid hazards of natural geological processes, such as snow avalanches, debris torrents, and rockfalls.

Actions. Actions for alternative B are the same as the proposed action. New NPS developments and recreational facilities would be sited to avoid geohazards, and existing NPS/concessioner development would be relocated away from geohazards.

The National Park Service, through cooperative efforts with state and local agencies, would oppose private commercial visitor facilities in geohazard areas. The county would be advised of the location of geohazards.

Forest Fuel Reduction I Firewood Management Plan Elements

Management Objective. Use fire suppression, prescribed natural fire, management-ignited prescribed fire, and selective manual fuel reductions to improve wildland fire protection for human life and property; to manage for late-succession stage in ponderosa pine/Douglas fir forest; and to monitor and evaluate manual thinning and prescribed fire effects over time.

Actions. Actions for alternative B are the same as the proposed action. Hazard forest fuel surveys would be conducted near government-owned buildings, and the hazards removed by the pruning and cutting of trees and shrubs to create more defensible space for fire suppression near these structures in the event of wildfire.

Hazard forest fuel surveys on private property would be conducted free of charge upon the request of private property owners and recommendations made to create more defensible space around these structures.

Human- and lightning-caused fires on the valley floor would be suppressed for the protection of human life and property. This is a recognized suppression zone in the fire management plan.

Prescribed natural fire would be used beyond the valley floor, when conditions were appropriate, to maintain the natural role of fire on mountain slopes and upstream from High Bridge (above 1,640-foot elevation).

Selective manual thinning and management-ignited prescribed fire would be used in forest fuel reduction areas to accomplish the following objectives:

- to reduce the amount of fuel in strategically located sites for more effective fire protection
- to strive for a 40%-60% forest canopy cover in some areas based on the mature forest component
- to perpetuate a multiaged ponderosa pine/Douglas fir forest
- to restore the effects of low-intensity fire
- to provide firewood for Stehekin residents from surplus logs as a secondary objective, contingent upon meeting the other objectives

Selective manual thinning would precede management-ignited prescribed fire treatment in some of the forest fuel reduction areas. Coniferous trees may be thinned in riparian communities within the fuel reduction areas. Trees would be selected and marked by a silviculturalist before any thinning activity. Manual thinning in easy access zones (150-250 feet from a road) could be done by individual woodcutters with a woodcutting permit. More remote zones in the forest fuel reduction areas would be thinned by contractors or licensees experienced with low-impact logging methods.

The wood produced through selective manual thinning would be used as firewood, but the production of firewood would be a result, not a primary objective of these wildfire management actions.

Manual thinning in forest fuel reduction areas would

- predominantly be from green trees less than 110 years old
- scatter slash from tree cutting or make slash piles for later burning, or chipping and mulching
- be cut in ponderosa pine/Douglas fir forest type only
- remove selected trees using an in-series or sequential strategy to maximize fire protection
- leave snags, dead and downed logs, and other woody debris in the forest fuel areas except along the perimeters

Vehicle access would be only on existing roads and 15 old road segments. Eight of these roads would be closed and revegetated after initial thinning operations. Additional old road segments within the areas and the old woodlots would also be revegetated. Removal of logs for firewood would either be by hand (close to roads) or by mechanized equipment. Generally, if mechanized equipment is used, most activity would be restricted to winter, with at least 2 feet of snow cover on the ground.

The practice of woodlot cutting for firewood would be phased out over a two-year period to enable the establishment of long-term monitoring plots and resource baseline data collection in the forest fuel reduction areas. No green trees would be cut in the woodlots during this period. Woodcutting would concentrate in the 150- to 250-foot woodcutter's zone along the Stehekin Road within the Orchard/Rainbow and Boulder Creek forest fuel reduction areas during the two-year transition period. No other woodcutting would occur until the monitoring plots were established and a program created to continue monitoring and evaluation. Other sources of firewood (see below) would still be available.

When available, firewood would be provided from the following sources:

- hazard trees that are pruned or removed in accordance with an approved hazard tree management plan
- blowdown trees in developed areas
- trees removed to restore historic landscapes in historic districts
- trees removed because of new development
- trees pruned or removed for fire protection as a result of hazard fuel surveys for government-owned structures
- driftwood within the high-pool limits of Lake Chelan
- trees removed from forest fuel reduction areas by selective manual thinning

Firewood would be provided at fair market value. There would be no guarantee of firewood cordage per year. The firewood supply probably would diminish over the long term, but ultimately the amount of government-supplied firewood would be significantly reduced.

Residents with a woodcutter's permit would be able to obtain firewood from designated areas for personal, family, and business use. Residents not wishing to obtain their own firewood would be required to purchase it from the NPS contractor. If contractor-supplied firewood is not available, residents may have other persons cut and haul their firewood.

Private firewood users of public firewood would be required to use efficient woodstoves. Where the National Park Service uses firewood, the agency would provide efficient woodstoves. Most existing NPS firewood use would be converted to other energy sources. Existing private firewood users would be encouraged to use other energy sources.

Firewood barged to Stehekin from other areas (Northwest Energy Services, Inc. 1993: 51ff) should be treated to eliminate potential nonnative pest species.

Driftwood from the lake would be available for firewood, but logs and other woody debris would not be removed from the Stehekin River, to protect the diversity of fish and wildlife habitat. Firewood would be obtained from Stehekin Valley only, not from wilderness or the park.

Other Energy Sources

Management Objective. Manage energy with a mix of efficiency and economic viability.

Actions. The efficiency of energy use and energy conservation would be emphasized in all NPS facilities. The National Park Service would pursue collaboration between itself, Chelan County PUD, and Chelan County to institute conservation measures and provide technical assistance.

The conversion to propane or other more efficient and less polluting systems than what are currently used for private and concession water and space heating needs would be encouraged. Also, energy conservation would be encouraged for all new private uses through design guidelines.

Threatened, Endangered, and Rare Species; Nonnative Species

Management Objective. Aggressively restore and protect, where feasible, species and ecological relationships that would exist were it not for human impacts in the valley. Conserve and restore candidate and listed species in accordance with state and federal laws.

Actions. As in the no-action/minimum requirements alternative, selected nonnative plants would be controlled through

monitoring and mitigation, including biological control agents, herbicides, and mechanical means.

The U.S. Fish and Wildlife Service would define critical habitats. The National Park Service would pursue resource inventory, monitoring, and research programs to enhance knowledge of biological communities and natural processes and to evaluate trends.

Nonnative plant and animal species would be controlled only in identified areas of concern. The reintroduction of select native species would be pursued and species recovery plans implemented as approved.

The National Park Service would educate and cooperate with private landowners and other agencies (e.g., planning commission) to encourage use of native species.

Scenic Resources

Management Objective. Maintain existing levels of natural scenic quality, including rural and pastoral images.

Actions. The current character of the road from the Landing to Harlequin Bridge and the country lane road image/rural character from Harlequin Bridge to High Bridge would be maintained. The overall scene would be maintained largely as it is today.

As in the no-action/minimum requirements alternative, the natural character of the lake edge (includes areas within 200 feet of shoreline) would be restored. Structures would be removed from the shoreline, and new docks or structures would not be built on the shoreline. The "fairways" would not be restored.

A vista clearing component should be developed as part of the vegetation management plan.

All power lines should be retained above-ground. There would be no changes at the Chelan County generators.

Wilderness Management Plan Elements

Management Objective. Manage human activities in the wilderness to allow a full spectrum of compatible uses.

Actions. The actions that follow apply to wilderness areas.

Horse grazing — Grazing would be allowed at levels below, but within limits of acceptable change standards used in the Chelan-Sawtooth Wilderness (USFS). Only certified weed-free, processed feed and nongrass grains would be allowed.

The maximum party size allowed in any part of national recreation area wilderness would be 24 pairs of eyes (human or stock).

Campfires — The same campfire standards would apply as those for Chelan-Sawtooth Wilderness (USFS).

Boundary changes — No changes would be proposed to the wilderness boundaries.

CULTURAL RESOURCE MANAGEMENT

Management Objective. Emphasize rehabilitation and use of national register properties, while preserving all other cultural resources; research, inventory, evaluate, and document other cultural resources.

Actions. Inventories of the cultural properties in the Stehekin area would continue to be updated on a regular cycle and the existing national register nomination would be amended to incorporate any additional eligible properties.

The Golden West Lodge would be rehabilitated, and used for NPS administrative purposes and as a visitor center. The

associated historic cabins would be retained. The High Bridge Historic District would be rehabilitated and reused for NPS administrative purposes. Rehabilitation of historic structures would be in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties.*

The Buckner homestead and orchard would be rehabilitated for enhanced visitor use (picnicking, lodging, and festivals).

An agricultural use permitting system would be developed, and community gardens would be allowed.

A collection storage/museum curatorial facility should be constructed in Stehekin Valley.

VISITOR EXPERIENCE

Management Objective. Emphasize selected opportunities that focus on best natural, cultural, and recreational values, through both structured and unstructured ways and both solitary and social means. Visitors encounter facilities and services in a rural community context where needs are balanced with preservation of a nearly pristine natural environment.

Encourage visitor cooperation in resource preservation through interpretation, protection, design, and example. Visitors' typical perceptions of wilderness thresholds are the side walls of the valley and beyond High Bridge.

Pace and Access

Actions. Visitors would be provided with opportunities to enjoy a relaxed, leisurely pace, and to have several choices of access to a variety of feature locations.

Speed limits should be kept at low levels. Shuttle buses, operated by the National Park Service and/or the private sector, would become the primary motorized form of transportation (shuttles, including the Bridge Creek shuttle, should be operated on schedules). Wherever appropriate, interpretation would be provided on shuttles (i.e., where there are important and interesting stories about sites visited or seen).

Visitors would be encouraged to use nonmotorized forms of transportation, e.g., walking, riding bicycles or horses, and renting boats and canoes within the national recreation area. Seating would have access to views and provide for relaxation.

Recreational Activities

Actions. Visitors would be provided with opportunities to engage in a variety of recreational activities, including but not limited to, e.g., hiking, bicycling, boating, canoeing, kayaking, sailing, rafting, cross-country skiing, snowshoeing, fishing, hunting, horseback riding, photography, guided walks, exploring, and lounging. Recreational access for visitors with disabilities would be enhanced.

All recreational activities would be managed to prevent impacts on resources and to minimize conflicts among users. Activities that infringe on the solitude and natural beauty of Lake Chelan NRA and that cause unacceptable impacts on resources — e.g., bungee jumping, flying ultralights, parasailing, hang gliding, waterskiing, jet-skiing, and using ORVs — would be discouraged or prohibited.

Circulation

Actions. Enjoyable and efficient transportation would be provided from the Landing to Bridge Creek and to features and lodging. This would be achieved by maintaining the Stehekin Valley road, a linear road spine from the Landing to Bridge Creek. The road would have a "country lane"

character through speed limits, design, and use patterns.

The Stehekin Valley road would be paved from the Landing to Harlequin Bridge; between Harlequin Bridge and High Bridge the road width would be reduced to a single lane with pullouts and maintained as a gravel road.

Pedestrian and horseback riding loops would be provided off the road spine at feature areas. Access to the lake and around the Landing would be included, as well as a river access route from the Castle area, across a pedestrian suspension bridge over the Stehekin River (just below Boulder Creek confluence) to the river trail that runs from Weaver Point to Harlequin Bridge area. Access to Buckner homestead, Rainbow Falls, and High Bridge and road access to lodgings would be retained.

The use of bicycles on roads would be encouraged, but they would not be allowed on pedestrian trails except on connections to features and some campgrounds.

Overnight Uses

Actions. The private sector should make available both separated (cabins, huts, tent cabins, houses) and clustered (traditional mountain lodge or hostel with central gathering space, or bed-and-breakfasts) lodging experiences. Facility and landscape designs must be consistent with resource and visitor experience values.

Lake

Actions. The head of Lake Chelan would be managed to encourage a leisurely, peaceful ambience, through the use of speed limits, boat permits, and no-wake zones. The floatplane takeoff area would be reconfigured to reduce noise while maintaining safety.

Marina services would be provided for both day and long-term users (e.g., fuel, time-limited boat moorage, boat and canoe rentals, water taxi, fishing equipment rental and sales, and dump station), and would be concentrated at the Landing.

The lake edge would be designed to allow picnicking, swimming, walking, and sitting, within and complemented by the restoration and maintenance of natural systems. The levels and types of recreational activities would not impair the overall natural, pastoral feeling of the lake and environs.

River

Actions. The Stehekin River would be managed as a natural system with some human manipulations. Opportunities for visitors to appreciate the power and intricacy of the river as a natural system would be enhanced.

Similar to the proposed action, river-related activities such as hiking, picnicking, fishing, sitting, and photography would be included. Access would be designed to avoid harmful impacts on critical areas, yet give visitors opportunities to appreciate and experience significant resource values. Rafting would be allowed only when river levels permitted safe transit.

Snags and woody debris would be cleared from the river to improve safety, protect public roads or bridges, and enhance recreational opportunities, only if there were no adverse impacts on the natural environment.

Visitor Use and Resource Protection

Actions. As in the proposed action, the impacts of human activity on natural and cultural systems (e.g., Stehekin River, Lake Chelan, wetlands, camping and picnic areas, trails, historic resources) would be monitored to ensure the resources were protected.

The National Park Service would participate in Resource Conservation and Development District activities to help address lakewide resource and visitor use issues. A forum consisting of Stehekin residents, environmental groups, Chelan County, Chelan County PUD, U.S. Forest Service, National Park Service, and other agencies would be developed to adopt or modify a framework, such as limits of acceptable change, to set goals, standards, and monitoring/corrective strategies for recreational and other human activities in and around Lake Chelan NRA. Cumulative effects of activities on the Lake Chelan watershed would be considered.

INTERPRETATION AND INFORMATION

Management Objective. Encourage visitors to experience and appreciate the natural, cultural, and recreational resources of the valley by using a variety of media and approaches. Visitors would be able to understand primary interpretive themes, resource management and safety issues, Lake Chelan NRA purpose and role in greater ecological and recreational complexes, and the roles of NPS and private sector in recreational opportunities.

Orientation

Actions. As in the proposed action, information would be made available before visitors have to make decisions. This information would help visitors learn about the resources and experiences that would be available, the behaviors that would be expected (and why), and the skills that are needed for different activities. Information on safety in Lake Chelan NRA should be introduced before visitor arrival, emphasized upon visitor arrival, and reinforced prior to visitor initiation of activities.

Visitors would be encouraged to try new activities that are within their capabilities. At contact stations at Chelan and Fields Point, orientation would be provided through telephone inquiries and personal contacts, exhibits, waysides, and printed materials. Boat passengers could read printed materials and talk to and hear presentations by boat crew or NPS interpreters to learn of recreational opportunities and resource information. At Stehekin Landing, visitors would be provided with information about recreational options, how to structure their visits, and the national recreation area in general. Wayside exhibits, a small community-staffed information area, a roving NPS interpreter, NPS and private brochures, and a bulletin board would be used. At the Golden West visitor center, orientation would be provided, using exhibits, audiovisual, publications, attended information desk, and through the private sector.

Interpretation

Actions items for alternative B are similar to the proposed action. The National Park Service would take the lead role in planning, managing, and providing information and interpretive services, and would plan, design, and implement optimum actions to meet interpretive goals. The Park Service would provide the following:

- introduction to interpretive stories at staging areas, including Chelan and Fields Point, using exhibits, wayside exhibits, publications, and personal services
- personal services interpretation and publications on commercial boats in cooperation with Lake Chelan Boat Company and U.S. Forest Service
- major rehabilitation of the Golden West visitor center, including exhibits, audiovisual programs, and information services
- minimum-level interpretive programs and media that focus on primary interpretive themes related to natural

history, ecology, and prehistory of the area

- offseason information and informal interpretation at Stehekin Landing and on boats during layovers

- assistance to private providers of interpretation in training, planning, marketing, and quality assurance

During the summer, activities such as evening programs, roving interpretation, and shuttle bus programs, and winter activities such as talks at the Landing and on boats, and information services at the visitor center would be provided. The frequency of activities would be based primarily on staffing levels, resource sensitivity, and visitor numbers and interest. In all programs, national recreation area resource values would be emphasized.

The Stehekin community might provide additional interpretive services, including programs and tours focusing on local history and culture (might be free or fee) and information in conjunction with rental or hiring of recreational services and equipment (e.g., guided canoe, bicycle, or horseback riding trips, shuttle buses, and camping and lodging services). Local initiatives would be complemented through NPS interpretation of local history and culture at the visitor center, contact stations, etc.

Facilities

Actions. Orientation and other visitor services and interpretation of primary interpretive themes and resource management issues would be provided at the Golden West visitor center. The interpretive media and information services would be upgraded, including new exhibits and audiovisual programs, and an auditorium for personal and audiovisual programs. The first and second floors of the building would be made accessible to visitors in wheelchairs from the Landing.

The exhibits and wayside exhibits at the Chelan and Fields Point contact stations would be upgraded. The wayside exhibits in the valley would be upgraded where needed. New waysides would be installed where significant views or sites should be interpreted and where visual and other impacts would be minimal.

LAND USE AND DEVELOPMENT

Transportation Plan Elements

Management Objective. Provide transportation and access to, from, and within Lake Chelan NRA to accomplish a quality visitor experience, fulfill resource management objectives, and meet local community needs.

Actions. The actions that follow apply to transportation and access.

Getting there — Visitation would be accommodated to approximately the current level of present maximum boat capacity and include interpreters on all peak season commercial ferries.

The airstrip would be closed, and a portion would be used for NPS and concessioner support facilities, including NPS housing and maintenance. Unused or sensitive portions of the airstrip would be reclaimed. Commercial floatplanes would be allowed to fly at present capacity.

Once there — An NPS/commercial-operated shuttle bus service to High Bridge, including an onboard interpreter.

Nonmechanized (e.g., walking, horseback riding) and mechanized (e.g., bicycling) types of transportation would be emphasized. A bike rental system would be maintained.

Tours would be organized around scenic, historic and cultural features that use transportation methods other than car, shuttle, or

bus, e.g., walking and bicycle tours. Interpretive cross-country ski tours would be *provided during winter holidays*.

Snowmobile use would be limited to existing roads below High bridge.

Actions would be taken to remove abandoned vehicles.

Roads and trails The current character (slow leisurely pace) and surface (chip seal on main valley road only) of road from the Landing to Harlequin Bridge would be maintained.

The road width between Harlequin Bridge and High Bridge would be reduced to a single lane with pullouts and maintained as a gravel road. The road would be relocated out of the 100-year floodplain at 8-Mile. Excessive gravel roadsides would be rehabilitated to natural vegetation. The road between High Bridge and Cottonwood Camp would be converted to a trail.

Approximately 200 yards of the existing Company Creek road would be relocated away from active river erosion. A 0.9-mile section of new road would cross Battalion Creek at two locations and traverse through mature forest and across wetlands. The realigned road would be maintained, and the old section of road would be rehabilitated.

As in the proposed action, the present road system would not be expanded. Unnecessary roads would be eliminated and the areas restored to natural conditions. Some of the old and abandoned road alignments would be converted to new trail loops in the lower valley, if appropriate.

A pedestrian and horseback riding trail system would be provided that connects key lower valley features to the Stehekin Valley road. A trail would be developed from the Castle or Corral area to the Stehekin River without crossing private property, across the Stehekin River with a pedestrian suspension bridge just below the confluence of Boulder to the Harlequin Bridge area). Also, a trail *would be developed on the historic road* access from the valley road to the Buckner orchard as well as a trail connecting Buckner orchard with "Rainbow "Falls.

Stehekin Landing and Airstrip Area Development Concept Plans Elements

Management Objective. Preserve the rural setting through sustainable design for development and to demonstrate the best human adaptations to the natural environment, including prehistoric, historic, and contemporary (e.g., existing conditions); locate facilities in the least environmentally sensitive areas possible.

For a graphic portrayal of the development concept plans for alternative B, see the Stehekin Landing Development Concept Plan map in the "Proposed Action" section and the accompanying Airstrip Area Development Concept Plan map.

Actions. The level of NPS developments for visitor use would be kept similar to existing conditions, only better arranged with lodging relocated and restyled.

Visitor flow and parking at the Landing would be improved. Lodging would be maintained in its new location away from geological hazard areas.

Weaver Point dock facilities would be improved to accommodate the Purple Point dock and allow seasonal moving of the dock between Purple Point and Weaver Point.

Transportation — Adequate and safe commercial boat docking must be ensured. Docking for ferries would be improved. Small boat moorage would be limited.

The floatplane tie-up would be retained, but takeoffs would be designated farther downlake.

Visitor lodging and campgrounds — Actions are the same for the proposed action. Existing lodging would be phased out at present locations as the life cycle of the buildings was reached. New facilities, including some winterized units, would be located at the Landing away from all hazards. Housekeeping facilities would be included. The present level of overall beds would be retained. Summer lodging upvalley would be expanded. The Riddle Creek cabins would be removed and the area converted to less-intrusive campsites.

All existing campgrounds would be retained. Camping opportunities would be available at a variety of sites in the lower valley. The sites would be low density, unobtrusive and safe, with ample screening. Water would be provided at the Purple Point and Weaver Point campgrounds. All sites would have access to pit or composting toilets. Sites would be set back from the lake and removed from hazardous areas as necessary. The Purple Point campground would be retained for hikers/climbers. The Weaver Point campground would be expanded and moved back from the shoreline.

Two campgrounds would be accessible to visitors in wheelchairs. The Weaver Point campground would be used for boat-in camping. Park management would determine which sites are available on a reservation basis.

In addition, under alternative B private campgrounds might offer more improvements.

NPS and concession housing — Some NPS and concession housing would be consolidated in clustered sites on and beside the closed airstrip, based on environmental parameters and in compliance with compatibility criteria (see "Land Protection Plan Elements" section for criteria). Also, some NPS and concession housing would remain dispersed.

NPS housing would be available for 9 permanent employees, 17 seasonals, and 10 transients. Concession housing would be available for 10 permanent and 20 seasonal employees.

Food service — Food services, including a restaurant, a deli, and a bakery, would be provided to respond to the style of lodging and the need for lunch options created by ferry schedules.

Administrative/office facilities — NPS headquarters and office space for valleywide needs, post office, etc. would be retained at the Landing.

Commercial retail/services — A commercial center would be established at the Landing with a grocery store and deli provided by NPS/concession, and craft shops, bike rentals, and other appropriate retail provided by local residents.

Utilities — Fuel and a sewage dump station (located away from geohazards) would continue to be provided at the marine service center at the Landing. Other fuels (propane, gasoline) would be stored and dispensed upvalley.

Unnecessary power lines would be removed or active lines would be buried where feasible.

NPS maintenance — Maintenance facilities would be located near the airstrip.

Land Protection Plan Elements

Management Goal. Make sure that land uses on public and private lands are compatible with the purposes of Lake Chelan NRA, emphasizing those uses that protect area natural and cultural resources and natural processes, and provide for safe visitor facilities and services.

Management Objectives. The six principal management objectives are as follows:

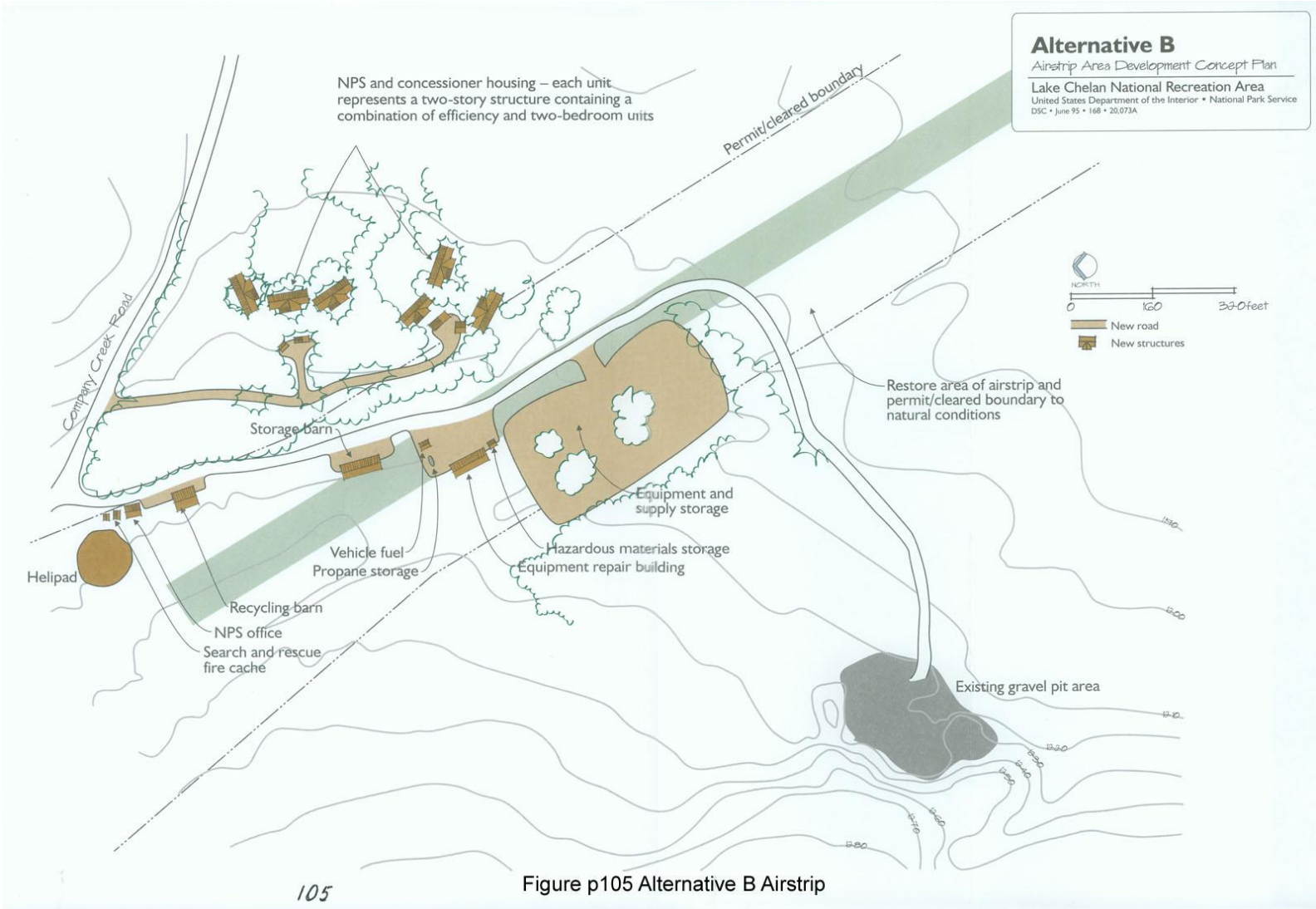


Figure p105 Alternative B Airstrip

- Protect Lake Chelan NRA from land use and development that are incompatible with the recreation area purposes.

- Actively support local government in its regulation of nonfederal land within the Stehekin Valley, which places primary reliance on adopted Chelan County zoning ordinances, subdivision regulations, and other applicable ordinances and regulations that ensure that the public health and safety of Stehekin Valley residents and visitors are maintained and enhanced.

- Provide a formal process by which Stehekin Valley residents can actively participate and provide meaningful input to the Chelan County land use decision process regarding the regulation of private lands.

- Ensure that applicable laws and policies of the state of Washington, including health and safety regulations and Washington Growth Management Act provisions, are followed.

- Provide a basis for meaningful and constructive NPS review of proposals for land use change on private land within the Stehekin Valley in order to ensure that all uses and land developments are compatible with the purposes of Lake Chelan NRA.

- Maintain an effective NPS capability to acquire or exchange for full or partial interests in private lands, conducted on a willing buyer/willing seller basis, to augment the land protection measures provided by county land use authority and compatibility determinations.

Guidelines. Based on the land protection goal and objectives, the following guidelines form the basis for the land protection plan (LPP), which is being prepared in conjunction with this GMP. The LPP further defines specific land protection strategies that are to be employed relative to private property within the Stehekin Valley. In addition to incorporating all pertinent elements included in this section of the proposed action, the LPP would also provide a tract by tract listing of landownerships, identifying the approximate area of each tract that has a high priority for resource protection (see appendix D).

- Place emphasis on local zoning and other land use authorities of county and state government to regulate private land uses within the Stehekin Valley (see "Local Zoning/Land Use Regulations" and "Stehekin Valley Overlay District" sections).

- Provide opportunities for local review of Stehekin Valley land use proposals, and an appropriate forum to provide this input to Chelan County government.

- Accept new residential and other private land uses that are compatible with the purposes of Lake Chelan NRA (see "National Park Service Land Use Compatibility Criteria" section).

- Accept new commercial uses on private lands that provide visitor and resident services and that are compatible with the purposes of Lake Chelan NRA.

- Accept new industrial uses on private lands that are typical of and compatible with historical industrial uses within the Stehekin Valley and that are compatible with the purposes of Lake Chelan NRA.

- Encourage land uses that consume a low level of resources, and that conserve both renewable and nonrenewable resources.

- Encourage new construction and conversion of existing facilities that adhere to sustainable design principles (NPS 1993e).

- Identify those properties with areas that have a high priority for resource

protection, and where a public interest in land is necessary to protect national recreation area resources, based on resource sensitivity and values, or to provide for compatible visitor use and public community needs consistent with the purposes of Lake Chelan NRA and other legislated mandates. Resources that have a high priority for protection under alternative B are high flood influence, wetland, riparian, and high visual sensitivity areas.

Continue willing buyer/willing seller acquisitions for properties with areas that have a high priority for resource protection, or for which public needs have been identified, when appropriated funds are available for such purposes or appropriate lands are available for exchange. The National Park Service will consider other factors on a case-by-case basis in making final determinations to purchase parcels. Private lands within areas that have a low priority for protection are not proposed for acquisition, but willing seller opportunities would be considered when funds are available.

Use land exchanges, as natural, cultural, and scenic conditions allow, within the Lake Chelan NRA by offering to exchange private lands having resources with high priority for protection for public land from previously acquired private parcels having resources with a low priority for protection.

Emphasize, where appropriate, with the cooperation of the landowner, opportunities for easement purchases and other less-than-fee (e.g., conservation easements) interests for resource protection and public use. This will allow greater flexibility in the protection of high priority resources, including scenic areas, and could provide an alternative method of achieving public nonmotorized recreational trail access to lakes, rivers and streams and other sites within Lake Chelan NRA.

- Exercise the use of eminent domain procedures only to prevent imminent resource degradation of recreation area values by uses on private land, and only used as a last resort where other prudent and reasonable measures to protect recreation area resources by eliminating or mitigating the resource degradation, have been exhausted.

Disclaimer. Nothing in this plan constitutes an offer to purchase private property, a taking of private property, or a usurpation of the responsibility of the state of Washington and Chelan County to regulate the use of private land within the Stehekin Valley.

Local Zoning/Land Use Regulations. Complementary actions by local authorities would include the following:

- application by Chelan County of adopted local controls, including zoning ordinances, shoreline management master programs, Growth Management Act comprehensive plan, and subdivision, and other land use authorities to regulate land use and development within the Stehekin Valley

- adherence to adopted Chelan County and Washington State building codes, health and safety, and other applicable standards by valley residents and uniform enforcement by county and state officials

Because the state of Washington already has a relatively sophisticated regime of land use controls and planning, the National Park Service, acting through the superintendent, strongly encourages use of local authorities and existing local controls for regulation of private land use within Lake Chelan NRA. Therefore, as part of this, the National Park Service proposes that the county adopt a new zoning code chapter establishing an overlay district for review of proposed uses

and developments on private lands within the Stehekin Valley. This would be in addition to enforcement of applicable state laws and local controls, including the Washington Growth Management Act, Chelan County zoning ordinance, subdivision regulations, and shoreline management master program.

To be consistent with P.L. 90-544 and the purposes for which Lake Chelan NRA was established, the National Park Service will propose that the overlay district, modeled after the Icicle Valley Overlay District in Chelan County Zoning Code (Chelan County Code, chapter 11.39B), meet the following standards:

- Be applicable to all properties in Stehekin that are subject to county jurisdiction.

- Preserve the recreational, scenic, and historic values and general character of the valley setting through review standards for frontage, setback, density, height, sustainable design, size, materials, nonconforming uses, and new subdivisions.

- Discourage variances or exceptions for any new use or additional development that does not meet established controls or overlay review standards or NPS compatibility criteria.

- Recognize formally the role of the superintendent of the North Cascades National Park Service Complex, or his/her designees, in participating in all proceedings before the county concerning land use or developments that may have an effect on NPS lands and resource values and /or the visitor experience within Lake Chelan NRA.

- Provide that the superintendent be given timely prior written notice of all proposed changes to any Chelan County plans, ordinances, or regulations affecting the Stehekin Valley, and of all applications for permits or approvals within Lake Chelan NRA or related areas of concern.

- Demonstrate a clear and consistent commitment to sound land use principles and a method of enforcement by local authorities and, where applicable, the National Park Service.

Stehekin Valley Overlay District. In keeping with these standards, the National Park Service has prepared a draft of a proposed overlay district ordinance for Lake Chelan NRA for consideration by Chelan County to adopt as part of their review of land use actions on private land within the Stehekin Valley.

The proposed Stehekin Valley overlay district would have a review board made up of area residents and other interested parties with *ex-officio* participation by the National Park Service, which would review all land use development proposals for private lands within the area, and make recommendations to Chelan County regarding the appropriateness of each land use proposal.

1. Objectives. Design review for the Stehekin Valley is intended to accomplish the following objectives:

(a) Encourage uses on public and private lands that can be developed and used compatibly with the purposes of the Lake Chelan National Recreation Area, emphasizing those uses that protect area natural processes and resources and provide for safe visitor facilities and services.

(b) Maintain the current level of services for visitors, allowing the private sector to augment services to meet additional demand, on lands determined suitable for such uses.

(c) Maintain compliance with Chelan County and NPS objectives for the area as described in local and state controls and plans, including the Chelan County Zoning

Code, Chelan County Shoreline Master Program, Chelan County Sensitive Areas Ordinances, National Park Service Architectural Character Guidelines and Management Objectives-Lake Chelan National Recreation Area, National Park Service Compatibility Standards, Chelan-Douglas Health District Design Guidelines for Septic and Drainfield Systems, Chelan-Douglas Health District On-site Sewage Disposal System Rules and Regulations, and other local, state, and federal laws and regulations.

(d) Facilitate recreational opportunities while conserving the scenic, scientific, historic, and other values contributing to public enjoyment.

(e) Promote the management, use, and disposal of renewable natural resources and development that, are compatible with, or do not significantly impair public recreation and conservation of the scenic, scientific, historic, or other values contributing to public enjoyment and community vitality of the district.

2. Applicability

[The formal legal description of the subject area will be presented here.]

3. Design Review Committee. For the Stehekin Valley Design Review Overlay District, the Design Review Committee will consist of five voting members who will be registered voters and/or property owners within the planning area. The five voting members will be appointed as follows: three members appointed by the Chelan County Commissioners, one appointed by the Chelan County PUD, and one appointed by the Commissioner of Public Lands. They will be assisted by expert, *ex-officio* (no-voting) members, including a professional hydrologist and a public health sanitarian (both designated by Chelan County), a planner employed by Chelan County, an NPS resource specialist, a planner or landscape architect affiliated with or designated by the National Park Service, **and** a wildlife biologist designated by the National Park Service. All members will be appointed and will serve in accordance **with** this ordinance, except that *ex-officio* members affiliated with the National Park Service will be appointed by the park superintendent.

4. Review Responsibilities. The Stehekin Valley Design Review Committee will review and make recommendations on all land use and development matters within the district subject to Chelan County jurisdiction, including but not limited to:

- grading, building, and other related permits and approvals
- conditional use permits
- variances
- zone changes
- planned unit developments
- shoreline substantial development permits
- comprehensive plan modifications
- short and long subdivisions
- minimum lot sizes and densities

5. All Uses Conditional. In the Stehekin Valley Design Review Overlay District, all otherwise permitted uses will be deemed conditional uses. The recommendation of the Design Review Committee on such uses will be given substantial weight by the zoning adjustor, Board of Adjustment, Board of County Commissioners, and other bodies in deciding applications within the district. Uses appropriate in one area of the district may be subject to conditioning or denial in another (e.g., siting of commercial facility in inappropriate scenic area).

All applications will be reviewed on the following criteria:

(a) Consistency with the objectives for the district will be sought.

(b) Early termination of uses inconsistent with the objectives of the district will be encouraged.

(c) Otherwise permitted development will not be approved if clearly inconsistent with adopted NPS compatibility standards.

(d) Degradation of critical/sensitive natural resources will not be permitted.

(e) Suitability of location in light of objectives for the district will be encouraged.

(f) Arrangements for use by general public consistent with objectives of the district will be encouraged.

(g) Uses that result in less consumption of resources and conservation of both renewable and nonrenewable resources will be encouraged over more consumptive alternatives.

(h) Conversion of existing facilities to uses compatible with the objectives of the district will be encouraged.

(i) Uses that may result in degradation of water quality or pollution will be discouraged.

(j) The construction or siting of building on slopes with gradient greater than 20% without assurances of acceptable mitigation measures will be discouraged to minimize the potential for erosion; hazards to public safety and health; and any adverse impacts on the recreation, scenic, scientific, and historic values of the area.

(k) The clustering of structures is encouraged in order to promote open space scenic quality, resource conservation, and the efficient provision of visitor services. In developing overnight visitor accommodations, the combining of accommodation units may also be permitted.

6. Specific Uses

(a) Permitted Conditional Uses. When consistent with the above criteria, permitted conditional uses at appropriate locations will include:

- small-scale visitor lodging and/or campgrounds
- NPS and concession housing
- food service
- administrative and office facilities for governmental purposes
- commercial and retail services consistent with the purpose of the area
- utility facilities and ancillary services
- private residential uses

(b) Restricted Uses. In addition to restrictions noted above, the following additional restrictions apply to uses specified below:

(1) Applications for construction of multifamily dwellings will not **be** approved unless they would facilitate achieving otherwise permitted residential density while avoiding construction in critical or sensitive areas.

(2) Manufacturing or industrial uses not historically typical of the lower Stehekin Valley will not be permitted.

(3) Mining, except for limited extraction of sand, rock, and gravel for local maintenance use in accordance with an NPS-approved sand, rock, and gravel plan, will not be permitted.

(4) For all proposals that would entail the use or consumption of federal property or resources, no approval will be granted unless prior federal approval has been obtained.

National Park Service Land Use Compatibility Criteria. The National Park Service will adopt a revised approach for **a** determination of compatibility regarding proposed use and development of private and nonfederal lands within Lake Chelan NRA to ensure that such uses are compatible with the purposes for the national recreation area was established. Where proposed uses are not adequately addressed by county and state land use authorities, the application of compatibility criteria would be the basis for

a case-specific compatibility analysis by the National Park Service. The limitations of the previous compatibility standards, and their approach to specific land use standards in regulatory language, have been removed.

P.L. 90-544, which established the Lake Chelan National Recreation Area, provided that the secretary of the interior may "acquire lands, waters and interests therein by donation, purchase with donated or appropriated funds, or exchange, except that he may not acquire any such interests within the recreation areas without the consent of the owner, so long as the lands are devoted to uses compatible with the purposes of this act." **(emphasis added)**

Therefore, in accordance with the applicable provisions of P.L. 90-544, these compatibility criteria establish the basis for identifying which land uses within the Stehekin Valley are inconsistent with the protection of natural, recreational, scenic, scientific, and historic values of Lake Chelan National Recreation Area. They also identify land uses that are incompatible with the purposes of Lake Chelan NRA. This could subject the property that is proposed for the incompatible use to potential acquisition via the use of federal eminent domain powers where all other prudent and reasonable attempts to remove or mitigate the incompatibility have failed.

These compatibility criteria are not intended to duplicate county zoning standards or other applicable land use practices that are the proper purview of local government, and that would be related more to the protection of the life, health, and safety of Stehekin Valley residents. Instead, these NPS criteria are intended to guide both park management and Stehekin Valley residents in determining which land use proposals and practices are in harmony with the resource values of the national recreation area and which are not. The criteria are resource-based, and have been developed to ensure the long-term protection of the natural, recreational, scenic, scientific, and historic values of the area.

The following purposes provide further guidance in the application of the compatibility criteria, the adherence to compatible uses by Stehekin Valley landowners, and the application of criteria by park management.

- To identify uses that would harm, degrade, or adversely affect resource values of Lake Chelan NRA.
- To identify proposed types and levels of land uses that would harm resources when cumulative effects are considered in the context of previously established uses.
- To encourage uses that would enhance resource values and the general character of the valley.
- To encourage conversion from a higher impact land use to a lower impact land use.

I. COMPATIBILITY CRITERIA

A. General Criteria

The alteration, development, and use of all public and private properties within Lake Chelan NRA must comply with applicable federal laws, rules, and regulations, and must be compatible with the congressionally designated purposes of Lake Chelan NRA.

B. Incompatible Uses of All Property within Lake Chelan NRA

The following uses of all public and private property within the Stehekin Valley are incompatible with the purposes of Lake Chelan NRA:

1. Any subdivision of land that was not in effect prior to the adoption of these compatibility criteria,

except as permitted through the Chelan County Subdivision Regulations and as consistent with Chelan County health standards.

2. The siting or construction of any building, including but not limited to, residential, commercial, and industrial buildings, in an identified:

    - high flood influence area
    - wetland
    - riparian area

3. Any dredging or filling of Lake Chelan or the Stehekin River without full compliance with the U.S. Army Corps of Engineers permitting process.

4. The cutting of timber for sale or transport outside the Stehekin Valley.

5. The cutting of timber by any means other than selective tree harvesting, except as required by Washington State Department of Natural Resource regulations.

C. Incompatible Uses of Public Property Within Lake Chelan NRA

In addition to those uses listed in section B. above, the following use of all public property within the Lake Chelan NRA is incompatible with the purposes of the area. While these standards have not been applied to private lands within the Stehekin Valley, it is highly recommended they be adopted by Chelan County within the county zoning ordinances and the proposed Stehekin Valley Overlay Zone.

The National Park Service will not site any building or structure in an identified:

- 100-year floodplain, unless used for nonhuman occupancy and with conditions on specific uses or mitigation

- wetland soils, and those soils not conducive to building foundations, leachfield percolation, or site drainage

- geohazard areas

- areas with slopes greater than 20% gradient

- areas of high visual sensitivity, except where specific design mitigation measures can successfully be used

D. Effective Date of the Compatibility Criteria

Upon adoption, these compatibility criteria will supersede those compatibility standards promulgated in 1988, and updated in 1992. Adoption will be official upon the signing of the Record of Decision by the regional director, National Park Service, Pacific Northwest Region.

E. Request for Determination of Compatibility

The Lake Chelan NRA legislation does not grant the secretary of the interior zoning authority. However, it does impose the responsibility to ensure that existing uses are compatible and that proposed land uses will be compatible with the purposes for creation of the national recreation area. The current zoning ordinances of Chelan County have been found to substantially satisfy the intent of the Lake Chelan NRA legislation, and therefore constitute the primary basis for implementing these compatibility criteria.

Landowners or other interested or affected parties can make a written request to the superintendent for a

determination as to whether an existing or proposed use is in compliance with the compatibility criteria. Generally, the superintendent will find that existing and proposed land uses are compatible if such uses conform to applicable local, state, and federal laws and not specifically sited within incompatible use areas as described in section B.2. above.

Requests for a determination of compatibility must be made in writing to the superintendent and include the following information:

1. Description/location of the property and the applicable county or local zoning classification, e.g. rural residential, conservation, general.

2. Existing use and/or development being proposed on the property.

3. Statement as to whether the county or local zoning for the property will allow for the proposed use or development without the need for a variance.

4. Statement as to how the use or proposed development will comply with the compatibility criteria.

The superintendent will review the request and notify the landowner in writing within 45 days after receiving a request for determination whether the existing use or proposed development and use is in compliance with the compatibility criteria. The superintendent may need to extend the schedule for making a determination of compatibility by 30 days if additional information is needed.

In the event the superintendent determines an existing or proposed use or development is not in compliance or not compatible based on the supplied information and a field check by NPS staff, the superintendent will give the landowner written notice of the manner and nature of the incompatibility. To the extent practicable, the notice will include suggestions or alternatives for working with landowners to achieve compatibility.

PARK OPERATIONS

Concessions, Contracting, Special Use Permits, and Private Enterprise

Management Objective. Provide services to accommodate existing and reasonable demand for expanded recreational experiences.

Actions. NPS services, facilities, and programs would continue and/or expand at a reasonable level to accommodate demand. Commercial uses would be allowed to continue to expand.

Services and facilities/programs would be provided by a mix of entities, including the National Park Service, concessioners, and private enterprise. The use of the local workforce as much as possible would be encouraged.

NPS Provision of Services to Private Landowners

Management Objective. Provide services essential for resource protection and visitor health/safety. Continue NPS services and/or reasonably expand to include private land uses that support resources protection and the visitor experience. Use private contracts where appropriate.

Actions. No technical assistance in planning, design, and construction of facilities, and visitor programs would be provided.

The following services would be provided:

wildfire protection (through reimbursable agreement between the U.S. Forest Service and Washington State Department of Natural Resources) and cooperative structure fire protection

all solid waste disposal on a user-fee basis in accordance with regulations

boat sewage disposal and moorage with moorage fees

road maintenance (including snow removal 9 miles upvalley) on the Stehekin Valley road to High Bridge

post office space

building for community purposes available under permit

basic transportation system on a fee basis

law enforcement in conjunction with county

NPS Staffing

Management Objective. Through NPS presence, be responsive to visitor demands balanced with resources/visitor management objectives.

Actions. Current levels of permanent employees would be retained; however, there would be slightly fewer levels of seasonal employees than at present. All employees would be stationed at Lake Chelan NRA.

Cooperative Relationships with Others

Management Objective. Strengthen working relationships with others, defining shared objectives and developing strategies that lead to cooperative agreements for the management of natural, scenic, cultural, and recreational resources of Lake Chelan NRA.

Actions. The National Park Service would work with county, state, and federal agencies for enforcement of existing ordinances and regulations.

Cooperative management would be pursued with the U.S. Forest Service (e.g., wildfire, wildlife, wilderness, Fields Point); Washington Department of Natural Resources, Department of Ecology, Department of Fish and Wildlife; Chelan County (e.g., law enforcement, search and rescue, land uses); Chelan County PUD.

The National Park Service would build cooperative relationships with county, state and federal agencies; private sector; and the public through constant communication to involve them in all efforts to facilitate resource protection and visitor enjoyment. Also, the Park Service would facilitate setting up and coordinating a lakewide business forum, and would participate in other lakewide planning efforts.

ALTERNATIVE C

ALTERNATIVE CONCEPT

Lake Chelan National Recreation Area would be a retreat/refuge/resort where resources and natural processes are showcased for the enjoyment of visitors. The visitor would encounter a built environment that blends with the natural surroundings. Visitor facilities would be expanded to meet increased demand, but would be located only in resource suitable areas, primarily upvalley. A broad range of activities and services, provided mostly by the community, would assist and encourage individual and group interactions with the outstanding features, sites, areas, and corridors of the valley.

See the accompanying Stehekin Valley map for a graphic portrayal of alternative C.

NATURAL RESOURCE MANAGEMENT

Management Objective. Protect and restore the most significant and sensitive natural resources. The natural aspect of the land might be altered, but manipulation would be the minimum necessary to achieve planned use.

Water Quality

Management Objective. Maintain or restore water quality and minimum stream flows to protect dependent biota, human health, and recreational uses.

Actions. The National Park Service would work with county, state, and other federal agencies to monitor and protect water quality and to promote enforcement of regulations. Also, the Park Service would work with Chelan County PUD to mitigate shore erosion, and to ensure that when a new FERC license is issued to Chelan County PUD, the PUD continues to enhance water recreation use.

Baseline water resource parameters would be inventoried and monitored to evaluate the effects of land and water use, and to ensure compliance with standards and regulations.

The National Park Service would work with property owners to encourage public access and recreation as well as to minimize water resource impacts.

The best pollution control measures (e.g., sewage treatment and disposal, erosion control, toxic substance management) would be implemented to minimize the risk of water pollution.

Under this alternative, there would be no restrictions on recreational water use.

The National Park Service would promote water resource protection for all of Lake Chelan through cooperation with other agencies and organizations that affect the management of Lake Chelan (e.g., U.S. Forest Service, state, county, city of Chelan, and local interest groups).

Fish

Management Objective. Preserve existing native fish populations and restore listed or candidate native fish species to viable population levels; preserve the opportunity for anglers to fish for and harvest native fish species.

Actions. Resource inventory, monitoring, and research programs would be pursued to enhance the knowledge of native fish populations and their habitat to determine and evaluate change in response to habitat dynamics, exotic fish species, recreational fishing, land use, and management actions.

The impacts of fish stocking in naturally fish-free lakes would continue to be researched, and management recommend-dations would be developed to minimize impacts.

Fish stocking would be limited to endemic species or species native to the region. Supplemental stocking would be allowed.

Normative fish species that jeopardized threatened, endangered, or candidate fish species (according to approved recovery plans) would be controlled.

Harvest levels of native species would be increased based on biological balance and integrity. Fisheries in interjurisdictional waters would be managed for optimum sustainable harvest of game species.

The Washington Department of Wildlife would take the lead in developing a fisheries management plan for upper Lake Chelan and lower Stehekin River in cooperation with the National Park Service and Chelan County PUD.

Stehekin River

Management Objective. Manage the river as a visually natural experience, and provide optimum recreational opportunities.

Actions. Existing public or private improve-ments threatened by river erosion and flooding would be protected. The removal and manipulation of woody river debris that cause severe erosion problems or safety hazards, including hazards to recreational activity, would be allowed.

Roads would be protected in their existing locations except where they limit or create hazards to recreational opportunities.

The National Park Service would encourage private property owners, or purchase easements, to provide public access for recreation, protect visual experience, or protect significant natural river processes.

As in the proposed action, river processes would be inventoried, researched, and monitored to evaluate and mitigate impacts of recreation and other land uses.

Previously manipulated sites (including controlled structures) would not be restored to natural conditions.

The suitability of the Stehekin River would be studied for designation as a wild and scenic river.

Wetland, Floodplain, Shoreline, and Riparian Areas

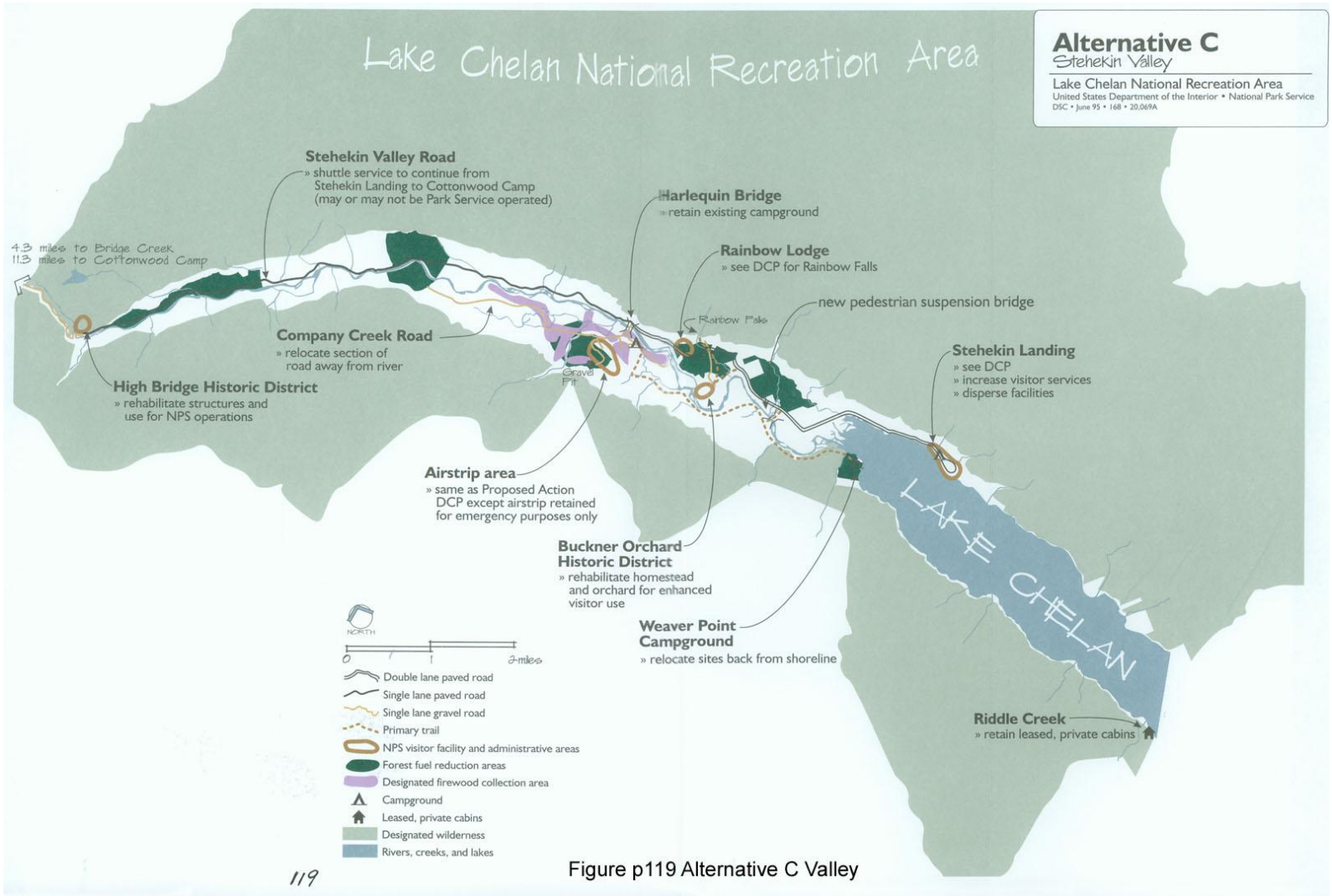
Management Objective. Preserve or restore the most significant or sensitive ecological processes and conditions in wetland, floodplain, shoreline, and riparian area.

Actions. Existing NPS development on public wetland, appropriate regulatory floodplain, shoreline, and riparian areas (except significant cultural resources) would be relocated to suitable sites and the disturbed sites restored to natural conditions. Current recreational facilities would be retained, and low impact recreational opportunities, such as fishing, rafting, and hiking, would be expanded. Development should not dominate the scene.

The National Park Service would work with property owners to encourage public access and recreation as well as minimize impacts. It would seek to acquire properties or interest (easements) where uses most significantly threatened wetland, floodplain, shoreline, and riparian areas.

Sand, Rock, and Gravel Plan Elements

Management Objective. Allow regulated mining of sand, rock, and gravel for private and NPS uses.



119

Figure p119 Alternative C Valley

Actions. The existing borrow pit would be recovered as new excavation occurred; the size of the pit would remain constant. New pits would be established if the existing pit became depleted.

Valley sources of sand, rock, and gravel would be used for new construction, and the materials would be treated to eliminate nonnative species, toxic materials, etc.

The mining of sand, rock, or gravel from the 100-year floodplain of Stehekin River or its tributaries would be allowed only if there were no adverse impacts.

Gravel would be crushed and stockpiled at the active pit for routine NPS maintenance needs.

Sand, rock, and gravel should be recycled and conserved whenever possible.

Geohazards

Management Objective. Allow measures that protect life and property from natural geological processes, such as snow avalanches, debris torrents, and rockfalls.

Actions. Similar to the proposed action, under this alternative new NPS developments and recreational facilities would be sited to avoid geohazards, and existing development would be protected from geohazards or relocated.

The National Park Service, through cooperative efforts with state and local agencies, would oppose private commercial visitor facilities in geohazard areas. The county would be advised of the location of such geohazards.

Forest Fuel Reduction I Firewood Management Plan Elements

Management Objective. Augment the level of protection of life and property. Use selective manual forest fuel reduction techniques rather than management-ignited prescribed fire to reduce hazard forest fuel loadings. Combine the wildfire management tools of fire suppression, prescribed natural fire, and selective manual forest fuel reductions to reduce the risk of loss of life and property. Supply firewood at 1986 levels.

Actions. Hazard forest fuel surveys would be conducted near government-owned buildings, and the hazards removed by the pruning and cutting of trees and shrubs to create more defensible space for fire suppression near these structures in the event of wildfire.

Hazard forest fuel surveys would be conducted free of charge upon the request of private property owners and recommendations made to create more defensible space around these structures.

Human- and lightning-caused fires on the valley floor would be suppressed for the protection of human life and property.

Prescribed natural fire would be used beyond the valley floor, when conditions were appropriate, to maintain the natural role of fire on mountain slopes and upstream from High Bridge.

This alternative differs from the proposed action in that the criteria for forest fuel reduction areas would be based primarily on a suppression strategy. Selective manual thinning would be the only tool employed to achieve desired stand conditions.

Firewood collection from forest fuel reduction areas would

- predominantly be from green trees less than 110 years old
- scatter slash from tree cutting or slash piles for later burning, or chipping and mulching

- be cut in ponderosa pine/Douglas fir forest type only
- remove selected trees using an in-series or sequential strategy to maximize fire protection
- leave snags, dead and downed logs, and other woody debris in the forest fuel areas except along the perimeters

Woodlot cutting would be stopped within the next two years to allow the establishment of Company Creek road designated firewood area.

Firewood when available would be provided from the following administrative sources:

- hazard trees that are pruned or removed in accordance with an approved hazard tree management plan
- blowdown trees in developed areas
- trees removed to restore historic landscapes in historic districts
- trees removed because of new development
- trees pruned or removed for fire protection as a result of hazard fuel surveys for government-owned structures
- driftwood within the high-pool limits of Lake Chelan

When less than 120 cords is supplied from administrative sources, an additional supply would be provided that, when added to the administrative wood, would not total more than 120 cords of firewood. The 120-cord limit should be reduced by an estimate of the amount eliminated by NPS conversions to other energy sources.

Selective cutting techniques would be used for the additional supply that comes from a designated area. These techniques are intended to retain the genetic stock of dominant trees of a species, preserve all existing layers of the vegetative community, and otherwise leave intact all elements and processes of the ecosystem.

All public lands within 250 feet of the Company Creek road or any historic roads on the south side of the river would be included within a designated area. The boundary of the designated area would be drawn on a map. No firewood cutting would be permitted in wetlands.

On-the-stump rate charges would equal the next cheapest BTU-equivalent source of fuel (e.g., firewood cut from designated USFS lands and barged to Stehekin).

Private firewood users of public firewood would be required to use efficient woodstoves. Where the National Park Service uses firewood, the agency will provide efficient woodstoves. Most existing NPS firewood use would be converted to other energy sources. Existing private firewood users would be encouraged to use other energy sources.

Firewood barged to Stehekin from other areas (Northwest Energy Services, Inc. 1993: 51ff) should be treated to eliminate potential nonnative pest species.

Driftwood from the lake would be available for firewood, but logs and other woody debris would not be removed from the river. Firewood should be obtained from Stehekin Valley only, not from wilderness or the **park.**

Other Energy Sources

Management Objective. Manage energy based on high-efficiency and economic incentives.

Actions. The efficiency of energy use and energy conservation would be emphasized in all NPS facilities. The National Park Service would pursue collaboration between itself,

Chelan County PUD, and Chelan County to institute measures and provide technical assistance.

The conversion to propane or other more efficient, less polluting systems than currently used for private and concession water and space heating needs would be encouraged. Energy conservation would be encouraged through substantial economic incentives.

Threatened, Endangered, and Rare Species; Nonnative Species

Management Objective. Aggressively restore and protect all species in accordance with federal, state, and local laws and guidelines.

Actions. Unlike the other alternatives, alternative C would not make control of nonnative, noxious plants a priority.

The U.S. Fish and Wildlife Service would define critical habitats.

Current levels, or levels defined in approved recovery plans, of resource inventory, monitoring, and research programs would be maintained.

Only identified areas of concern would be revegetated. The reintroduction of select native species would be pursued in these areas.

The National Park Service would educate and cooperative with private landowners and other agencies (e.g., planning commission) to encourage the use of native species.

Scenic Resources

Management Objective. Improve scenic quality by increasing numbers of scenic natural views and restoring cultural scenes.

Actions. The road alignment would be manipulated to maximize the opening up of views; however the country lane road image/rural character would be retained.

New structures would not be allowed to dominate the view of the lake edge. Setbacks (greater than 200 feet), recessive colors, and materials and textures that blend would **be** used. Dominant shoreline structures would be removed, and the areas would be restored to natural conditions. The "fairways" would not be restored.

Vista clearing should be a component of the vegetation management plan to be developed. Vista clearing should be done by opening up views through selective thinning, trimming, or clearing.

As in the proposed action, the outpost community image would be maintained. Design guidelines would identify a crafted, step-back-in-time image. Historic attributes, particularly the Buckner orchard, would be highlighted.

Under alternative C, the power lines would be left. The Chelan County PUD generators would be expanded as necessary.

Wilderness Management Plan Elements

Management Objective. Manage human activities in the wilderness to allow a full spectrum of compatible uses.

Actions. The actions that follow apply to wilderness areas.

Horse grazing — The same grazing standards used in the Chelan-Sawtooth Wilderness (USFS) would be allowed in national recreation area wilderness. Only certified weed-free, processed feed and nongrass grains would be allowed. The maximum party size allowed in any part of the national recreation area wilderness would be 36 pairs of eyes.

Campfires — The campfire standards that apply to Chelan-Sawtooth Wilderness (USFS) would be allowed in national recreation area wilderness.

Boundary changes — No changes to the wilderness boundaries would be proposed.

CULTURAL RESOURCE MANAGEMENT

Management Objective. Emphasize rehabilitation and use of national register properties, while preserving all other cultural resources; research, inventory, evaluate, and document other cultural resources.

Actions. Inventories of the cultural properties in the Stehekin area would continue to be updated on a regular cycle and the existing national register nomination would be amended to incorporate any additional eligible properties.

The Golden West Lodge would be rehabilitated and used for NPS administrative purposes and as a visitor center. The associated historic cabins would be retained. The High Bridge Historic District would be rehabilitated and reused for NPS administrative purposes. The Buckner homestead and orchard would be rehabilitated for enhanced visitor use (picnicking, lodging, and festivals). Rehabilitation of historic structures would be done in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties.*

An agricultural use permitting system would be developed; community gardens would be allowed.

A collection storage/museum curatorial facility would be constructed in the Stehekin Valley.

VISITOR EXPERIENCE

Management Objective. Emphasize a wide variety of visitor experience choices that incorporates the natural, cultural, and recreational values of Lake Chelan NRA, through both structured and unstructured ways and both solitary and social means (with more emphasis on social means than in the proposed action). Maintain a community resort-like environment in the valley, within pastoral and natural landscapes. Seek visitor cooperation in resource preservation through interpretation, protection, design, and example. Ensure that facilities are carefully located and designed, and personal assistance widely available. Visitors' typical perception of wildness thresholds should be the sidewalls of the valley and outside the road corridor to Cottonwood Camp.

Pace **and Access**

Actions. Visitors would be provided with the opportunity to enjoy a variety of paces, and to have several choices of access to a variety of feature locations. Areas with different paces should be kept separate to the degree feasible and desirable; however, the overall pace would still be lower than downlake.

As in the proposed action, speed limits should be kept at low levels. Shuttle buses, operated by the National Park Service and/or private sector, would become the primary motorized form of transportation. Shuttles, including the High Bridge and Cottonwood Camp shuttles, should be operated on schedules. Wherever appropriate, interpretation would be provided onboard (i.e., where there are important and interesting stories about sites visited or seen). Other guided services would be encouraged (horseback, canoes, rafting, bicycles, etc.).

Visitors would be encouraged to use a variety of transportation modes — walking, bicycles, horses, shuttle buses, taxis, boats, and canoes. Pedestrian access would be enhanced along the lake and riverbanks, and opportunities to circulate, engage in

activities, and relax in a variety of ways would be increased.

Recreational Activities

Actions. Action items for alternative C are the same as the proposed action. Visitors would be provided with opportunities to engage in a variety of recreational activities, including but not limited to, e.g., hiking, bicycling, boating, canoeing, kayaking, sailing, rafting, cross-country skiing, snowshoeing, fishing, hunting, horseback riding, photography, guided walks, exploring, and lounging. Recreational access for visitors with disabilities would be enhanced.

All recreational activities would be managed to prevent impacts on resources and to minimize conflicts among users. Activities that infringe on the solitude and natural beauty of Lake Chelan NRA and that cause unacceptable impacts on resources — e.g., bungee jumping, flying ultralights, para-sailing, waterskiing, jet-skiing, and using ORVs — would be discouraged or prohibited.

Circulation

Actions. Enjoyable and efficient transportation would be provided from the Landing to Cottonwood Camp and to features in-between such as the lake, river, Buckner homestead, Rainbow Falls, and lodgings. This would be achieved by providing a linear road spine from the Landing to Cottonwood Camp, with pedestrian loops off the spine at feature areas as far away as High Bridge. The road would have a country lane character through the speed limits, design, and use patterns.

The spine road would be a double-lane paved road from the Landing to Harlequin Bridge, a single-lane paved road to High Bridge, and a single-lane gravel road to Cottonwood Camp.

Lake access at and around the Landing and access to and along the Stehekin River would be improved. The existing access to Buckner homestead, Rainbow Falls, and High Bridge would be retained.

Bicycle use on roads and designated dirt tracks would be encouraged, but bicycles would not be allowed on pedestrian trails except for connections to features and campgrounds.

Overnight Use

Actions. As in the proposed action, the private sector should make available both separated (cabins, huts, tent cabins, houses) and clustered (traditional mountain lodge **or** hostel with central gathering space, or bed-and-breakfasts) lodging experiences. Facility and landscape designs must be consistent with resource and visitor experience values.

Lake

Actions. Action elements under alternative C are the same as the proposed action. The head of Lake Chelan would be managed to encourage a leisurely, peaceful ambience, through the use of speed limits, boat permits, and no-wake zones. The floatplane takeoff area would be reconfigured to reduce noise while maintaining safety.

Marina services would be provided for both day and long-term users (e.g., fuel, time-limited boat moorage, boat and canoe rentals, water taxi, fishing equipment rental and sales, and dump station), and would be concentrated at the Landing.

The lake edge would be designed to allow picnicking, swimming, walking, and sitting, within and complemented by the restoration and maintenance of natural systems. The levels and types of recreational activities would not impair the overall natural, pastoral feeling of the lake and environs.

River

Actions. As in alternative B, the Stehekin River would be managed as a natural system with some human manipulations. Opportunities for visitors to appreciate the power and intricacy of the river as a natural system would be enhanced.

River-related activities such as hiking, picnicking, fishing, sitting, and photography would be included. Access would be designed to avoid harmful impacts on critical areas, yet give visitors opportunities to appreciate and experience significant resource values. Rafting would also be allowed but only when river levels permitted safe transit.

Snags and woody debris would be cleared from the river to improve safety, protect public roads or bridges, and enhance recreational opportunities.

Visitor Use and Resource Protection

Actions. Action items for alternative C are the same as the proposed action. The impacts of human activity on natural and cultural systems (e.g., Stehekin River, Lake Chelan, wetlands, camping and picnic areas, trails) would be monitored to ensure that resources would be protected.

The National Park Service would participate in Resource Conservation and Development District activities to help address lakewide resource and visitor use issues. A forum consisting of Stehekin residents, environmental groups, Chelan County, Chelan County PUD, U.S. Forest Service, National Park Service, and other agencies would be developed to adopt or modify a framework such as limits of acceptable change to set goals, standards, and monitoring and corrective strategies for recreational and other human activities in and around the national recreation area. The cumulative effects of activities on the Lake Chelan watershed would be considered.

INTERPRETATION AND INFORMATION

Management Objective. Encourage visitors to experience and appreciate the natural, cultural, and recreational resources of the valley by using a variety of media and approaches. Visitors would be able to understand primary interpretive themes, resource management and safety issues, Lake Chelan NRA purpose and role in greater ecological and recreational complexes, and the roles of NPS and private sector in recreational opportunities. Emphasize safe, low-impact recreation through interpretive programs and media.

Orientation

Actions. Action items for orientation under alternative C are the same as the proposed action. Information would be made available before visitors have to make decisions. This information would help visitors learn about the resources and experiences that would be available, the behaviors that would be expected (and why), and the skills that are needed for different activities. Information on safety in the national recreation area should be introduced before visitor arrival, emphasized upon visitor arrival, and reinforced prior to visitor initiation of activities.

Visitors would be encouraged to try new activities that are within their capabilities. At contact stations at Chelan and Fields Point, orientation would be provided through telephone inquiries and personal contacts, exhibits, waysides, and printed materials. Boat passengers could read printed materials and talk to and hear presentations by boat crew or NPS interpreters to learn of recreational opportunities and resource information. At Stehekin Landing, visitors would be provided with information about recreational options, how to structure their visits, and the national recreation area in general. Wayside exhibits, a small community-staffed information area, a

roving NPS interpreter, NPS and private brochures, and a bulletin board would be used. At the Golden West visitor center, orientation would be provided, using exhibits, audiovisual, publications, attended information desk, and through private sector.

Interpretation

An association composed of NPS and private residents would be created to take the lead role in planning, designing, and providing information and interpretive services.

The National Park Service would provide:

- introduction to interpretive stories at staging areas, including Chelan and Fields Point, using exhibits, wayside exhibits, publications, and personal services
- personal services interpretation and publications on commercial boats in cooperation with Lake Chelan Boat Company and U.S. Forest Service
- major rehabilitation of Golden West visitor center, including exhibits, audiovisual programs, and information services
- assistance to private providers of interpretation in training, planning, marketing, and quality assurance
- support services such as clerical, curatorial, and research activities
- general oversight, coordination, funding, visitor center staffing, and primary leadership for the association

The association would provide:

- a regular forum for planning, design, management, and evaluation of interpretive media and programs
- interpretive programs and media that focus on primary natural history and prehistory interpretive themes; possible inclusion of programs such as guided walks, interpretive talks, and evening programs, conducted shuttle bus tours, children's programs, offseason information, and informal interpretation at Stehekin Landing and on boats during layovers

The private sector would provide:

- public involvement in the planning, design, management, implementation, and evaluation of interpretive activities and media
- interpretive services and activities based on resource opportunities and sensitivities, visitor interests, interpretive themes, individual capabilities, and maintenance of a rustic atmosphere; concentrate activities on local history and culture

Either free or fee-based interpretive services would be available. Interpretive messages might be provided in conjunction with rental or hiring of recreational services and equipment (e.g., guided canoe, bicycle, or horseback riding trips, shuttle buses, and camping and lodging services).

Facilities

The Golden West visitor center (operated by NPS/private sector association) would be used to provide orientation and other visitor services, and to interpret primary interpretive themes and resource management issues. Interpretive media and information services would be upgrades, including new exhibits and audiovisual programs, and an auditorium for personal and audiovisual programs. Media technology would be more complex and its appearance less rustic than under the proposed action. The first and second floors of building would be made

accessible to visitors in wheelchairs from the Landing.

Exhibits and waysides at Chelan and Fields Point contact stations would be upgraded. Wayside exhibits in the valley would be upgraded if needed. New waysides would be installed where significant views or sites should be interpreted, and where visual and other impacts would be minimal.

LAND USE AND DEVELOPMENT

Transportation Plan Elements

Management Objective. Provide transportation and access to, from, and within the national recreation area to accomplish a quality visitor experience, fulfill resource management objectives, and meet local community needs.

Actions. The actions that follow apply to transportation and access.

Getting there — Mooring preference would be given to larger passenger volume craft. An overnight berthing schedule would be encouraged at Stehekin for one of the ferry runs to supplement overnight experiences schedules. Information and planning assistance would be provided to ferry passengers in selecting and coordinating activities after disembarking.

The airstrip would be managed for emergency use only. Commercial floatplanes would be allowed to fly at present capacity.

Once there — An NPS/commercial-operated shuttle bus service would be provided to Cottonwood Camp, including an onboard interpreter.

Nonmechanized (e.g., walking, hiking, horseback), mechanized (e.g., bicycles), and motorized (e.g., cars, shuttles) transportation types would be accommodated in the national recreation.

Concessioner-provided tours would be available, and all-day and specialty tours should be encouraged. The tours would be organized around scenic, historic, and cultural features that use transportation methods other than car, shuttle or bus, e.g., walking and bicycle tours. During winter holidays, interpretive, cross-country ski tours, etc. would be provided.

Snowmobile use would be limited to existing roads to Cottonwood Camp.

No action would be taken on abandoned vehicles.

Roads and trails — As in alternative B, the current character (slow leisurely pace) and surface (chip seal on main valley road only) of the road from the Landing to Harlequin Bridge would be maintained. Between Harlequin Bridge and High Bridge, the width of the road would be reduced to a single lane (12 feet wide) with pull-outs visible from each other and hardened (chip seal). The road would be protected in place at 8-mile from river erosion using riprap. Excessive gravel roadsides would be rehabilitated to natural vegetation.

The current character of the road between High Bridge and Cottonwood Camp would be maintained with some minor safety and comfort improvements.

Approximately 300 yards of the existing Company Creek road would be removed and located away from active river erosion. A 1.4-mile section of new road would be located along the edge of the valley wall. The old section of road would be rehabilitated.

Roads would be expanded nominally to improve circulation and parking at the Landing. Some old and abandoned road alignments would be converted to new trail loops in the lower valley if appropriate.

A pedestrian and horseback riding trail system would be provided that connects key

lower valley features to the Stehekin Valley road. A trail would be developed from the Castle or Corral area to the Stehekin River without crossing private property, across the Stehekin River with a pedestrian suspension bridge just below the confluence of Boulder Creek, to the river trail (from Weaver Point to the Harlequin Bridge area). Also, a trail would be developed on the historic road access from the valley road to the Buckner orchard as well as a trail that connects the Buckner orchard with Rainbow Falls.

Stehekin Landing, Rainbow Falls, and Airstrip Development Concept Plans Elements

Management Objective. Increase visitor services with emphasis on lodging, and access to lake and riverfronts; and disperse facilities to the least environmentally sensitive areas possible.

For a graphic portrayal of the development concept plans for alternative C, see the accompanying Stehekin Landing and Rainbow Falls Development Concept Plan maps; also refer to the "Proposed Action" section for the Airstrip Area Development Concept Plan map.

Actions. Development for visitor use would be located at dispersed activity nodes, including the Landing, the bakery, Buckner /Rainbow Falls, Courtney ranch, and Battalion Creek.

The Landing would be the focal point for visitor dispersement to various lodging accommodations, tours, transportation systems, and other recreational opportunities.

Transportation — Bulkheads at the Landing would be repaired, and docking for ferries would be improved.

Moorage would be reconfigured to accommodate small boat overnight use, to accommodate competing interests, to improve circulation, and to improve dispersement of freight.

The floatplane tie-up would be retained, but takeoffs would be designated farther downlake.

Visitor lodging and campgrounds — Lodging would be relocated from the Landing to the Rainbow Falls site. Additional lodging (up to 200 beds) would be absorbed through a combination of the public, Rainbow Falls site, and private, self-sustaining commercial developments where resource constraints are minimal, and NPS resource preservation goals are not compromised. The Riddle Creek cabins would be retained in private permits. The Purple Point campground would be retained, and Weaver Point campground would be moved back from the shoreline.

Camping opportunities would be offered at a variety of sites in the lower valley — private sites could offer a range of improvements. The public sites would be low density, unobtrusive, and safe, with ample screening. Water would be provided at Purple Point and other campgrounds where feasible. All sites would have access to pit or composting toilets. Public and private sites would be set back from the lake and removed from hazardous areas as necessary. At least two campgrounds would be made accessible to visitors in wheelchairs. The Weaver Point campground would be used for boat-in camping. Park management would determine which sites were available through reservation.

NPS and concession housing — As in the proposed action, some NPS and concession housing would be consolidated in clustered sites beside the airstrip, depending on environmental parameters and in compliance with compatibility criteria (see "Land Protection Plan Elements" section for criteria). Also, some NPS and concession housing would remain dispersed.

NPS housing would be available for 10 permanent employees, 15 seasonal employees, and 10 transients. Concession housing would be available for 10 permanent and 20 seasonal employees.

Food service — Restaurant services connected with a lodging function would be retained. Food service would be provided within walking distance for all lodging nodes upvalley. Other private food services would be available in areas suitable for this use.

Administrative/office facilities — The NPS headquarters and office space for valleywide needs, post office, etc. would be retained at the Landing. In addition, the tourism/visitor orientation functions would be combined.

Commercial/retail services — A commercial center would be established at the Landing. It would include a grocery store and deli, which would be provided by the National Park Service/concessioner; craft shops, bike rentals, and other appropriate retail would be provided by local residents. Also, commercial services and locally operated shops would be increased upvalley. The capacity, number of structures, and sizes should be kept consistent with the compatibility criteria.

Utilities — The fuel and dump station (located out of geohazard areas) would continue to provided at the marine service center at the Landing. Other fuels (propane, gasoline) would be stored and dispensed upvalley.

Power lines would be retained aboveground.

NPS maintenance — Maintenance facilities would be located at the airstrip.

Land Protection Plan Elements

Management Goal. Make sure that land uses on public and private lands are compatible with the purposes of Lake Chelan NRA, emphasizing those uses that protect area natural and cultural resources and natural processes, and provide for safe visitor facilities and services.

Management Objectives. The six principal management objectives are as follows:

- Protect the national recreation area from land use and development that are incompatible with recreation area purposes.
- Actively support local government in their regulation of nonfederal land within the Stehekin Valley, which places primary reliance on adopted Chelan County zoning ordinances, subdivision regulations, and other applicable ordinances and regulations that ensure that the public health and safety of Stehekin Valley residents and visitors are maintained and enhanced.
- Provide a formal process by which Stehekin Valley residents can actively participate in and provide meaningful input to the Chelan County land use decision process regarding the regulation of private lands.
- Ensure that applicable laws and policies of the state of Washington, including health and safety regulations and Washington Growth Management **Act** provisions, are followed.
- Provide a basis for meaningful and constructive NPS review of proposals for land use change on private land within the Stehekin Valley in order to ensure that all uses and land developments are compatible with the purposes of Lake Chelan NRA.
- Maintain an effective NPS capability to acquire or exchange for full or partial interests in private lands, conducted on a willing buyer/willing seller basis, to augment the land protection measures provided by county land use authority and compatibility determinations.

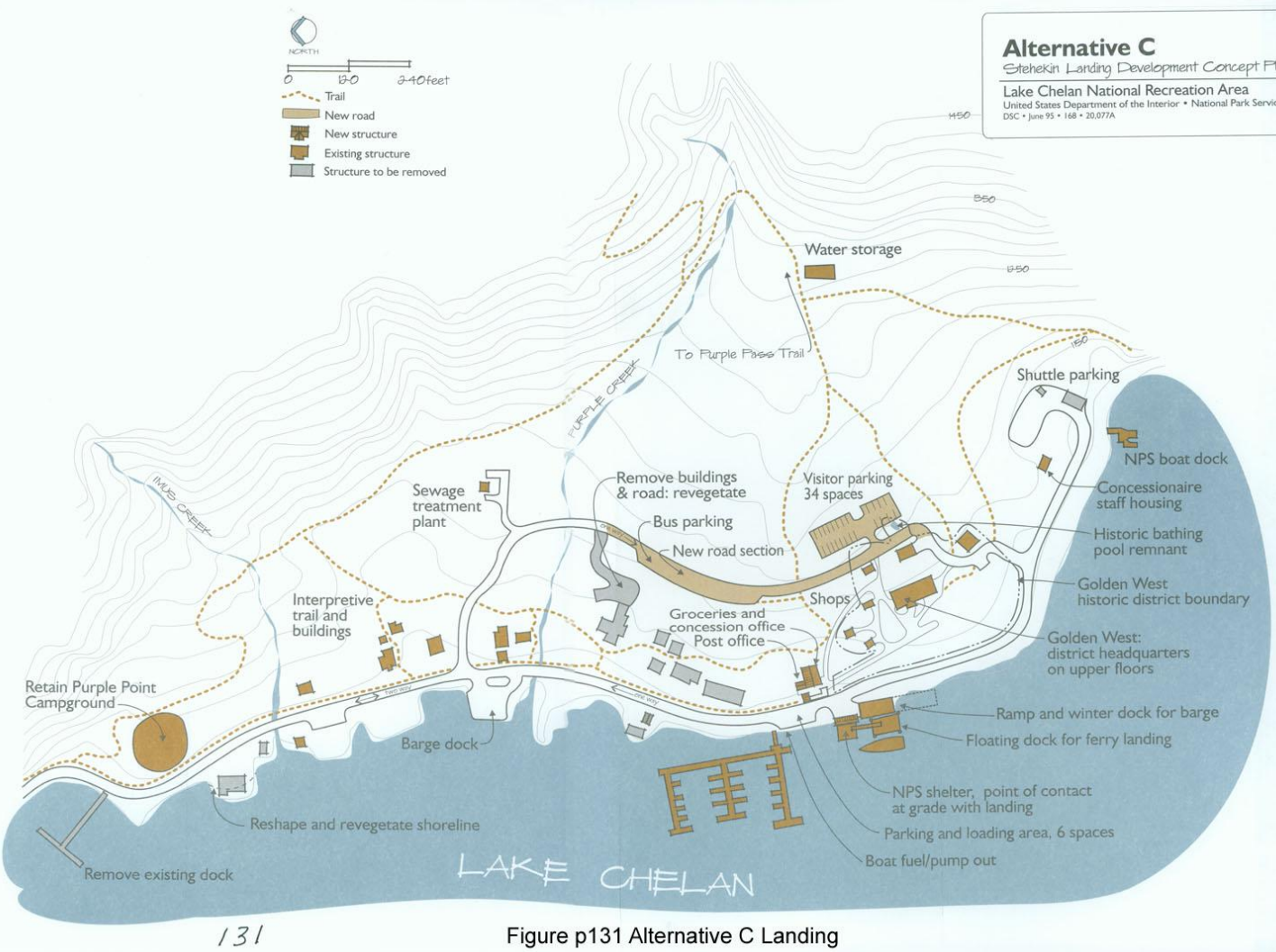
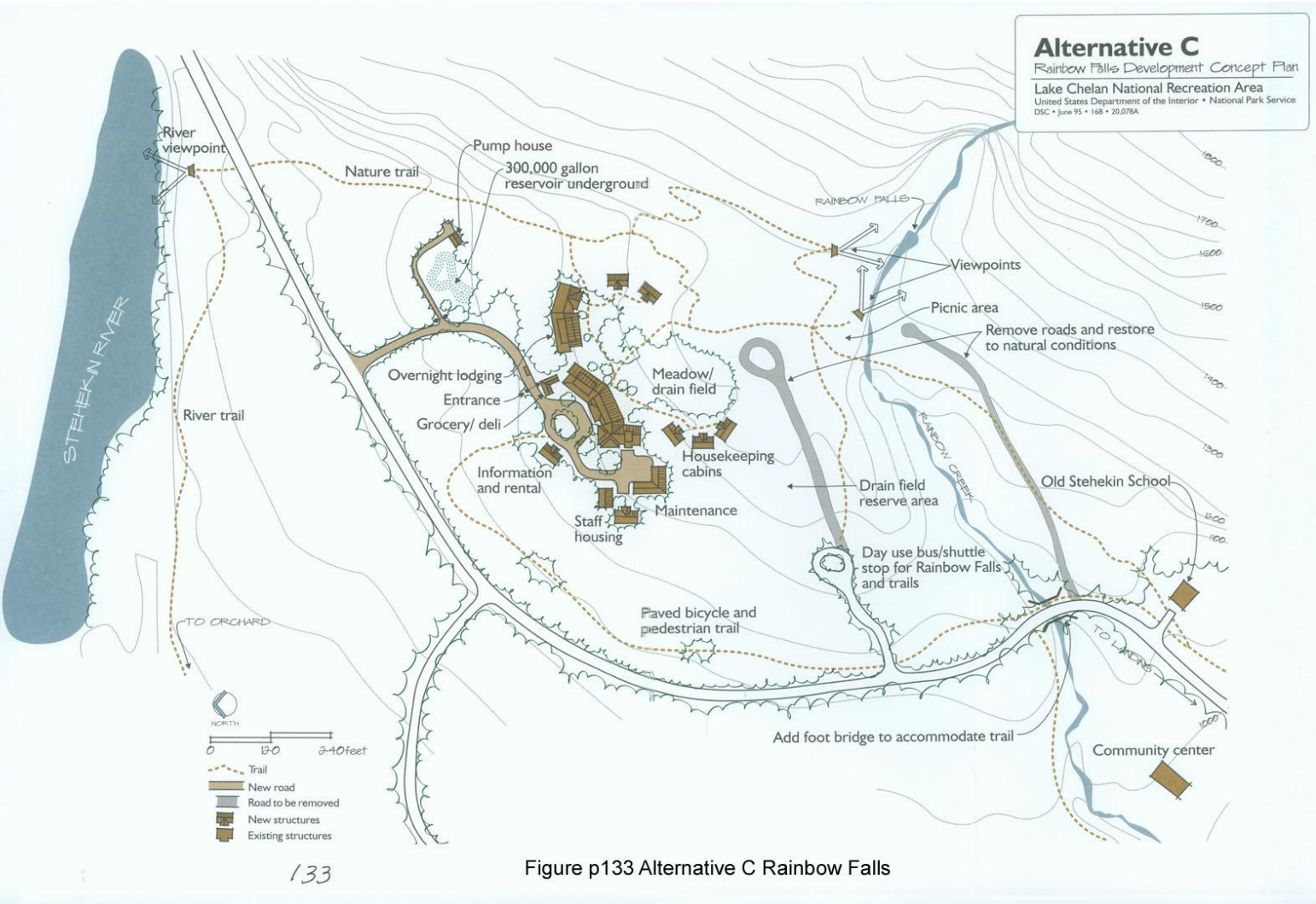


Figure p131 Alternative C Landing



133

Figure p133 Alternative C Rainbow Falls

Guidelines. Based on the land protection goal and objectives, the following guidelines form the basis for the land protection plan (LPP), which is being prepared in conjunction with this GMP. The LPP further defines specific land protection strategies that are to be employed relative to private property within the Stehekin Valley. In addition to incorporating all pertinent elements included in this section of the proposed action, the LPP would also provide a tract by tract listing of landownerships, identifying the approximate area of each tract that has a high priority for resource protection (see appendix D).

- Place emphasis on local zoning and other land use authorities of county and state government to regulate private land uses within the Stehekin Valley (see "Local Zoning/Land Use Regulations" and "Stehekin Valley Overlay District" sections).

- Provide opportunities for local review of Stehekin Valley land use proposals, and an appropriate forum to provide this input to Chelan County government.

- Accept new residential and other private land uses that are compatible with the purposes of the national recreation area (see "National Park Service Land Use Compatibility Criteria" section).

- Accept new commercial uses on private lands that provide visitor and resident services and that are compatible with the recreation area purposes.

- Accept new industrial uses on private lands that are typical of and compatible with historical industrial uses within the Stehekin Valley and that are compatible with the recreation area purposes.

- Encourage land uses that consume a low level of resources, and that conserve both renewable and nonrenewable resources.

- Encourage new construction and conversion of existing facilities that adhere to sustainable design principles (NPS 1993e).

- Identify those properties with areas that have a high priority for resource protection, and where a public interest in land is necessary to protect recreation area resources, based on resource sensitivity and values, or to provide for compatible visitor use and public community needs consistent with the purposes of the national recreation area and other legislated mandates. Resources that have a high priority for protection under alternative C are high flood influence, wetland, and high visual sensitivity areas.

- Continue willing buyer/willing seller acquisitions for properties with areas that have a high priority for resource protection, or for which public needs have been identified, when appropriated funds are available for such purposes or appropriate lands are available for exchange. The National Park Service will consider other factors on a case-by-case basis in making final determinations to purchase parcels. Private lands within areas that have a low priority for protection are not proposed for acquisition, but willing seller opportunities would be considered when funds are available.

- Use land exchanges, as natural, cultural, and scenic conditions allow, within the national recreation area by offering to exchange private lands having resources with high priority for protection for public land from previously acquired private parcels having resources with a low priority for protection.

- Emphasize, where appropriate, with the cooperation of the landowner, oppor tunities for easement purchases and other less-than-fee (e.g., conservation easements) interests for resource

protection and public use. This will allow greater flexibility in the protection of high priority resources, including scenic areas, and could provide an alternative method of achieving public nonmotorized recreational trail access to lakes, rivers, and streams and other sites within the national recreation area.

- Exercise the use of eminent domain procedures only to prevent imminent resource degradation of recreation area values by incompatible uses on private land, and only used as a last resort where other prudent and reasonable measures to protect recreation area resources by eliminating or mitigating the resource degradation, have been exhausted.

Disclaimer. Nothing in this plan constitutes an offer to purchase private property, a taking of private property, or a usurpation of the responsibility of the state of Washington and Chelan County to regulate the use of private land within the Stehekin Valley.

Local Zoning/Land Use Regulations. Complementary actions by local authorities would include the following:

- application by Chelan County of adopted local controls, including zoning ordinances, shoreline management master programs, Growth Management Act comprehensive plan, and subdivision, and other land use authorities to regulate land use and development within the Stehekin Valley

- adherence to adopted Chelan County and Washington State building codes, health and safety, and other applicable standards by valley residents and uniform enforcement by county and state officials

Because the state of Washington already has a relatively sophisticated regime of land use controls and planning, the National Park Service, acting through the superintendent, strongly encourages use of local authorities and existing local controls for regulation of private land use within Lake Chelan NRA. Therefore, as part of this, the National Park Service proposes that the county adopt a new zoning code chapter establishing an overlay district for review of proposed uses and developments on private lands within the Stehekin Valley. This would be in addition to enforcement of applicable state laws and local controls, including the Washington Growth Management Act, Chelan County zoning ordinance, subdivision regulations, and shoreline management master program.

To be consistent with P.L. 90-544 and the purposes for which Lake Chelan NRA was established, the National Park Service will propose that the overlay district, modeled after the Icicle Valley Overlay District in Chelan County Zoning Code (Chelan County Code, chapter 11.39B), meet the following standards:

- Be applicable to all properties in Stehekin that are subject to county jurisdiction.

- Preserve the recreational, scenic, and historic values and general character of the valley setting through review standards for frontage, setback, density, height, sustainable design, size, materials, nonconforming uses, and new subdivisions.

- Discourage variances or exceptions for any new use or additional development that does not meet established controls or overlay review standards or NPS compatibility criteria.

- Recognize formally the role of the superintendent of the North Cascades National Park Service Complex, or his/her designees, in participating in all proceedings before the county concerning land use or developments that may have an effect on NPS lands

and resource values and/or the visitor experience within Lake Chelan NRA.

- Provide that the superintendent be given timely prior written notice of all proposed changes to any Chelan County plans, ordinances, or regulations affecting the Stehekin Valley, and of all applications for permits or approvals within the national recreation area or related areas of concern.

- Demonstrate a clear and consistent commitment to sound land use principles and a method of enforcement by local authorities and, where applicable, the National Park Service.

Stehekin Valley Overlay District. In keeping with these standards, the National Park Service has prepared a draft of a proposed overlay district ordinance for the national recreation area for consideration by Chelan County to adopt as part of their review of land use actions on private land within the Stehekin Valley.

The proposed Stehekin Valley overlay district would have a review board made up of area residents and other interested parties with *ex-officio* participation by the National Park Service, which would review all land use development proposals for private lands within the area, and make recommendations to Chelan County regarding the appropriateness of each land use proposal.

1. Objectives. Design review for the Stehekin Valley is intended to accomplish the following objectives:

(a) Encourage uses on public and private lands that can be developed and used compatibly with the purposes of the Lake Chelan National Recreation Area, emphasizing those uses that protect area natural processes and resources and provide for safe visitor facilities and services.

(b) Maintain the current level of services for visitors, allowing the private sector to augment services to meet additional demand, on lands determined suitable for such uses.

(c) Maintain compliance with Chelan County and NPS objectives for the area as described in local and state controls and plans, including the Chelan County Zoning Code, Chelan County Shoreline Master Program, Chelan County Sensitive Areas Ordinances, National Park Service Architectural Character Guidelines and Management Objectives-Lake Chelan National Recreation Area, National Park Service Compatibility Standards, Chelan-Douglas Health District Design Guidelines for Septic and Drainfield Systems, Chelan-Douglas Health District On-site Sewage Disposal System Rules and Regulations, and other local, state, and federal laws and regulations.

(d) Facilitate recreational opportunities while conserving the scenic, scientific, historic, and other values contributing to public enjoyment.

(e) Promote the management, use, and disposal of renewable natural resources and development that, are compatible with, or do not significantly impair public recreation and conservation of the scenic, scientific, historic, or other values contributing to public enjoyment and community vitality of the district.

2. Applicability

[The formal legal description of the subject area will be presented here.]

3. Design Review Committee. For the Stehekin Valley Design Review Overlay District, the Design Review Committee will consist of five voting members who will be registered voters and /or property owners within the planning area. The five voting members will be appointed as follows: three members appointed by the Chelan County Commissioners, one appointed by the Chelan County PUD, and one appointed by

the Commissioner of Public Lands. They will be assisted by expert, *ex-officio* (no-voting) members, including a professional hydrologist and a public health sanitarian (both designated by Chelan County), a planner employed by Chelan County, an NPS resource specialist, a planner or landscape architect affiliated with or designated by the National Park Service, and a wildlife biologist designated by the National Park Service. All members will be appointed and will serve in accordance with this ordinance, except that *ex-officio* members affiliated with the National Park Service will be appointed by the park superintendent.

4. Review Responsibilities. The Stehekin Valley Design Review Committee will review and make recommendations on all land use and development matters within the district subject to Chelan County jurisdiction, including but not limited to:

- grading, building, and other related permits and approvals
- conditional use permits
- variances
- zone changes
- planned unit developments
- shoreline substantial development permits
- comprehensive plan modifications
- short and long subdivisions
- minimum lot sizes and densities

5. All Uses Conditional. In the Stehekin Valley Design Review Overlay District, all otherwise permitted uses will be deemed conditional uses. The recommendation of the Design Review Committee on such uses will be given substantial weight by the zoning adjustor, Board of Adjustment, Board of County Commissioners, and other bodies in deciding applications within the district. Uses appropriate in one area of the district may be subject to conditioning or denial in another (e.g., siting of commercial facility in inappropriate scenic area).

All applications will be reviewed on the following criteria:

(a) Consistency with the objectives for the district will be sought.

(b) Early termination of uses inconsistent with the objectives of the district will be encouraged.

(c) Otherwise permitted development will not be approved if clearly inconsistent with adopted NPS compatibility standards.

(d) Degradation of critical/sensitive natural resources will not be permitted.

(e) Suitability of location in light of objectives for the district will be encouraged.

(f) Arrangements for use by general public consistent with objectives of the district will be encouraged.

(g) Uses that result in less consumption of resources and conservation of both renewable and nonrenewable resources will be encouraged over more consumptive alternatives.

(h) Conversion of existing facilities to uses compatible with the purposes of the district will be encouraged.

(i) Uses that may result in degradation of water quality or pollution will be discouraged.

(j) The construction or siting of building on slopes with gradient greater than 20% without assurances of acceptable mitigation measures will be discouraged to minimize the potential for erosion; hazards to public safety and health; and any adverse impacts on the recreation, scenic, scientific, and historic values of the area.

(k) The clustering of structures is encouraged in order to promote open space scenic quality, resource conservation, and the efficient provision of visitor services. In developing overnight visitor accommodations, the combining of accommodation units may also be permitted.

6. Specific Uses

(a) Permitted Conditional Uses. When consistent with the above criteria, permitted conditional uses at appropriate locations will include:

- small-scale visitor lodging and/or campgrounds
- NPS and concession housing
- food service
- administrative and office facilities for governmental purposes
- commercial and retail services consistent with the purpose of the area
- utility facilities and ancillary services
- private residential uses

(b) Restricted Uses. In addition to restrictions noted above, the following additional restrictions apply to uses specified below:

(1) Applications for construction of multifamily dwellings will not be approved unless they would facilitate achieving otherwise permitted residential density while avoiding construction in critical or sensitive areas.

(2) Manufacturing or industrial uses not historically typical of the lower Stehekin Valley will not be permitted.

(3) Mining, except for limited extraction of sand, rock, and gravel for local maintenance use in accordance with an NPS-approved sand, rock, and gravel plan, will not be permitted.

(4) For all proposals that would entail the use or consumption of federal property or resources, no approval will be granted unless prior federal approval has been obtained.

National Park Service Land Use Compatibility Criteria. The National Park Service will adopt a revised approach for a determination of compatibility regarding proposed use and development of private and nonfederal lands within the national recreation area to ensure that such uses are compatible with the purposes for which Lake Chelan NRA was established. Where proposed uses are not adequately addressed by county and state land use authorities, the application of compatibility criteria would be the basis for a case-specific compatibility analysis by the National Park Service. The limitations of the previous compatibility standards, and their approach to specific land use standards in regulatory language, have been removed.

PL. 90-544, which established the Lake Chelan National Recreation Area, provided that the secretary of the interior may "acquire lands, waters and interests therein by donation, purchase with donated or appropriated funds, or exchange, except that he may not acquire any such interests within the recreation areas without the consent of the owner, so long as the lands are devoted to uses compatible with the purposes of this act." **(emphasis added)**

Therefore, in accordance with the applicable provisions of PL. 90-544, these compatibility criteria establish the basis for identifying which land uses within the Stehekin Valley are inconsistent with the protection of natural, recreational, scenic, scientific, and historic values of Lake Chelan NRA. They also identify land uses that are incompatible with the purposes of the national recreation area. This could subject the property that is proposed for the incompatible use to potential acquisition via the use of federal eminent domain powers where all other prudent and reasonable attempts to remove or mitigate the incompatibility have failed.

These compatibility criteria are not intended to duplicate county zoning standards or other applicable land use practices that are the proper purview of local government, and that would be related more to the protection of the life, health, and safety of Stehekin Valley residents. Instead, these NPS criteria are intended to guide both park

management and Stehekin Valley residents in determining which land use proposals and practices are in harmony with the resource values of the national recreation area and which are not. The criteria are resource-based, and have been developed to ensure the long-term protection of the natural, recreational, scenic, scientific, and historic values of the area.

The following purposes provide further guidance in the application of the compatibility criteria, the adherence to compatible uses by Stehekin Valley landowners, and the application of criteria by park management.

- To identify uses that would harm, degrade, or adversely affect resource values of Lake Chelan NRA.
- To identify proposed types and levels of land uses that would harm resources when cumulative effects are considered in the context of previously established uses.
- To encourage uses that would enhance resource values and the general character of the valley.
- To encourage conversion from a higher impact land use to a lower impact land use.

I. COMPATIBILITY CRITERIA A.

General Criteria

The alteration, development, and use of all public and private properties within Lake Chelan NRA must comply with applicable federal laws, rules, and regulations, and must be compatible with the congressionally designated purposes of Lake Chelan NRA.

B. Incompatible Uses of All Property within Lake Chelan NRA

The following uses of all public and private property within the Stehekin Valley are incompatible with the purposes of Lake Chelan NRA:

1. Any subdivision of land that was not in effect prior to the adoption of these compatibility criteria, except as permitted through the Chelan County Subdivision Regulations and as consistent with Chelan County health standards.
2. The siting or construction of any building, including but not limited to, residential, commercial, and industrial buildings, in an identified:
    - high flood influence area
    - wetland
    - riparian area
3. Any dredging or filling of Lake Chelan or the Stehekin River without full compliance with the U.S. Army Corps of Engineers permitting process.
4. The cutting of timber for sale or transport outside the Stehekin Valley.
5. The cutting of timber by any means other than selective tree harvesting, except as required by Washington State Department of Natural Resource regulations.

C. Incompatible Uses of Public Property Within Lake Chelan NRA

In addition to those uses listed in section B. above, the following use of all public property within the Lake Chelan NRA is incompatible with the purposes of the national recreation area. While these standards have not been applied to

private lands within the Stehekin Valley, it is highly recommended they be adopted by Chelan County within the county zoning ordinances and the proposed Stehekin Valley Overlay Zone.

The National Park Service will not site any building or structure in an identified:

- 100-year floodplain, unless used for nonhuman occupancy and with conditions on specific uses or mitigation
- wetland soils, and those soils not conducive to building foundations, leachfield percolation, or site drainage
- geohazard areas
- areas with slopes greater than 20% gradient
- areas of high visual sensitivity, except where specific design mitigation measures can successfully be used

D. Effective Date of the Compatibility Criteria

Upon adoption, these compatibility criteria will supersede those compatibility standards promulgated in 1988, and updated in 1992. Adoption will be official upon the signing of the Record of Decision by the regional director, National Park Service, Pacific Northwest Region.

E. Request for Determination of Compatibility

The Lake Chelan NRA legislation does not grant the secretary of the interior zoning authority. However, it does impose the responsibility to ensure that existing uses are compatible and that proposed land uses will be compatible with the purposes for creation of the national recreation area. The current zoning ordinances of Chelan County have been found to substantially satisfy the intent of the Lake Chelan NRA legislation, and therefore constitute the primary basis for implementing these compatibility criteria.

Landowners or other interested or affected parties can make a written request to the superintendent for a determination as to whether an existing or proposed use is in compliance with the compatibility criteria. Generally, the superintendent will find that existing and proposed land uses are compatible if such uses conform to applicable local, state, and federal laws and not specifically sited within incompatible use areas as described in section B.2. above.

Requests for a determination of compatibility must be made in writing to the superintendent and include the following information:

1. Description/location of the property and the applicable county or local zoning classification, e.g. rural residential, conservation, general.
2. Existing use and/or development being proposed on the property.
3. Statement as to whether the county or local zoning for the property will allow for the proposed use or development without the need for a variance.
4. Statement as to how the use or proposed development will comply with the compatibility criteria.

The superintendent will review the request and notify the landowner in writing within 45 days after receiving a request for determination whether the

existing use or proposed development and use is in compliance with the compatibility criteria. The superintendent may need to extend the schedule for making a determination of compatibility by 30 days if additional information is needed.

In the event the superintendent determines an existing or proposed use or development is not in compliance or not compatible based on the supplied information and a field check by NPS staff, the superintendent will give the landowner written notice of the manner and nature of the incompatibility. To the extent practicable, the notice will include suggestions or alternatives for working with landowners to achieve compatibility.

PARK OPERATIONS

Concessions, Contracting, Special Use Permits, and Private Enterprise

Management Objective. Provide services that promote expanded recreational experiences.

Actions. Expanded and/or new services and facilities/programs that enhance the recreational experience would be promoted. Partnerships (public/private) would be encouraged. A partnership arrangement would be used to assist and guide the expansion of commercial uses by promoting, disseminating information, developing facilities, and monitoring the quality of the visitor experience. The use of the local workforce as much as possible would be encouraged.

NPS Provision of Services to Private Landowners

Management Objective. Provide services essential for resource protection and visitor health/safety; expand services to include private land uses and commercial activities that enhance the visitor experience. Use private contracts where appropriate.

Actions. The following would be provided:

- technical assistance to "partners" for business/financial planning, design, and construction of facilities, and visitor programs
- wildfire protection through reimbursable agreement between the U.S. Forest Service and the Washington State Department of Natural Resources
- all solid waste disposal under user-fee basis by private contractor
- boat sewage disposal and moorage with moorage fees
- road maintenance to Cottonwood Camp (including snow removal 9 miles upvalley), including new roads to accommodate recreational activities
- post office space
- building for community purposes available under permit
- basic transportation system on a fee basis
- law enforcement personnel deputized by county

NPS Staffing

Management Objective. Through increased NPS presence, support expanded visitor services, facilities, and programs.

Actions. There would be more than current levels of permanent employees, but the current levels of seasonal employees would remain the same.

Cooperative Relationships with Others

Management Objective. Promote the development of partnerships to jointly manage the natural, scenic, cultural, and recreational resources of Lake Chelan NRA.

Actions. The National Park Service would work with county, state, and federal agencies for enforcement of existing ordinances and regulations.

Cooperative management would be pursued with the U.S. Forest Service (e.g., wildlife, wilderness, Fields Point); State of Washington Department of Natural Resources, Department of Ecology, and Department of Fish and Wildlife; Chelan County (e.g., law enforcement, search and rescue, land uses); and Chelan County PUD.

The National Park Service would establish a partnership arrangement to promote visitor services, disseminate information, develop facilities, and monitor quality of the visitor experience.

TABLE 1: SUMMARY OF ALTERNATIVES

ACTION ITEM •	PROPOSED ACTION	NO-ACTION/MINIMUM REQUIREMENTS ALTERNATIVE
Concept	The rustic setting of Lake Chelan NRA would be part of a transition from the downlake recreational, residential, agricultural, and industrial setting to the very wild and natural North Cascades National Park. The use of NRA resources by visitors and residents would be limited to preserve the natural, scenic, and cultural values of the area.	Lake Chelan NRA would be a rural resort community where resources are used, within limits, by an expanding residential presence. This alternative is the 1988 *General Management Plan* and supporting plans.
Water Quality	Baseline water resource parameters would be inventoried. Adjacent land uses and their effects on water resources would be monitored in order to develop management strategies for minimizing impacts. The Park Service would take action where extremely adverse actions occur that violate the Clean Water Act and significantly threaten water resources.	The National Park Service would inventory and monitor water quality to evaluate changes and ensure compliance with standards. There would be no restrictions on lake use.
Fish	Resource inventory, monitoring, and research programs would be pursued to enhance the knowledge of native fish populations and their habitat to determine and evaluate change in response to habitat dynamics, nonnative fish species, recreational fishing, land use, and management actions.	Resource inventory, monitoring, and research programs would be pursued to enhance the knowledge of native fish populations and their habitat, and to evaluate effects of angler harvest and management actions. Nonnative fish species that threaten existing native fish populations would be controlled.
Stehekin River	The National Park Service would not manipulate the Stehekin River or its tributaries nor manipulate woody debris except to protect public roads and bridges. Woody debris could be trimmed or turned in the lower 9 miles of the Stehekin River to allow safer river running if it did not alter the function or stability of woody debris accumulations and was permitted by the appropriate regulatory agency. Woody debris would not be removed from the river system in any case. The Park Service also would not manipulate the river nor manipulate or remove woody debris to protect private property. The Park Service would discourage private owners from manipulating the Stehekin River or removing woody debris on their land to protect their property, but would take no action to prevent owners from doing so, unless such actions would harm NRA resources or would not be in compliance with local, state, or federal ordinances, regulations, or laws. But, such actions would not be encouraged.	River erosion and flooding would be controlled only to protect life, health, existing public roads, and bridges. Immediate flood hazards to private property would be alleviated using minimum actions. Research would be conducted to evaluate stream resource use impacts and to recommend stream-bank protection measures that minimize impacts.

ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C
Lake Chelan NRA would be a wild, natural area where resources and natural processes would be largely undisturbed and protected. Natural forces would be allowed to slowly remove evidence of manmade occupation.	Lake Chelan NRA would be a rural woodland gateway to the North Cascades where the use of resources by visitors and residents would be limited in order to preserve the natural, scenic, and cultural values of the area.	Lake Chelan NRA would be a retreat/ refuge/ resort where resources and natural processes are showcased for the enjoyment of visitors.
Baseline water resource parameters would be inventoried and monitored to evaluate effects of land and water use, and to comply with standards and regulations. Nonessential land and water uses that threaten water quality and quantity should be eliminated where feasible and the best management practices implemented where not feasible.	Baseline water resource parameters would be inventoried and monitored to evaluate effects of land and water use, and to ensure compliance with standards and regulations.	Baseline water resource parameters would be inventoried and monitored to evaluate effects of land and water use, and to comply with standards and regulations. The best pollution control measures would be implemented to minimize the risk of water pollution. There would be no restrictions on recreational water use.
Resource inventory, monitoring, and research programs would be pursued to enhance the knowledge of native fish populations and their habitat, and to evaluate effects of angler harvest and management actions. Normative fish species would be eliminated and native fish and their habitat restored throughout their range. Only catch and release fishing would be allowed.	Same as proposed action.	Resource inventory, monitoring, and research programs would be pursued to enhance the knowledge of native fish populations and their habitat to determine and evaluate change in response to habitat dynamics, exotic fish species, recreational fishing, land use, and management actions. Normative fish species that jeopardized threatened, endangered, or candidate fish species would be controlled.
Removal of existing river control structures would be pursued and new river shoreline or bank protection structures on both federal and nonfederal lands would be prohibited. The removal or manipulation of woody debris from the river would be prohibited.	Riverbank protection structures would be allowed for protection of existing improvements only if no adverse impacts on the natural environment would result. The National Park Service would consider the removal of woody debris that was only a recreational hazard.	Protection of existing public or private improvements threatened by river erosion and flooding would be allowed. Removal and manipulation of woody river debris that causes severe erosion problems or safety hazards, including hazards to recreational activity, would be allowed.

ACTION ITEM	PROPOSED ACTION	NO-ACTION / MINIMUM REQUIREMENTS ALTERNATIVE
Wetland, Floodplain, Shoreline, and Riparian Areas	Existing NPS development in these areas (except significant cultural resources) would be relocated to suitable sites and the disturbed sites restored to natural conditions. The National Park Service would take appropriate measures where actions threatened to cause significant impacts in these areas.	No action would be taken that supports further development of the 100-year floodplain; developments would not be removed from wetlands. Shoreline between the Landing and head of the lake would be restored to natural conditions and made available for public recreation.
Sand, Rock, and Gravel Plan Elements	The active sand, rock, and gravel borrow pit would be maintained at less than or equal to its current size. There would be no new borrow pits. Old inactive borrow pits would be restored to natural-like contours and vegetative cover as appropriate. Allocation of pit material for local residents only would be based on available supply, resource impacts, and type of use. Pit material sold to the public would be at fair market value. No sand, rock, or gravel would be removed from the 100-year floodplain of the Stehekin River or its tributaries.	The currently active sand, rock, and gravel borrow pit would be reclaimed as new excavation occurs. The size of the pit would remain constant. New pits would be established if the existing pit was depleted. Mining of sand, rock, or gravel from the 100-year floodplain of the Stehekin River or its tributaries could occur only if there were no adverse impacts.
Geohazards	New NPS facility developments would not be sited in geohazard areas, and existing NPS/concessioner development would be relocated away from geohazards. The National Park Service, through cooperative efforts with state and local agencies, would oppose private commercial visitor facilities in geohazard areas.	Same as proposed action. Existing private development would be protected from geohazards or relocated.
Forest Fuel Reduction 1 Firewood Management Plan Elements	Human- and lightning-caused fires on the valley floor would be suppressed for the protection of human life and property. Prescribed natural fire would be used beyond the valley floor, when conditions were appropriate, to maintain the natural role of fire on mountain slopes and upstream from High Bridge.	Where feasible, federal lands would be treated with prescribed fire to reduce fuels. A program would be implemented to reduce hazardous fuels adjacent to developments and private land. Naturally ignited fires burning under prescribed conditions would be suppressed in the lower Stehekin Valley.

ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C
All nonessential development would be removed from public wetland, floodplain, shoreline, and riparian areas and the habitat restored to natural conditions. Over time, all properties would be acquired, with the consent of the owners.	Same as proposed action. The National Park Service would seek to acquire properties that have significantly threatened these areas.	Same as proposed action. The National Park Service would work with property owners to encourage public access and recreation as well as minimize impacts. It would seek to acquire properties or interest where uses most significantly threatened these areas.
The mining of sand, rock, and gravel would be prohibited within the valley. All borrow pits would be restored to natural contours and vegetative cover.	The mining of sand, rock, and gravel in the valley would be prohibited, but material could be barged in from outside the valley. All old borrow pits would be restored to natural contours and vegetative cover as appropriate. No sand, rock, and gravel would be removed from the 100-year floodplain of the Stehekin River or its tributaries.	The currently active sand, rock, and gravel borrow pit would be reclaimed as new excavation occurs. The size of the pit would remain constant. New pits would be established if the existing pit was depleted. Mining of sand, rock, or gravel from the 100-year floodplain of the Stehekin River or its tributaries could occur only if there were no adverse impacts.
Minimal new NPS development would be sited to avoid geohazards. Existing NPS or private development that is in geohazard areas or affects geological processes would be removed.	Same as proposed action.	New NPS developments and recreational facilities would be sited to avoid geohazards, and existing development would be protected from geohazards or relocated. Same as proposed action.
Human- and lightning-caused fires on the valley floor would be suppressed for the protection of human life and property. Forest fuel reduction would only be used to restore /maintain a naturally open stand structure in ponderosa pine/Douglas fir forest. Same as proposed action.	Same as proposed action.	Same as proposed action.

Action Item	Proposed Action	No-Action/Minimum Requirements Alternative
Forest Fuel Reduction I Firewood Management Plan Elements (cont.)	Selective manual thinning and management-ignited prescribed fire would be used in forest fuel reduction areas to • reduce the amount of fuel in strategically located sites for more effective fire protection • strive for a 40%-60% forest canopy cover in some areas • perpetuate a multiaged ponderosa pine/Douglas fir forest • restore effects of low-intensity fire • provide firewood for Stehekin residents from surplus logs as a secondary objective Selective manual thinning would precede management-ignited prescribed fire treatment in some of the forest fuel reduction areas. Coniferous trees may be thinned in riparian communities within the fuel reduction areas. The practice of woodlot cutting for firewood would be phased out over a two-year period to enable the establishment of long-term monitoring plots and resource baseline data collection in forest fuel reduction areas. When available, firewood would be provided from the following sources: • hazard trees that are pruned or removed in accordance with an approved hazard tree management plan • blowdown trees in developed areas • trees removed to restore historic landscapes in historic districts • trees removed because of new development • trees pruned or removed for fire protection as a result of hazard fuel surveys for government-owned structures • driftwood within the high-pool limits of Lake Chelan • trees removed from forest fuel reduction areas by selective manual thinning	Firewood would be obtained from harvesting 1-acre woodlots managed on an 80-year rotation for sustained-yield production. Administrative surplus trees cut by the National Park Service and driftwood from the lake would also be used as firewood.

ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C
A fire suppression strategy would be applied equally throughout the valley. Management-ignited prescribed fire would be the only tool used to achieve desired stand conditions.	Same as proposed action.	Differs from proposed action in that the criteria for forest fuel reduction areas would be based primarily on a suppression strategy. Selective manual thinning would be the only tool employed to achieve desired stand conditions.
	Same as proposed action.	
The cutting of wood for firewood on public lands would be discontinued. Woodlot cutting of firewood would be stopped immediately and the use of administrative wood would be phased out.	Same as proposed action.	Woodlot cutting would be stopped within the next two years to allow the establishment of Company Creek road designated firewood area. When available, firewood would be provided from the following sources: • hazard trees that are pruned or removed in accordance with an approved hazard tree management plan • blowdown trees in developed areas • trees removed to restore historic landscapes in historic districts • trees removed because of new development • trees pruned or removed for fire protection as a result of hazard fuel surveys for government-owned structures • driftwood within the high-pool limits of Lake Chelan

ACTION ITEM	PROPOSED ACTION	NO-ACTION/MINIMUM REQUIREMENTS ALTERNATIVE
Forest Fuel Reduction 1 Firewood Management Plan Elements **(cont.)**	Firewood would be provided at fair market value. There would be no guarantee of firewood cordage per year. The firewood supply probably would diminish over the long term, but ultimately the amount of government-supplied firewood would be significantly reduced. Residents with a woodcutter's permit would be able to obtain firewood from designated areas for personal, family, and business use. Residents not wishing to obtain their own firewood would be required to purchase it from the NPS contractor. Firewood barged to Stehekin from other areas should be treated to eliminate potential nonnative pest species. Driftwood from the lake would be available for firewood, but logs and other woody debris would not be removed from the Stehekin River, to protect the diversity of fish and wildlife habitat. Firewood would be obtained from Stehekin Valley only, not from wilderness or the park.	Administrative surplus trees cut by **the** National Park Service and driftwood from the lake would be used as firewood. Fallen trees might be collected if they **are** within 100 feet of the road. Firewood would be obtained from Stehekin Valley only, not from wilderness or the park.
Other Energy Sources	Energy conservation would be encouraged through using sustainable construction and insulation materials, efficient woodstoves; eliminating NPS woodstoves as primary heat source; converting NPS electric space heating to more efficient systems; converting to propane for private and concession water and space heating needs; using propane for NPS and concession vehicles, exploring viability of solar space heating; and promoting energy conservation for all new private uses.	No specific conservation measures would be employed except for the requirement **for** efficient woodstoves. Energy conservation would be voluntary.
Threatened, Endangered, and Rare Species; Nonnative Species	Resource inventory, monitoring, and research programs would be implemented to enhance knowledge of biological communities and natural processes and to evaluate trends. Selected nonnative plant species that threaten to spread adversely affect NRA resources would be controlled. The National Park Service would work with the U.S. Fish and Wildlife Service and other agencies to define and properly manage important habitats in an ecosystem context.	The National Park Service would expand its inventory, monitoring, and research programs. Selected nonnative plants would be controlled through monitoring and mitigation, including biological control agents, herbicides, and mechanical means. The U.S. Fish and Wildlife Service would define critical habitats.

ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C
Logs or wood derived from hazard trees would be used to restore disturbed sites, control soil erosion, maintain trails, and preserve historic structures. Firewood would not be provided. Same as proposed action.	Same as proposed action. Same as proposed action. Same as proposed action.	When less than 120 cords is supplied from administrative cords, an additional supply would be provided that, when added to the administrative wood, would not total more than 120 cords of firewood. The 120-cord limit should be reduced by an estimate of the amount eliminated by NPS conversions to other energy sources. Selective cutting techniques would be used for the additional supply that comes from a designated area. These techniques are intended to retain the genetic stock of dominant trees of a species, preserve all existing layers of the vegetative community, and otherwise leave intact all elements and processes of the ecosystem. Same as proposed action. Same as proposed action.
Similar to proposed action.	The efficiency of energy use and conservation would be emphasized in all NPS facilities. The conversion to propane or other less polluting systems than what are currently used for private and concession water and space heating needs would be encouraged. Also energy conservation would be encouraged for all new private uses through design guidelines.	The efficiency of energy use and conservation would be emphasized in all NPS facilities. The conversion to propane or other less polluting systems than currently used for private and concession water and space heating needs would be encouraged. Energy conservation would be encouraged through substantial economic incentives.
Same as proposed action. Critical habitats should be defined to include at least those areas identified by the U.S. Fish and Wildlife Service for listed and sensitive species; access should be restricted to these areas.	The National Park Service would pursue resource inventory, monitoring, and research programs to enhance knowledge of biological communities and natural processes and to evaluate trends. Selected nonnative plants would be controlled through monitoring and mitigation, including biological control agents, herbicides, and mechanical means. The U.S. Fish and Wildlife Service would define critical habitats.	Control of nonnative, noxious plants would not be a priority. Current levels, or levels defined in approved recovery plans, or resource inventory, monitoring, and research programs would be maintained. The U.S. Fish and Wildlife Service would define critical habitats.

ACTION ITEM	PROPOSED ACTION	NO-ACITON / MINIMUM REQUIREMENTS ALTERNATIVE
Scenic Resources	The current character of the road from the Landing to Harlequin Bridge and from 9-Mile to High Bridge would be maintained. The section from Harlequin Bridge to 9-Mile would be a hardened, single-lane road with pullouts visible from each other. The natural character of the lake and river edge on public lands (includes areas within 200 feet of the lake and river shoreline) would be restored. The open character of the pastures would be retained. The outpost community image of the area would be maintained.	No change would be made in the current road system. The natural character of the lake edge (includes areas within 200 feet of shoreline) would be restored. Existing structures would be removed, and no new docks or structures would be built there.
Wilderness Management Plan Elements	Horse grazing in the NRA portion of the Stephen Mather wilderness would continue to be permitted. Grazing would continue to be prohibited within the national park. Open campfires in subalpine zones and firewood gathering in subalpine zones and some other sensitive areas would be prohibited based on impact analysis.	Limited grazing would still be allowed in NRA wilderness but prohibited in the park. Campfires would be allowed in grates in designated sites only.
Cultural Resources	The Golden West Lodge and the High Bridge Historic District would be rehabilitated, and the Buckner homestead and orchard would be preserved. Significant parts of the Buckner collection should be acquired. Some artifacts should be maintained onsite for interpretation, and others should be stored in a curatorial facility constructed outside the valley but within Chelan County.	The Golden West Lodge would be rehabilitated, and the Buckner homestead and orchard would be preserved. A small collection storage facility should be provided in the lodge or other NPS structure in the valley for storage of collection items.
Visitor Experience	Visitors would be provided with opportunities to enjoy a relaxed, leisurely pace, and to have several choices of access to several feature locations. Shuttle buses would be the primary motorized form of transportation, but visitors would be encouraged to use nonmotorized methods (walking, riding bicycles and horses, and renting boats and canoes within the national recreation area). The Stehekin Valley road would be paved from the Landing to 9-Mile, gravel between 9-Mile and High Bridge, and a heavy-duty, high-clearance shuttle vehicle road from High Bridge to Cottonwood. Pedestrian and horseback riding loops would be provided off the road at several areas. Access to the lake and around the Landing would be included.	Visitors would have opportunities to enjoy a relaxed, leisurely pace, and to have choices of access to several feature locations. Shuttle services should be continued between the Landing and High Bridge and to Cottonwood Camp. To support relaxed pace, visitors would be encouraged to walk, ride bicycles and horses, or rent boats and canoes. A linear road spine would be provided from the Landing to Cottonwood Camp. The double-lane paved road for 4 miles from the Landing, the double-lane gravel road to 9-Mile, and the single-lane gravel road between 9-Mile and Cottonwood Camp would be maintained. A new 11-mile valley trail leading from the Landing to High Bridge, generally paralleling the road, would be constructed.

ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C
As property was acquired, roads would be removed to keep the visual experience primitive and trail-like. All existing native vegetation would be retained, and no manipulation clearing or vista clearing would be done. The overall image of wildlife would be determined by unmanipulated natural systems.	The current character of the road from the Landing to Harlequin Bridge and the country lane road image/rural character from Harlequin Bridge to High Bridge would be retained. The overall scene would be maintained largely as it is today. The natural character of the lake would be restored.	The road alignment would be manipulated to maximize the opening up of views; however, the country lane image/rural character would be retained. New structures would not be allowed to dominate the view of the lake edge. Dominant shoreline structures would be removed and the areas restored to natural conditions.
Grazing in the NRA wilderness would be prohibited. Campfire would be prohibited, and backcountry grates would be removed. The wilderness boundary should be changed to include the closed road corridor above High Bridge and to be managed as wilderness.	Grazing would be allowed at levels below, but within limits of acceptable change standards used in the Chelan-Sawtooth Wilderness. No changes would be proposed to the wilderness boundaries.	The same grazing standards used in the Chelan-Sawtooth Wilderness would apply in NRA wilderness. There would be no changes in the wilderness boundaries.
The Golden West Lodge would be rehabilitated; the associated historic cabins would be removed. The High Bridge Historic District would be rehabilitated. A minimum amount of Buckner artifacts should be acquired for interpretive purposes, and the remaining artifacts removed from Stehekin Valley by the family.	The Golden West Lodge would be rehabilitated; the associated historic cabins would be retained. The High Bridge Historic District would be rehabilitated. A collection storage/museum curatorial facility should be constructed in Stehekin Valley.	The Golden West Lodge, High Bridge Historic District, and Buckner homestead and orchard would be rehabilitated. A collection storage/museum curatorial facility would be constructed in the Stehekin Valley.
Visitors would have an opportunity to enjoy a slow pace. Nonmotorized transportation (walking, bicycling, canoeing) would be emphasized. There would be no public transportation. The road from the Landing to High Bridge would be converted to a bicycle and pedestrian trail. Pedestrian loops would be provided off the trail spine at feature areas. Access to the lake and around the Landing would be included.	Same as proposed action. Same as proposed action. A linear road spine would be provided from the Landing to Bridge Creek. The Stehekin Valley road would be paved from the Landing to Harlequin Bridge; between Harlequin Bridge and High Bridge the road would be a single-lane gravel road with pullouts. Pedestrian and horseback riding loops would be provided off the road spine at feature areas. Access to the lake and around the Landing would be included.	Visitors would be provided with the opportunity to enjoy a variety of paces, and to have several choices of access to a variety of feature locations. Shuttles would be the primary motorized form of transportation, but visitors would be encouraged to use other modes (e.g., walking, bicycles, taxis, boats). A linear road spine would be provided from the Landing to Cottonwood Camp, with pedestrian loops off the spine at feature areas. The spine road would be a double-lane paved road from the Landing to Harlequin Bridge, a single-lane paved road to High Bridge, and a single-lane gravel road to Cottonwood Camp. Lake access at and around the Landing and access to and along the river would be improved.

ACTION ITEM	PROPOSED ACTION	NO-ACTION/MINIMUM REQUIREMENTS ALTERNATIVE
Visitor Experience (cont.)	NPS camping areas and concession lodging facilities would be provided At the head of the lake, speed limits, boat permits, and no-wake zones would encourage a peaceful ambience. The Stehekin River would be managed as one of the major scenic attractions in the valley. River-related activities (e.g., fishing, picnicking, rafting, kayaking, and canoeing) would be available, but the latter three activities would be at the visitor's own risk.	The concessioner and the community **would** provide overnight accommodations. Boat and canoe camping would be available at the lake. The shoreline between the Landing and head of the lake would be restored. The Stehekin River would be managed as **a** scenic attraction and a modified natural system. River-related activities such as fishing and rafting would be available, but rafting would be allowed only when river levels permit safe transit.
Interpretation and Information	Information would be provided to visitors ahead of time so they can learn about the resources and experiences that would be available. Orientation would be provided at contact stations at Chelan and Fields Point. Boat passengers could read printed materials and hear presentations by boat crew or NPS interpreters. Information would also be available at wayside exhibits, Stehekin Landing, and Golden West visitor center. The National Park Service would take the lead in planning, managing, and providing information and interpretive services. The Stehekin community might provide additional interpretive services.	Same as proposed action. Same as proposed action. Same as proposed action.
Transportation Plan Elements	The airstrip would be operated under a special use permit with the Washington State Department of Transportation, Aeronautics Division, for noncommercial public use. Commercial floatplanes would be allowed to continue flying at present capacity and with similar flight patterns for landings. Takeoffs would be farther downlake to preserve natural quiet of the national recreation area. The Stehekin Valley road between the Landing and Harlequin Bridge would remain a two-lane paved road; from Harlequin Bridge to 9-Mile, it would become a single-lane, paved road with pullouts; from 9-Mile to High Bridge, a single-lane, gravel road; and from High Bridge to Cottonwood a heavy-duty, high clearance shuttle vehicle road.	The airstrip would continue to be operated as a state airstrip. The National Park Service might consider closure of the facility in the future. No changes would be made in floatplane use. The Stehekin Valley road between the Landing and Harlequin Bridge would remain a two-lane paved road — from Harlequin Bridge to Bridge Creek it would be maintained as a single-lane, gravel road; and from Bridge Creek to Cottonwood Camp, as a primitive road allowing safe vehicle passage.

ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C
No publicly provided lodging would be offered. At the head of the lake most lakeside developments would be removed. Canoeing, kayaking, rowing, and fishing would be encouraged. The Stehekin River would be managed as a dynamic natural system. Low-impact activities such as hiking, picnicking, and fishing would be allowed. No boating or rafting would be allowed.	The private sector should make available both separated (e.g., cabins) and clustered (e.g., lodge) accommodations. At the head of the lake, speed limits, boat permits, and no-wake zones would encourage a peaceful ambience. The Stehekin River would be managed as a natural system with some human manip-ulation. River-related activities such as hiking, picnicking, and fishing would be included. Rafting would be allowed only when river levels permitted safe transit.	Same as proposed action. Same as proposed action.
Same as proposed action. Same as proposed action. The National Park Service would plan, manage, and provide information and interpretive services. There would be no private sector interpretation except what would be provided on passenger boats.	Same as proposed action. Same as proposed action. Same as proposed action.	Same as proposed action. Same as proposed action. An association composed of NPS and private residents would be created to take the lead role in planning, designing, and providing information and interpretive services.
The airstrip would be closed and restored to natural conditions. The Stehekin Valley road between the Landing and Cottonwood Camp would be converted to a trail. Nonmotorized modes of transportation would be used on this trail.	The airstrip would be closed. The Stehekin Valley road between the Landing and Harlequin Bridge would remain a two-lane paved road: from Harlequin Bridge to High Bridge it would be reduced to a single-lane gravel road with pullouts; and between High Bridge and Cottonwood Camp the road would be converted to a pedestrian trail.	The airstrip would be managed by the National Park Service for emergency use only. The Stehekin Valley road between the Landing and Harlequin Bridge would remain a two-lane paved road: from Harlequin Bridge to High Bridge it would become a single-lane, paved road with pullouts; from High Bridge to Cottonwood Camp it would be maintained in its current condition except for some minor safety and comfort improvements.

ACTION ITEM	PROPOSED ACTION	NO-ACTION / MINIMUM REQUIREMENTS ALTERNATIVE
Transportation Plan Elements (cont.)	Unconstrained private vehicle use would end at High Bridge. Private vehicle use from High Bridge to Bridge Creek would be allowed, but traffic flow would be regulated by season of year and/or hour of day. Public shuttle service would be provided from the Landing to Cottonwood. Only the public shuttle service, hikers, horses, and bicycles would be allowed to use the road from Bridge Creek to Cottonwood. The National Park Service would seek a concessioner to replace the NPS-operated public shuttle service. Fare structure would provide discounts for frequent public shuttle users. Company Creek road would be maintained in its current alignment. This road would be protected from river erosion at three locations with structures designed to withstand frequently recurring floods and made from rock, soil, and native vegetation. An 11-mile pedestrian and horseback trail would be developed from the Landing to High Bridge. Also, a trail from the "Castle" area to the river trail, with suspension bridge, would be developed.	Company Creek road would be maintained in its current condition. Emergency repairs and reopening of the road following flood damage would be performed.
Stehekin Landing and Valley DCP Elements	Stehekin Landing would be redesigned to improve visitor flow and parking and to relocate lodging and other facilities away from geohazards. Relocation would occur as the end of the lifecycle of structures was reached. All campgrounds would be retained. Weaver Point dock facilities would be improved to accommodate the Purple Point dock and allow seasonal moving of the dock between Purple Point and Weaver Point. Some NPS and concession housing would be consolidated in clustered sites beside the airstrip, based on environmental parameters and in compliance with compatibility criteria. Also some NPS and concession housing would remain dispersed. Maintenance and related facilities would be located near the airstrip. Service facilities (restaurant, deli, grocery store) could be provided for year-round use.	NPS and concession seasonal housing would remain at the Landing and throughout the valley. NPS administrative offices would remain at the Landing. NPS maintenance and related facilities would remain at the Harlequin Bridge area.
Land Protection Plan Elements	Land uses on public and private lands would be compatible with the purposes of Lake Chelan NRA, emphasizing those uses that protect area natural and cultural resources and natural processes, and provide for safe visitor facilities and services. Land protection would emphasize high flood influence areas, wetlands, riparian areas, and high visual sensitivity areas.	Land protection would emphasize wetlands, shoreline characteristics, high scenic quality, water quality, visitor access, restriction of unsightly development, and development on areas with gradients greater than 20%.

ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C
Company Creek road would be converted to a trail.	Company Creek road would be maintained in its current alignment except for a 200-yard section that would be removed and replaced with a 0.9-mile section located away from active river erosion.	Company Creek road would be maintained in its current alignment except for a 200-yard section that would be removed and replaced with a 1.4-mile section located away from active river erosion.
All NPS and concession housing and maintenance and related facilities would be substantially reduced and located at the Landing. NPS recreation area headquarters would be in Chelan, and a reduced office space would remain at the Landing. All lodging would be removed. Appropriate areas at the Landing and other areas in the Stehekin Valley would be restored to natural conditions.	Stehekin Landing would be redesigned to improve visitor flow and parking and to relocate the lodging and other facilities away from the geohazards. Relocation would occur as the end of the lifecycle of structures was reached. Some NPS and concession housing would be consolidated in clustered sites on and beside the closed airstrip, based on environmental compliance with compatibility criteria. Also, some NPS and concession housing would remain dispersed. Maintenance and related facilities would be located near the airstrip.	Some NPS and concession housing would be consolidated in clustered sites beside the airstrip, depending on environmental parameters and in compliance with compatibility criteria. Also, some NPS and concession housing would remain dispersed. Maintenance and related facilities would be located near the airport. The Landing would be redesigned to improve visitor flow and parking and to relocate facilities away from the geohazards. Lodging would be expanded and relocated from the Landing to the Rainbow Falls site.
Land protection would involve acquisition, on an opportunity purchase basis, or by eminent domain authority, all private lands within the recreation area. Acquisition would be with fee title purchase method.	Land protection emphasizes high flood influence areas, wetlands, riparian areas, and high visual sensitivity areas. Other land use control on private land would be done by Chelan County.	Land protection emphasizes high flood influence areas, wetlands, riparian areas, and high visual sensitivity areas. Other land use control on private land would be done by Chelan County.

; TOPIC	PROPOSED ACTION	NO-ACTION/MINIMUM REQUIREMENTS ALTERNATIVE
Land Protection Plan Elements (cont.)	The National Park Service proposes that Chelan County adopt a new zoning code chapter establishing an overlay district for review of proposed uses and developments on private lands within the Stehekin Valley. This would be in addition to enforcement of applicable state laws and local controls.	The Park Service would support the use of private land for providing compatible public services and recreational opportunities for visitors.
	The Park Service will adopt a revised approach for a determination of compatibility (compatibility criteria) regarding proposed use and development on private and nonfederal lands within the recreation area to ensure that such uses are compatible with the purposes for which Lake Chelan NRA was established.	Existing compatibility standards would be enforced.
	Incompatible uses on all public and private property within the valley include	Incompatible structures, developments, and uses of property in Stehekin include
	• Any subdivision of land that was not in effect prior to the adoption of these compatibility criteria, except as permitted through the Chelan County Subdivision Regulations and as consistent with Chelan County health standards.	• Any subdivision of land that was not in effect prior to the adoption of the compatibility standards, except as permitted in section C, "The Subdivision and Use of Land in the Recreation Area." • Construction of any duplexes, apartments, condominiums, or other multifamily dwellings.
	• Siting or construction of any building, including but not limited to, residential, commercial, and industrial buildings, in an identified high flood influence area, wetland, or riparian area.	• Siting or construction of any structure in an identified high flood influence area.
	• Dredging or filling of Lake Chelan or Stehekin River without full compliance with the U.S. Army Corps of Engineers permitting process.	• Any dredging or filling of Lake Chelan or the Stehekin River, within the recreation area, for the siting or construction of a building.
		• Construction or siting of any building or structure more than 35 feet high.
	• Cutting of timber for sale or transport outside the Stehekin Valley.	• Cutting of timber for sale or transport outside the Stehekin Valley.
	• Cutting of timber by any means other than selective tree harvesting, except as required by Washington Dept. of Natural Resource regulations.	• Cutting of timber by any means other than selective harvesting.

ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C
Same as proposed action.	Same as proposed action.	Same as proposed action.
Same as proposed action.	Same as proposed action.	Same as proposed action.
Same as proposed action.	Same as proposed action.	Same as proposed action.

Tone	PROPOSED ACTION	NO-ACTION/MINIMUM REQUIREMENTS ALTERNATIVE
***Land** Protection Plan Elements (cont.)*	**In** addition to those uses above, the National Park Service will not site any building or structure in an identified: • 100-floodplain, unless used for nonhuman occupancy and with conditions on specific uses or mitigation • wetland soils, and those soils not conducive to building foundations, leachfield percolation, or site drainage • geohazard areas • areas with slopes greater than 20% gradient • areas of high visual sensitivity, except where specific design mitigation measures can successfully be used	• Siting, after adoption of the compatibility standards, of any recreation vehicles. The siting, after adoption, of any mobile or manufactured homes not certified as complying with applicable materials, safety, and set-up requirements of the Washington Department of Labor and Industries, the U.S. Department of Housing and Urban Development, and section (a) of these standards. • The construction or siting of structures on slopes greater than 20% without assurances acceptable to the superintendent that mitigation measures — to minimize the potential for erosion; hazards to public safety and health; and any impacts on the recreation, scenic, scientific, and historic values of the area — will be taken.
Park Operations	The range of concession services for food and lodging would be maintained. The Park Service would provide services essential for resource protection and visitor health and safety. There would be a fair-share charge for these services. Private contracts would be used where appropriate.	Services to accommodate existing and reasonable demand for expanded recreational experiences would be provided. The National Park Service would provide services essential for resource protection and visitor health and safety. Private contracts would be used where appropriate.
Estimated Costs	$31,107,000	$5,515,000

ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C
Same as proposed action.	Same as proposed action.	Same as proposed action.
Only those services that promote solitude and primitive recreational experiences would be provided. Services essential for resource protection and visitor health and safety would be provided.	Services to accommodate existing and reasonable demand for expanded recreational experiences would be provided. The National Park Service would provide services essential for resource protection and visitor health and safety. Private contracts would be used where appropriate.	Services that promote expanded recreational experiences would be provided. Services to accommodate existing and reasonable demand for expanded recreational experiences would be provided. The National **Park** Service would provide services essential for resource protection and visitor health and safety. Private contracts would be used where appropriate.
$11,266,000	$30,317,000	$33,874,000

TABLE 2: SUMMARY OF ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES

IMPACT TOPIC	PROPOSED ACTION	NO-ACTION / MINIMUM REQUIREMENTS ALTERNATIVE
Impacts on Stehekin River/Floodplain	Impacts on natural river processes and habitat for fish and other aquatic species generally would be beneficial, including restoration of about 27 acres of the Stehekin River floodplain and reduced instream modifications. Acquiring interests in private lands would eventually provide additional long-term protection for another 149 acres of floodplain. Potentially hazardous conditions associated with flooding would be substantially reduced by relocating NPS facilities and acquiring land interests currently located in floodplain or geohazard areas. Negative impacts might include accelerated erosion and increased flooding downstream and adjacent to erosion control structures at 8-Mile and Company Creek.	Impacts on natural river processes and habitat for fish and other aquatic species would be the least beneficial. Less than 1 acre of the Stehekin River floodplain would be restored. Acquiring interests in private lands with the owner's consent would eventually provide additional long-term protection for another 61 acres of floodplain. The river would continue to erode portions of Company Creek road. Potentially hazardous conditions associated with flooding and other geological hazards would not be substantially reduced.The potential for designation of the Stehekin River as a wild and scenic river would not be compromised by this alternative.
Impacts on Wetlands	Impacts on wetlands generally would be beneficial. Approximately 26 acres of habitat in or near wetlands would be restored where possible and another 63 protected by acquiring interests. Existing road disturbance and vegetation management activities to maintain the airstrip would adversely affect 6.7 of vegetated wetlands.	Impacts on wetlands would be the least beneficial. Only 10 acres of habitat in or near wetlands would be restored and another 10.5 protected by acquisition. Road disturbance and vegetation management activities would adversely affect 11.7 acres of wetlands. River manipulation and erosion and runoff from roads could also adversely affect an unknown amount of wetlands.
Impacts on Riparian Communities	A total of 146 acres of riparian communities would be protected or restored, and up to 74 acres would be affected by prescribed fire. Given that there are only 936 acres of riparian on the valley floor, this would be a major beneficial impact on community-level biodiversity in the valley.	A total of 25 acres of riparian communities would be protected, and up to 130 acres would be lost. This would be a major adverse impact on riparian communities in the valley. The community-level biodiversity of the park complex would be adversely affected through impacts from this alternative.
Impacts on Upland Communities	A total of 140 acres of upland communities would be protected or restored, 9 acres would be lost, and 636 acres would be affected by prescribed fire and thinning. The 48-acre airstrip, infested with aggressive invader species, would remain a source of normative species for the valley.	A total of 62 acres of upland communities would be protected, and 38 acres would be lost. This would result in a net beneficial change of 24 acres of upland communities — a minor gain of relatively abundant upland communities.
Impacts on Native Fish	The integrity of existing native fish habitat and populations would be enhanced; also, native cutthroat and bull trout populations would be restored in part of their historic habitat within the Stehekin drainage.	Only limited additional protection would be provided for existing native cutthroat and bull trout populations, and native fish populations would not be reestablished in the Stehekin drainage.

ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C
The greatest long-term beneficial impacts on natural river processes and habitat for fish and other aquatic species, including restoration of 90 acres of the Stehekin River floodplain and removal of instream modifications, would result. Acquiring private lands with the owner's consent would eventually provide additional long-term protection for another 167 acres of floodplain. Potentially hazardous conditions associated with flooding would be substantially reduced by removing NPS buildings, facilities, and roads, and acquiring private land now located in floodplain or other geohazard areas.	Impacts on natural river processes and habitat for fish and other aquatic species, including restoration of 26 acres of the Stehekin River floodplain, generally would be beneficial. Instream modifications could adversely affect natural river processes and aquatic habitat. Acquiring interests in private lands with the owner's consent eventually would provide additional long-term protection for another 153 acres of floodplain. Potentially hazardous conditions associated with flooding would be substantially reduced by relocating most NPS buildings and facilities now located in floodplain or geohazard areas and acquiring land interests.	Impacts on natural river processes and habitat for fish and other aquatic species, including restoration of 16 acres of the Stehekin River floodplain, generally would be beneficial. Instream modifications could adversely affect natural river processes and aquatic habitat. Acquiring interests in private lands with the owner's consent eventually would provide additional long-term protection for another 118 acres of floodplain. Potentially hazardous conditions associated with flooding would be reduced substantially by relocating most NPS buildings and facilities now in floodplain or geohazard areas and acquiring land interests.
The greatest long-term beneficial impacts, restoring 67 acres of habitat in or near wetlands where possible and protecting another 63 acres by acquisition, would result.	Impacts on wetlands generally would be beneficial, restoring approximately 18 acres of habitat in or near wetlands, and protecting another 63 acres by acquiring interests. Existing road disturbance would continue to adversely affect about 1.2 acres of wetlands.	Approximately 17 acres of wetlands would be restored where possible and another 63 acres protected by acquiring interests — generally beneficial effects. Existing road disturbance and vegetation management activities to maintain the airstrip would adversely affect about 6.7 acres of vegetated wetlands.
A total of 315 acres of riparian communities would be protected or restored — a major beneficial impact on riparian communities and on community-level biodiversity in the valley.	A total of 144 acres of riparian communities would be protected or restored, and up to 74 acres would be affected by prescribed fire. Overall, a major beneficial impact on community-level biodiversity in the valley would occur.	A total of 70 acres of riparian communities would be protected or restored, and up to 74 acres would be affected by prescribed fire.
A total of 247 acres of upland communities would be protected or restored — a major beneficial impact on upland communities.	A total of 81 acres of upland communities would be protected or restored, and 636 acres would be affected by prescribed fire and thinning.	A total of 53 acres of upland communities would be protected, and up to 837 acres would be affected by prescribed fire, thinning, and firewood cutting; 17 acres would be lost. This would result in a major adverse impact.
This alternative would have the greatest beneficial impact. The integrity of existing native fish populations and habitat would be greatly enhanced, and native cutthroat and bull trout populations would be reestablished in most of their historic habitat within the Stehekin drainage on NPS lands.	The integrity of existing native fish populations and habitat would be enhanced, and native cutthroat and bull trout populations would be reestablished in part of their historic habitat within the Stehekin drainage.	Additional protection would be provided for the existing native cutthroat and bull trout populations. Native fish populations may become reestablished in portions of the Stehekin drainage because of supplemental **stocking and control of normative** species.

IMPACT TOPIC	PROPOSED ACTION	NO-ACTION//MINIMUM REQUIREMENTS ALTERNATIVE
Impacts on Threatened, Endangered, or Rare Species	There would be no effect on existing bald eagle use of the area; possible effects on long-term recovery of the local population are unknown. Northern spotted owls and grizzly bears are not likely to be adversely affected, although impacts would be both beneficial and adverse. Gray wolves would be beneficially affected. Peregrine falcons would not be affected. Potential and occupied goshawk nesting sites could be adversely affected. Harlequin ducks would be beneficially affected.	Gray wolves and grizzly bears would continue to be adversely affected from the upper valley road, the loss of riparian areas, and general high levels of human activity in the lower valley. Existing bald eagle use would not be affected. Northern spotted owls would be adversely affected from multiple sources. These would combine to possibly preclude the potential nesting use of the lower valley by owls. Potential and occupied northern goshawk nesting sites would be adversely affected from human activities. The harlequin duck would be adversely affected from the loss of riparian areas and the continued construction of river control structures. The species-level biological diversity of the park complex would be adversely affected through impacts from this alternative.
Impacts on Water Quality	Protection in addition to that afforded by existing laws and regulations would be provided for water resources.	Some protection of water resources in addition to that afforded by existing laws and regulations would be provided.
Impacts on Air Quality	This alternative would increase the total energy-related air pollutants within the Stehekin Valley by 6%, particularly for oxides of nitrogen. Energy conservation measures would help reduce some air pollutant emissions. Increases in dust, vehicle, and prescribed fire emissions would adversely affect the NRA's air quality.	This alternative would increase the total energy-related air pollutant emissions within the valley by 18%, particularly for oxides of nitrogen. Energy conservation measures would help reduce some air pollutant emissions. Prescribed fire emissions and increases in dust and vehicle emissions would adversely affect the NRA's air quality.
Impacts on Cultural Resources	A systematic and comprehensive program for the preservation, protection, and interpretation of cultural resources in the NRA would be conducted in conformance with the park complex's *Resource Management Plan* and *Interpretive Prospectus*. The program would provide for the preservation of significant cultural resources illustrating the history of the area and for additional efforts directed toward management of the area's cultural resources and historic landscapes. One historic and two prehistoric archeological sites would be affected.	Cultural resource management actions would be more limited under this alternative, resulting in the possible deterioration or loss of some cultural resources and elements of the historic landscape and the lack of an interpretive program.

ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C
Both the upper and lower valley would be permanently protected and available as habitat for all species. For gray wolves, grizzly bears, Pacific fishers, and possibly California wolverines, this is particularly important given the valley's unique geographic and ecologic position in the surrounding ecosystem. Potential nesting habitat for northern spotted owls, bald eagles, and northern goshawks would be available for recolonization, assisting in meeting the goals of recovery plans for the first two species. Harlequin ducks would not be displaced from important breeding habitat. Forest habitat for flammulated owls, Vaux's swift, pileated woodpeckers, and western gray squirrels would be protected permanently.	These impacts are largely the same as those of the proposed action with the following exceptions. Three spotted owl nest sites would be better protected by the closure of the road between High Bridge and Bridge Creek. The closure of the upper valley road would benefit gray wolves, grizzly bears, Pacific fishers and harlequin ducks.	This alternative would have the greatest impacts on sensitive wildlife species. Expected levels of development and human activity in the lower valley would represent a permanent loss of this area as usable habitat for gray wolf, bald eagle (nesting), grizzly bear, northern spotted owl (nesting), Pacific fisher, northern goshawk (nesting), and possibly harlequin duck. The species-level biological diversity of the park complex would be adversely affected from this alternative.
This alternative would have the greatest beneficial impacts on water resources. Impacts would be reduced by restoring most land disturbance and removing most fuels and other toxic materials from the NRA.	Impacts on water resources would be reduced.	Same as alternative B.
This alternative would have the greatest long-term beneficial impact. It would eventually decrease the total energy-related air pollutant emissions within the valley by 99%. Diminishing vehicle use and revegetation of disturbed areas would also gradually improve air quality. Natural wildland fires would adversely affect the NRA's air quality on a periodic basis.	Same as proposed action, except vehicle-caused pollution above High Bridge would be less.	This alternative would increase the total energy-related air pollutant emissions within the valley by 34%, particularly for oxides of nitrogen. Energy conservation measures would help reduce some air pollutants. Increases in dust, vehicle, and prescribed fire emissions would adversely affect the NRA's air quality on a periodic basis.
Cultural resource management actions would be limited, resulting in the deterioration or loss of significant historic landscapes and historic properties and the lack of an interpretive program. There would be no impacts on any known archeological sites.	Cultural resource management actions would be limited, resulting in the deterioration or loss of significant historic landscapes and historic properties and the lack of an interpretive program. There is a possibility that one historic and two prehistoric archeological sites would be affected. No significant adverse effects are anticipated.	Same as alternative B.

IMPACT TOPIC	PROPOSED ACTION	NO-ACTION / MINIMUM REQUIREMENTS ALTERNATIVE
Impacts on Visual/Scenic Resources	Visual/scenic resources would be improved, while the opportunity to experience these resources by residents and visitors to the valley would become more confined as views from trails, the valley road, and the river became more enclosed and constricted.	The incremental development of public facilities as well as an expanding private residential presence associated with this alternative would affect visual resources. The shoreline of the lake and private parcels of land located on the river or along the Stehekin Valley road would be developed to service visitors or for private residences. Demands by both residents and visitors for additional services and facilities would create changes to the resources in the valley. These changes would affect visually sensitive areas and key viewpoints.
Impacts on Access and Transportation	Moderate increases in visitor arrivals (40-45%) would cause moderate increases in vehicular congestion and noise in the valley. Increased use would require increased maintenance of facilities, roads, and trails. Existing and proposed new facilities would meet the additional demand.	Moderate increases in visitor arrivals (30%) would cause moderate increases in vehicular congestion, noise, and potential accidents in the NRA compared to existing conditions. Increased use would require increased maintenance of facilities, roads, and trails. Existing facilities would meet the additional demand.
Impacts on Visitor Experiences	A wide spectrum of visitors would have diverse means of access to prime natural, cultural, scenic, and recreational resources without significantly affecting park resources or degrading the experiences of other visitors.	Visitors would have diverse means of access to prime natural, cultural, scenic, and recreational resources without significantly affecting park resources or degrading the experiences of other visitors.
Impacts on the Regional Economy	There would be moderate but positive effects on the regional economy. By 2007 visitor arrivals and lodging spaces would increase by about 40%. Visitor expenditures and total employment would increase by about 37%. The net fiscal impacts on the Chelan County general and road funds would have a higher surplus in 2007 than in 1992. The school district is expected to have 24 pupils in 2007 and would generate a higher net surplus than in the 1992-93 school year.	There would be modest positive impacts on the regional economy. By 2007 visitor arrivals and lodging spaces would increase by about by about 30%. Visitor expenditures are projected to increase accordingly. When all direct, indirect, and induced effects are counted, total FTE employment, earnings, and output are projected to increase substantially above 1992 levels. The net fiscal impacts on the Chelan County general and road funds would have a higher surplus in 2007 than 1992. The school district is expected to have 27.8 pupils in 2007, with a net fiscal surplus slightly lower than 1992-93 school year.

ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C
Visual/scenic resources would be enhanced. The potential to experience these resources by visitors to the area would be limited because of the reduction in viewing opportunities due to the elimination of culturally manipulated open spaces and restricted views from the shoreline and Stehekin Valley road/trail.	Visual resources would be improved. The opportunity to experience these resources by residents and visitors to the valley would increase because of the development of a vista and view clearing component of the vegetation management plan.	Overall, the increased emphasis on commercial activities and the **new** development required to meet **all** future demands would place stress on the visual resources in Stehekin Valley. In the short term, there are sufficient areas of low sensitivity, where visual resource constraints are minimal, to accommodate this demand. As the demand increases and the development follows **that** demand, the possibility of development affecting visual resources also increases. In addition, more people would be encountered on the road, on trails, at viewpoints, and at historic sites, thus affecting the visual experience.
Slight decreases in visitor arrivals and closing the airstrip and roads would eventually eliminate most vehicular congestion, noise, and potential accidents in the NRA area. All maintenance equipment and activities to support motorized vehicles on the roadway system would eventually be eliminated. Landing facilities would be modified to meet pedestrian needs.	Similar to proposed action.	Major increased in visitor arrivals (105-110%) would cause substantial increases in vehicular congestion, noise, and potential accidents in the **NRA** compared to existing conditions. Increased use would require increased maintenance of facilities, roads, and trails. New or improved facilities would be needed at the Landing to meet the additional demand.
Visitors would have more opportunities for nonmotorized activities and fewer opportunities for motorized activities. Elderly, sedentary and disabled visitors would have fewer opportunities to experience NRA resources and values.	Same as proposed action, except there would be greater access to river rafting and more limited access to interpretive activities.	A wide spectrum of visitors would have diverse means of access to prime natural, cultural, scenic, and recreational resources with some impacts on park resources and the experiences of other visitors.
Alternative A would have modest negative effects on the regional economy. By 2007, visitor arrivals would decline about 7% from 1992. Lodging spaces would decline substantially to about 27% of the 1992 level. Visitor expenditures would decline to a level somewhat below that in 1992. Total direct, indirect, and induced effects generate employment, earnings, and output below those for 1992. The net fiscal effects for the Chelan County general and road funds would be the lowest of the alternatives. The school district is projected to have 14 pupils and the lowest net fiscal balance (revenues in excess of expenditures) of the five alternatives.	Similar to the proposed action, alternative B would have moderate but positive effects on the regional economy. By 2007, visitor arrivals and lodging spaces would increase by 40%. Visitor expenditures and total employment would increase by about 37%. The net fiscal impacts on the Chelan County general and road funds would have a higher surplus in 2007 than in 1992. The school district is expected to have 24 pupils in 2007 and would generate a higher net surplus than in the 1992-93 school year.	Alternative C would have the most highest positive impacts on the regional economy. By 2007, visitor arrivals and lodging spaces would increase. Visitor expenditures are also the largest among the five alternatives. The total direct, indirect, and induced activities are projected to generate workers, earnings, and output at more than double those of 1992. The net fiscal impacts on the Chelan County general and road funds would have a higher surplus in 2007 than in 1992. The school district is expected to have 32 pupils in 2007.

IMPACT TOPIC	PROPOSED ACTION	NO-ACTION//Minimum REQUIREMENTS ALTERNATIVE
Impacts on the Regional Economy (cont.)	Chelan County PUD No. 1 supplies power on a chronically deficit basis for the Stehekin system. Power costs are a limiting factor to Stehekin growth. A rate increase may be necessary over the next 15 years. NPS-provided activities and their costs would expand in response to growth in visitor use and development levels. These include such services as sewer and water at the Landing, waste disposal, and road maintenance. Impacts on the community generally would be favorable. These include a sense of well being, community structure, and a better quality of life. The National Park Service would require compatibility of uses and would emphasize acquisition of interests in land rather than acquisition in fee, as sellers became willing and funds became available.	Chelan County PUD No. 1 operates the Stehekin system at a deficit, and this would continue under this alternative. Services provided by the National Park Service and their costs would expand somewhat for the full-implementation year, 2007. Impacts on the community would be favorable due to gradually increased commercialization of visitor services. The National Park Service would purchase land as sellers became willing and funds became available.

ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C
Chelan County PUD No. 1 would have a lower operating deficit and might break even on operations.	Chelan County PUD No. 1 supplies power on a chronically deficit basis for the Stehekin system. Power costs are a limiting factor to Stehekin growth. A rate increase may be necessary over the next 15 years.	Service demands and costs would increase for the Chelan-Douglas Health District and Chelan County PUD No. 1, although these are funded by fees.
NPS-provided public services would decline especially in view of the withdrawal of concession-provided food and lodging.	NPS-provided activities and their costs would expand somewhat in response to growth in visitor use and development levels.	NPS-provided services and costs also would expand significantly.
Impacts on the community by the year 2007 would be slightly negative. The NPS pursuit of land purchase and compatibility of uses would be more stringent than in 1992. Business might switch to some extent to the private sector after NPS withdrawal from food/lodging provision. However, overnight visits would likely decline sharply without NPS support. Economic viability for non-NPS local residents would likely be more difficult.	Impacts on the community generally would be favorable. The National Park Service would require compatibility and would pursue land acquisition as sellers became willing and funds became available.	Impacts on the community would reflect less stringent NPS policies regarding commercialization of visitor services, resource use compatibility, and land purchase. Local residents would have greater business opportunities, but might face competition from outsiders.

AFFECTED ENVIRONMENT

BIOLOGICAL AND PHYSICAL ENVIRONMENT

INTRODUCTION

In this document, issues concerning the biological and physical environment are analyzed for their effect on biological diversity. This approach is organized into three headings: ecosystem processes and community-level biodiversity; ecosystem components and species-level biodiversity; and abiotic ecosystem conditions. These headings are explained below.

Biological diversity, or biodiversity, is a complex concept frequently but inadequately defined as the variety of life and its processes. This definition does, however, recognize that the biological world is not a series of independent elements. Rather, it assumes a fundamental concept of ecology that states that all ecosystem elements are interconnected. It is the mix of elements and the connections or processes that link those elements that define them as a system and maintain them as a viable whole.

Biodiversity can be approached from at least four levels: the diversity between large-scale ecosystems; the diversity of communities within an ecosystem; the diversity of species within a community; and the diversity of genetic differences within a species (Keystone Center 1991; CEQ 1993). Although all four are important for the conservation of biodiversity, this document focuses on two of these levels: community diversity and species diversity.

A community is an association of plant and animal species living in a relatively distinct physical habitat (Odum 1973). It is a complex collection of plant species together with associated wildlife species that may be dependent on the plant resources of that particular community type. Communities form the living matrix of a greater ecosystem. A given community type is normally defined by, and named for, its dominate vegetative species. In this document, this is synonymous with the vegetative or land cover classification.

Ecosystems can also be divided into "ecosystem processes," which are usually interactions among and between biotic (living) and abiotic (nonliving) elements — including fire, hydrologic processes, plant succession and disturbance regimes such as insect infestations — and "ecosystem components," which are relatively discrete parts of the system such as a particular species or a population of a species.

Thus, the first heading, "Ecosystem Processes and Community-Level Biodiversity," addresses hydrologic processes including flooding and other river-based phenomena, plant succession including wildfire regimes, and plant and wildlife habitats based on communities. Preserving these processes and communities protects biodiversity in the long term. The second heading, "Ecosystem Components and Species-Level Biodiversity," addresses specific species of concern — primarily those that are threatened or endangered. Addressing these components and species protects immediate and expected threats to biodiversity. And the third heading, "Abiotic Ecosystem Conditions," addresses the nonliving elements of water quality and air quality.

ECOSYSTEM PROCESSES AND COMMUNITY-LEVEL BIODIVERSITY

River Processes and Aquatic Communities

The Stehekin River. The Stehekin River begins as the meltwater of snow and glaciers high in the North Cascade Mountains near Cascade Pass. As it flows through a glacial U-shaped valley, major tributaries adding to the flow of the Stehekin River include Flat Creek, Park Creek, Bridge Creek, Company Creek, Agnes Creek, Rainbow Creek, Blackberry Creek, and Boulder Creek. The

study area river corridors provide a diverse combination of water and vegetation important to variety of fish and wildlife.

A study area for river processes and wetlands was defined that included all NPS and private land in the national recreation area that was not wilderness. The limits of the study area include the wilderness boundaries on each side of the valley, the upper recreation area boundary near High Bridge, and the lower recreation area boundary on Lake Chelan.

River processes — The Stehekin River system is controlled by a variety of interdependent climatic, geologic, and biologic factors. The river system is self-adjusting and continually changing in response to any changes in these factors. When the natural attributes of a river channel and adjacent land are altered, the river system adjusts to a new set of conditions.

To better understand the relationship between river processes and development and use, the National Park Service recently examined old aerial photos and maps to identify the extent of the Stehekin River channel movement and understand erosion-prone banks. The Stehekin River channel changed considerably sometime during the first half of this century. It is likely that the 50-year flood of 1948 was the event that caused most of this change. Recent investigations of other rivers in the Pacific Northwest indicate that a 50-year flood or greater may be the key event that causes major river channel change. This may also be true for the Stehekin River when considering the major changes associated with the 1948 flood. Since 1953 the river channel position has been relatively stable. Most change since then has been associated with erosion of riverbanks, not major shifts in channel position. Average rates of bank erosion vary along the river from less than 1 foot per year to as much as 4 feet per year. Riverbank erosion at a given site is dependent on a number of factors, including channel geometry, riverbank soil, vegetation, and flood frequency and magnitude.

Roots and trunks of forest vegetation restrict lateral migration of the river. When native forest cover is replaced by pasture, riverbank erosion is generally accelerated (e.g., the upper end of the lower meadow). Loose sand and gravel soils are more easily eroded than clay and silt soils.

Stream channel geometry also plays an important role in changes of the river channel's position. In the 9.2 miles above Lake Chelan, the river has two hydraulically different reaches. Between the lake and approximately river mile 4, the river's gradient is generally under 30 feet per mile. In this reach the river has a relatively low velocity and a channel pattern characterized as meandering with a cobble and gravel bed. Meander loop development is a natural process that causes considerable bank erosion. Above river mile 4, the river gradient is generally over 50 feet per mile. The channel morphology is characterized as an island bar pattern and the river has a higher velocity and its bed is composed of cobbles and boulders. Areas where the geometry of the channel focuses the high velocity of the river directly at a riverbank are prone to high rates of bank erosion (e.g., 8-mile and Company Creek Road). At the gradient change near the mouth of Company Creek the river channel is particularly unstable. Where the gradient decreases the river loses some of its capacity to transport sediment. Sediment deposition causes the channel to realign itself frequently.

The frequency and magnitude of floods is also a major factor in riverbank erosion. Banks erode mainly during high water periods that occur annually during early winter rain on snow events and during spring snowmelt. Over the past century six of the seven largest floods occurred during spring snowmelt (see table 3).

TABLE 3: LARGEST FLOODS ON RECORD FOR THE STEHEKIN RIVER

Date	Peak Discharge @ Gage (cubic feet per second)	Approximate Recurrence Interval
05-28-1948	18,900	90 yr.
06-21-1950	13,500	10 yr.
06-21-1967	13,900	10 yr.
06-02-1968	14,400	10 yr.
06-10-1972	14,400	10 yr.
06-16-1974	16,600	25 yr.
11-21-1990	14,700	15 yr.

River habitat — The Stehekin River and its tributaries provide important habitat for a variety of fish species (see "Fish" and "Water Quality" subsections). Fish, especially salmonid species, use specific locations within stream channels throughout their life cycle in response to different spawning, feeding, and overwintering requirements.

In general, optimal salmonid riverine habitat is characterized by clear, cold water; silt-free substrate in riffle-run areas; equal areas of pools and riffles, with areas of slow, deep water; well-vegetated stream banks; abundant instream cover; and relatively stable water flow, temperature ranges, and streambanks.

Stream bottom substrate composition varies in study area streams depending on stream velocity and sediment source. Clean silt-free gravel in the lower reaches of Company Creek, Blackberry Creek, and Stehekin River provide important spawning gravel for various salmonid species (see "Fish" subsection). Clean silt-free substrates, especially in riffle areas, are also highly productive areas for bottom-dwelling fish food organisms.

Undisturbed areas adjacent to the Stehekin River and tributaries are generally well vegetated. Fish habitat is directly related to and is highly dependent on vegetation adjacent to the stream. Streamside vegetation is important because it provides cover, controls temperature, protects against erosion, and provides nutrients for aquatic and terrestrial fish food organisms.

Woody debris accumulations are a significant feature along the Stehekin River. Approximately 100 such accumulations were identified in the lower Stehekin Valley. Fallen shrubs, trees, and limbs in the stream channel are an important fish habitat component of streams. The abundance of fish in streams and rivers is strongly related to the abundance of coarse woody debris. Instream woody debris provides cover for fish, creates important hydrologic features such as pools and backwaters, and stores inorganic sediment. Woody debris captures bedload gravels, thereby creating spawning areas for salmonid species (Sedell et al. 1984).

Most of the Stehekin River channel and tributaries are in a natural condition. Erosion control structures on the lower 9.2 miles of the Stehekin River have modified about 4% (4,664 feet) of the channel banks. In general, cabled logs and riprap are the most common erosion control methods for streambank protection along the Stehekin River. Five types of erosion control structures have been installed at 34 sites, including 15 sites with cabled logs, 13 sites with riprap, 4 sites with log cribbing, 1 site with log jam, and 1 site with bags of concrete.

Floodplain — Recently the National Park Service studied the lower Stehekin River floodplain and other geological hazards in the valley. Details of these studies are available for review in the NPS *Data Summary Booklet* (1993a) and a report by Riedel (NPS 1993b). Data collected by the National Park Service, Federal Emergency Management Agency, and U.S. Geological Survey were used. The purpose of the studies was to provide basic data required for this planning process and to delineate the 100- and 500-year floodplains and other geologic hazards in the valley. The extreme floodplain where the maximum probable flood could occur was not mapped. The floodplain maps have not been formally

adopted by Chelan County, which is a precursor to acceptance by the Federal Emergency Management Agency.

It is a natural attribute of the Stehekin River to frequently produce flows that cannot be contained within the channel. During such events the adjacent floodplain becomes part of the river. Thus, the nature of the floodplain is a derivative of dynamic river processes, sediment character, vegetation, and human modifications. In general, the floodplain performs a variety of important ecological functions including

- conveying and storing flood water
- storing river sediment
- supporting a variety of vegetation that provides food and habitat to a rich diversity of wildlife species (see "Riparian and Upland Communities" subsection)

Stehekin River floods can occur at three times of the year. Summer floods occur during thunderstorms and associated intense rainfall. These floods usually affect areas of less than 10 square miles. Due to the size of the Stehekin watershed (359 square miles), these floods affect tributary streams more than the Stehekin River.

Spring floods occur in May or June because of snowmelt. The magnitude of these floods varies depending on winter snowpack and spring weather (rain, freezing level, temperature). Since 1950 the average peak daily spring flood is 8,891 cubic feet per second (cfs). The maximum recorded spring flood was 18,900 cfs in May 1948 (see table 3).

Floods on the Stehekin River can also occur in the late fall to early winter period (see table 3). The Thanksgiving flood of November 1990 occurred because of a large magnitude precipitation event associated with unusually warm temperatures and a preexisting heavy snowpack.

Within the floodplain of the Stehekin River, specific flood hazards are deep, fast-moving water and erosion associated with faster moving water along flood channels and main channel. Adjacent to the river channel within the floodplain is the high flood influence area. In this area the geologic hazard is much greater than the actual flood hazard because of rapid bank erosion, high sediment deposition, channel shifts, water velocities in excess of 3 feet per second and water depths greater than 6 feet. The 100-year floodplain covers about 1,243 acres (17.7% of the study area) and the high flood influence area adjacent to the river covers about 517 acres (7.4% of the study area). The 500-year floodplain is only slightly larger than the 100-year floodplain in most areas.

The 100-year floodplain contains much of the development in the national recreation area, and these developments likely influence floodplain parameters. The area of disturbed land cover, excluding roads, within the 100-year floodplain and high flood influence area is presented in table 4. Roads cover an additional 15 acres within the 100-year floodplain, including 3 acres in the high flood influence area. There are also 98 privately owned buildings (i.e., residences and outbuildings) within the 100-year floodplain, including 27 in the high flood influence area. There are another 16 NPS-owned buildings within the 100-year floodplain, including two in the high flood influence area. There are five known sites where fuels and other hazardous materials are stored within the 100-year floodplain.

TABLE 4: OWNERSHIP, DISTURBANCE, AND AREAS IN 100-YEAR FLOODPLAIN AND HIGH FLOOD INFLUENCE AREA

	100-Year Floodplain		High Flood Influence	
Ownership	**Total Area (acres)**	**Disturbance Less Roads (acres)**	**Total Area (acres)**	**Disturbance Less Roads (acres)**
Nonfederal				
Private	167	**23**	**70**	**6**
Chelan County PUD	6	**2**	4	**1**
Subtotal	173	**25**	74	**7**
Federal				
Land acquired since 1968	526	**36**	203	**9**
Land owned since 1968	544	**15**	240	**3**
Subtotal	1,070	**51**	443	**12**
Total	**1,243**	**76**	**517**	**19**

Other geological hazards — Other hazards associated with flooding also occur along every tributary to the Stehekin River. These hazards were mapped by the National Park Service as tributary debris cones and alluvial fans. Debris cones are constructed in part by mass movements (debris flows, debris torrents, etc.). These mass movements usually occur during heavy rain and are extremely destructive. Debris cones typically have surface slopes greater than 10 degrees. In contrast, alluvial fans are associated with larger tributaries and have slopes of less than 5 degrees. Boulder and Rainbow creeks build alluvial fans; Wilson Creek is an active debris torrent system constructing a debris cone.

Small, straight, steep streams carry debris torrents and make debris cones. These streams operate as systems that include a debris source area, a debris transport zone associated with a canyon or channel constriction, and a debris deposition area (the debris cone) (Clague and Eisbacher 1984). The activity of the debris torrent system is dependent on conditions in the debris source area. If landslides or other processes allow the movement of debris into the stream in the source area, the debris torrent system is active. At the end of the last ice age, before vegetation reoccupied the area, all of the debris torrent streams were active. Today, with good vegetation cover, most are dormant. However, changes in vegetation cover (e.g., fire) and particularly heavy rains can reactivate these systems. In other debris torrent systems, geology (faults, thick glacial deposits) controls activity (e.g., Wilson Creek).

Other hazards in the valley associated with hydrologic and geomorphic processes include snow avalanches, rockfalls, and terrace edges. The steep slopes along the walls of the Stehekin Valley pose geologic hazards. Snow avalanches and rockfalls are carried down steep slopes and deposited on the valley bottom at a number of places. Most snow avalanches are at the head of debris cones. The Harlequin Bridge talus slope is an example of a rockfall deposit that is still active. Valley walls are steep slopes that have the potential for instability, particularly when they are modified or composed of thick glacial deposits.

Deposits (terraces) left long ago by the Stehekin River, its tributaries, and glaciers are generally geologically stable. Terrace edges, however, present a geologic hazard because they are prone to mass movements if modified. Steep slopes on terrace edges

and the loose sediments they are composed of combine to create unstable areas.

Wetlands. Wetlands cover about 444 acres of the study area, in low lying areas near the Stehekin River, its tributaries, and Lake Chelan. In general, these areas provide a diverse combination of water and vegetation that perform a variety of important ecological functions including

- moderating surface water and groundwater flow
- controlling sediment transport, erosion, and deposition
- mediating physical and chemical processes affecting water quality and nutrient cycling
- generating plant matter and providing food and habitat for animals (Strickland, ed. 1986; Kusler 1983).

In 1990 the National Park Service mapped wetlands within the lower Stehekin River valley. The maps were based on field observations and existing information including the U.S. Fish and Wildlife Service's *National Wetlands Inventory* (NWI), the Soil Conservation Service's *Soil Survey,* aerial orthophotos, topographic maps, and the "Stehekin Valley Habitat Types" GIS map (NPS 1993b). The Wetlands map does not represent jurisdictional wetland boundaries as defined by the U.S. Army Corps of Engineers (33 CFR 320-330).

Study area wetlands were classified using the standard NWI classification system developed by the U.S. Fish and Wildlife Service (Cowardin et al. 1979). With this system wetlands are categorized first according to hydrological regime in which they are located, then further subdivided according to the class of vegetation or substrate present. Stehekin Valley wetlands were categorized as either palustrine (wet vegetated areas), riverine (river channels), or lacustrine (Lake Chelan). These three major groups were distinguished because they perform different ecological functions and support different biological communities.

Palustrine — Palustrine wetlands are dominated by vegetation. Study area palustrine wetlands were classified as either forested or scrub/shrub, the dominant land cover types present. Forested palustrine habitat covers 139 acres and scrub/shrub palustrine habitat covers 50 acres. Much of the palustrine habitat was formed by erosion and sediment deposition processes within the floodplains of the Stehekin River and tributaries. These wetlands tend to change over time as large floods scour the floodplain, as the river or tributaries form new channels, or as material is deposited during lesser flood events. Some palustrine habitat was formed by beaver activity and also tends to change over time.

Riverine — Riverine habitat includes all wetlands within the channel of the Stehekin and its tributaries that are not dominated by vegetation. Riverine habitat was classified as either unconsolidated shore or open water. Unconsolidated shore (about 88 acres) included the area of the channel seasonally exposed during low-flow and dominated by sand, gravel, or cobble. Open water riverine habitat (about 167 acres) is the consistently flooded portion of the channel. Location of these wetlands often change during short time periods because of the dynamic nature of the Stehekin River.

Lacustrine — Lacustrine habitat includes all of Lake Chelan in the study area and covers about 2,341 acres in the study area. This habitat was not further subdivided in the GIS.

Existing conditions — The majority of wetlands in the national recreation area have not been changed by human activities. However, developments on both federal and nonfederal property have substantially reduced wetland area and likely influenced functions of wetlands in the study area. Fill has been placed in wetlands for construction of roads, buildings, and docks, control of erosion, and to increase area of private parcels suitable for development. The total amount of wetlands directly or indirectly

affected by fill in the recreation area is unknown; however, the area of disturbance within or near wetlands has been estimated (see table 5). There are about 11 acres of known disturbed land cover, excluding roads, within wetlands. There are also eight private and two NPS buildings within wetlands. There are two known sites where fuels or other hazardous materials are stored in or near wetlands.

TABLE 5: OWNERSHIP, DISTURBANCE, AND AREA IN OR NEAR WETLANDS

	River Wetlands and Buffer*		Lake Wetlands and Buffer**	
Ownership	**Total Area (acres)**	**Disturbance Less Roads (acres)**	**Total Area (acres)**	**Disturbance Less Roads (acres)**
Nonfederal				
Private	**85**	**11**	**46**	9
Chelan County PUD	**2**	**0**	165	_2
Subtotal	**87**	**11**	211	11
Federal				
Land acquired since 1968	301	**17**	187	10
Land owned since 1968	447	**5**	154	1
Subtotal	748	**22**	341	11
Total	**835**	**33**	**552**	**22**

* Includes all wetlands in the Stehekin River Valley and a 200-foot river edge buffer. ** Includes all wetlands near Lake Chelan and a 200-foot lake edge buffer.

Terrestrial Processes and Communities

Riparian and Upland Communities. The following section describes the 36 land cover classifications since many impacts are reported by land cover type. This information is from Tanimoto (1991) except for modifications made on classes 17, 32, 33, 34, and 35, completed in 1992. See the *Data Summary Booklet* (NPS 1993a) for a concise discussion of Tanimoto's methodologies. The original area mapped for land cover was bounded primarily by the wilderness boundary, which is the 1,640-foot contour. Since this boundary is arbitrary from a geographical or ecological perspective, a "valley floor" study area was delineated using a GIS slope analysis. All lands of 20% or less slope were included in this valley floor study area. This method attempts to define the valley floor as a geographic entity, and, indirectly, as an ecologic unit that includes the river, almost all of Tanimoto's original riparian polygons, and uplands of the lower valley slopes. It also includes almost all existing disturbed lands and nonfederal lands. There are 2,543 acres in this study area. See table 6 for all class acreages in the valley floor study area.

Classes have been organized into five headings based primarily on soil moisture — riparian, nutrient-poor; riparian, nutrient-rich; upland mesic; upland xeric; and miscellaneous. Of the 36 classes, 5 are considered unvegetated — water, sand/gravel/cobble, roads, xeric uplands, and active erosion/talus. The remaining 31 classes are heavily to sparsely vegetated with native, or in some cases nonnative, species.

Riparian classes were determined by vegetative and topographic characteristics. Riparian was further divided into nutrient-poor and nutrient-rich groupings. Based on field examinations of soil development and species presence, nutrient-poor classes were defined as those containing only alder, Sitka willow, or cottonwood. Nutrient-rich classes contained additional species.

TABLE 6: ACREAGES OF VEGETATION/LAND COVER CLASSES IN THE VALLEY FLOOR STUDY AREA

Land Cover Classification	Acres
Riparian, Nutrient-Poor	
Alder	52
Willow *(S. sitchensis)*	5
Cottonwood	50
Cottonwood/Alder	29
Riparian, Nutrient-Rich	
Mixed Deciduous	83
Mixed Coniferous	47
Mixed Deciduous/Coniferous	317
Grand Fir	20
Western Redcedar	9
Douglas Fir	56
Bigleaf Maple	58
Cottonwood	114
Cottonwood/Alder	14
Alder	66
Aspen	3
Willow (S. *scouleriana)*	6
Emergent Vegetation	9
Upland Mesic (Moderate Moisture)	
Mixed Deciduous	13
Mixed Coniferous	501
Mixed Deciduous/Coniferous	149
Grand Fir	1
Douglas Fir	236
Ponderosa Pine	2
Bigleaf Maple	79
Cottonwood	2
Ravine	5
Upland Xeric (Dry)	
Xeric Uplands	21
Active Erosion/Talus	2
Slope/Talus Drainage Area	37
Miscellaneous	
Sand/Gravel/Cobble	98
Water	178
Lawn/Pasture	65
Orchard/Large Garden	13
Development	54
Disturbed	96
Roads	56
Total	2,543

Subtotals:

Percentages of the Valley Floor Study Area All riparian classes (936 acres) - 36.8% All forested riparian classes (917 acres) - 36.0% All upland or xeric classes (1,047 acres) - 41.2% All forested upland or xeric classes (983 acres) - 38.6% All human disturbance classes (283) - 11.1%

Riparian classes on federal lands - 818 acres Riparian classes on nonfederal lands - 118 acres Human disturbance classes on federal lands - 209 acres Human disturbance classes on nonfederal lands - 74 acres

---

The riparian zone can be defined as the river channel, and upslope lands where vegetation is influenced by elevated water tables, flooding, or by the ability of soils to hold water (Naiman 1993). It is the zone of direct ecological interaction between the forest and the river system (Swanson and Franklin 1992).

The riparian zone is ecologically important for many reasons. Tanimoto (1991) found that the areas of highest community-level biodiversity tended to occur among riparian classes. This was partially caused by the smaller stand sizes (polygons) in these areas, which are a result of river process dynamics. Additionally, in a short-term, baseline inventory, it was discovered that species-level diversity was slightly higher for birds and small mammals in nutrient-rich riparian study plots (NPS 1993a). Longer-term studies have found an even greater level of increased diversity in riparian zones. For example, more species of breeding birds use riparian areas than any other habitat type in North America, and other Cascades studies have found up to twice the species richness in riparian zones as compared to upland habitats. (Douglas et al. 1992; Gregory et al. 1991).

Studies have also found that nearly 70% of vertebrate wildlife species in a region will use riparian corridors in some significant way during their life cycles (Naiman et al. 1993). The riparian zone also provides, or could provide, important habitat for at least 10 threatened, endangered, or rare species. These species are the northern spotted owl, grizzly bear, gray wolf, bald eagle, bull trout, Pacific fisher, Cascades and spotted frogs, harlequin duck, and pileated woodpecker.

Plant life is also diverse in this zone; 166 species were inventoried, forming an unusual flora for such a small area, with species from wide geographical, altitudinal, and ecological ranges (Mason and Koon 1985). Riparian zones often play an important role within landscapes as corridors for dispersal of plants (Gregory et al. 1991).

The riparian zone is also a critical component of the overall hydrologic process of the Stehekin River. In general, a natural riparian zone connects montane headwaters with lowland terrains, providing avenues for the transfer of water, nutrients, sediment, organic matter, and aquatic and terrestrial organisms (Gregory et al. 1991) A natural riparian zone reduces the severity of flood events, acts as a buffer to pollution sources entering the river, controls the loss of groundwater nutrients into the river, and provides important fish habitat and food sources from overhanging vegetation and associated terrestrial insects.

Riparian zone woody debris entering and accumulating in the river channel creates significant amounts of habitat for aquatic insect, fish, small mammal, and bird species, as well as influences the formation of pools,

river movement, and the overall structural habitat diversity of the river system (USFS 1988; Rhoades 1986; Gregory et al. 1991). Extensive research into the ecological role of woody debris has concluded that it is a critical element of river ecosystems (Swanson and Franklin 1992).

Riparian, Nutrient-Poor — These are the primary invading woody species on more recent fluvial deposits.

1. Alder. Red alder is the primary invading tree species on point bars and other river-edge sites.

2. Sitka Willow *(Salix sitchensis). S. sitchensis* is a shrub occurring primarily on islands at the head of Lake Chelan. It is a small class at only 5 acres.

3. Cottonwood. Black cottonwood grows on bottomlands along the river and tributary streams. In the valley it grows to over 4 feet in diameter.

4. Cottonwood/Alder. Mixed stands are about one-half as common as either alder or cottonwood stands. Cottonwood succeeds alder on many point bars.

Riparian, Nutrient-Rich — These are the species that occur on older river deposits. They invade nutrient-poor stands after soils have become enriched from flood silt deposits and litter accumulations from the earlier-successional trees.

5. Mixed Deciduous. These stands contain bigleaf maple and cottonwood and/or alder.

6. Mixed Coniferous. With a highly variable composition, these stands are common on well-developed soils on old point bars.

7. Mixed Deciduous/Coniferous. These stands contain mixes of alder, cottonwood, bigleaf maple, Douglas fir, grand fir, ponderosa pine, or western redcedar. At 317 acres, it is the third most common community type in the valley.

8. Grand Fir. These relatively small stands, characteristic of moist sites with rich soil, are concentrated near the mouth of the river.

9. Western Redcedar. Pure stands of redcedar are rare and occur on wet sites associated with the river and tributaries. There are only 9 acres of this community type in the valley.

10. Douglas Fir. This species may be considered a climax species on the oldest portions of point bars.

11. Bigleaf Maple. A relatively common species occurring throughout the valley's riparian zone, in a wide variety of site conditions.

12. Cottonwood. In these stands, black cottonwood is mixed with bigleaf maple, grand fir, Douglas fir, or redcedar. At 114 acres, these stands are relatively common and occur throughout the valley.

13. Cottonwood/Alder. Stands that occur on intermediately developed soils, often containing bigleaf maple.

14. Alder. These stands occur on abandoned oxbows and river channels, and form distinct, sinuous stands near the Company Creek road.

15. Aspen. An uncommon land cover type near Margerum Creek, possibly of wildfire origin.

16. Scouler's Willow *(Salix scouleriana)*. Although this shrub species grows throughout the valley, stands dominated by this willow occur only near the mouth of the river on well-developed soils.

17. Emergent Vegetation. These are primarily grass or sedge-dominated stands at the head of the lake associated with lake draw down.

Upland Mesic — These are nonriparian communities on soils of moderate moisture content.

18. Mixed Deciduous. This is an uncommon class composed of bigleaf maple mixed with cottonwood, vine maple, Scouler's willow, or Pacific dogwood.

19. Mixed Coniferous. This is the most common land cover type in the valley and covers 501 acres. Most stands are dominated by Douglas fir but also contain ponderosa pine or grand fir. Some of these mixed stands are dominated by ponderosa pine.

20. Mixed Deciduous/Coniferous. At 149 acres, this class covers the fourth largest acreage. It is composed of a wide variety of deciduous and coniferous species.

21. Grand Fir. Pure stands of nonriparian grand fir are very rare in the valley.

22. Douglas Fir. This species is the most widespread in the valley. It forms pure stands on 236 acres and is the second most common land cover type.

23. Ponderosa Pine. Ponderosa tolerates dryer sites and is found on both sides of the valley.

24. Bigleaf Maple. This common land cover type occurs on well-developed, well-drained, sloping sites throughout the valley. Understory species are often Scouler's willow and Pacific dogwood.

25. Cottonwood. This rare class occurs on fluvial deposits associated with tributaries rather than the river.

26. Ravine. These are deep, steep-sided, tributary canyons containing flowing streams. Although soils are shallow, redcedar and numerous other species occur.

Upland Xeric — These are the driest sites in the valley and occur on either north- or south-facing slopes. Two of the three xeric classes (classes 27 and 28) are largely unvegetated due to severe microclimates. All three classes are relatively common on the valley's steeper side slopes.

27. Xeric Uplands. These sites are characterized by exposed bedrock and are unvegetated or contain less than 10% tree cover. They have little or no soil development.

28. Active Erosion/Talus. These areas are found below eroding cliffs or steep slopes and, except for lichens, are largely unvegetated.

29. Slope or Talus Drainage Area. These sites are found at the base of active erosion and talus areas (class 28). They support sparse, herbaceous plants and some trees. Precipitation concentrates on their downhill slopes.

Miscellaneous — This category includes the active river channel and areas of human disturbance.

30. Sand/Gravel/Cobble. This is a relatively common land cover type composed of recent Stehekin River fluvial deposits.

31. Water. This class is limited to the Stehekin River wet channel at the time the aerial photographs were taken.

32. Lawn/Pasture. These are large, maintained lawns and pastures used either for grazing or for hay/alfalfa crops.

33. Orchard/Large Garden. This class includes the apple trees at the Buckner orchard, and the largest private gardens. Many small gardens were too small to distinguish.

34. Development. This varied class contains residential, commercial, and public developments including structures. Some small structures, obscured by the forest canopy, were not included in this class. If there is vegetation in this class, it is largely modified by human activities or by the dominance of normative species.

35. Disturbed. This class has tree coverage of less than 10% and two or more of the

following: few trees, if any, taller than 15 feet; a significant presence of nonnative plant species; ongoing maintenance of the area as a clearing (other than lawns, pastures, orchards, or gardens) *or* an unmaintained clearing where disturbance had been sufficient to prevent forest regrowth (usually colonized by nonnative species); ample evidence that the clearing was of human origin. These criteria were applied conservatively; if two of the criteria were not met, an area was classed as a natural clearing or as one of the other vegetated classes.

36. Roads. Most roads were mapped in the summer of 1990 in field work separate from Tanimoto's. This road information was then incorporated into Tanimoto's vegetation/land cover theme. Each road segment was assigned one of five different width classes. Total road disturbance below High Bridge is estimated at 56 acres.

See the Principal Existing Disturbed Areas map for graphic portrayal of the disturbance sites — those in classes 32, 33, 34, or 35.

Sensitive Communities. Several community types have been identified as being of particular importance to wildlife species. These are all of the riparian, nutrient-rich classes, the water class, and the upland xeric, active erosion/talus class (NPS 1993c). As a group, the riparian, nutrient-rich classes were found to have slightly higher species richness for both birds and small mammals. The riparian zone also is, or can be, important habitat for 10 sensitive species — harlequin duck, bull trout, pileated woodpecker, spotted frog, Cascades frog, northern spotted owl, Pacific fisher, bald eagle, gray wolf, and grizzly bear. The water class, being primarily the river, is important habitat for harlequin ducks, bull trout, and for the two frog species to a degree. Additionally, open water at the head of the lake is used by numerous waterfowl species in the winter. And finally, the active erosion/talus class appears to be important in providing microhabitat sites for reptile and amphibian species.

Existing and Past Human Disturbances. Human disturbances in the Stehekin Valley have been extensive. They include selective and clear-cut logging; clearings for residences, agriculture, NPS administration, visitor facilities, golf course, road and trail system, and airstrip; gravel extraction sites; riverbank modifications; flooding of the original lakeshore and river delta; dredging and filling of wetlands; and establishment of exotic plant species. Some of these past disturbances, particularly logged areas, have returned to more natural states, although species composition may have changed. Currently, the total disturbance area is 283 acres, based on the land cover data. It is estimated that 188 of these acres, or 65%, are in the riparian zone (NPS 1993c). Other selective disturbance acreages are as follows: Buckner orchard/homestead - 42 acres; airstrip - 48; current gravel quarry - 2; lower field - 7; disturbance from firewood cutting in woodlots to date - 12 acres; estimate of vegetation lost with rise of lake level - 140 acres (NPS 1993b).

Moderate-scale logging began in the valley in the early 1890s with the beginning of steamboat service and its attendant demand for fuel (Byrd 1972). Areas in the lower valley were cut in an irregular manner with some areas resembling clear cuts (Oliver and Larson 1981). Intermittent logging continued into the 1960s, with mostly selective cuts and some small clear-cuts. Historically, at least 10 sawmills have operated in the valley, and some logs and timber were exported down lake. Three small mills still occasionally operate, cutting private timber. Based on mapped information provided by long-term resident Robert Byrd, it is estimated that over 1,650 acres, covering 65% of the valley floor study area, have been logged over the years. Most of these areas have returned to more natural, second-growth conditions.

Snags (dead standing trees) and downed trees have been heavily used in the past as a

Principal Existing Disturbed Areas

Stehekin Valley

Lake Chelan National Recreation Area

United States Department of the Interior • National Park Service DSC • June 95 • 168 • 20.079A

43 mile's- to Bridge OreeK.
113 mile^ to Oottonwood Camp

High
teri

Figure p185: Disturbed Areas

source of firewood. In 1987 it was estimated that at least 1,000 snags had been cut since 1968 (NPS 1987b). The impacts of this practice have been debated. Oliver and Larsen (1981) observed cut stumps virtually throughout the lower valley and believed that the supply of snags was decreasing. The *Firewood Management Plan* (NPS 1987b) identified over 50 wildlife species dependent on snags, while another study has documented 178 vertebrate species which use downed trees (Forest Service 1979). Currently, at least five of the valley's sensitive species could use snags and/or down logs as important habitat — pileated woodpecker, Vaux's swift, spotted owl, Pacific fisher, and western gray squirrel.

Tanimoto's (1991) work analyzed this situation. In two large areas of the lower valley, snag density was examined in relation to distance from roads. All canopy snags within 820 feet of roads were individually mapped (597 total snags). A statistically valid correlation was found of increasing snag density as distance from a road increased. It was estimated that natural snag densities were reached at about 625 feet from a road, at 0.55 snags per acre. Using the GIS, it is estimated that past firewood collecting has affected 1,400 acres of the lower valley. On these acres, snag densities are less than what would be found under natural conditions. The same is probably true for the density of down logs. Given the wildlife dependencies on these structural components of a forest stand, it is likely that numerous wildlife species are also negatively affected on these 1,400 acres.

Existing physical disturbances to the natural vegetation of the valley include road surfaces and shoulders; parking areas; residential, commercial, and visitor facility structural footprints; lawns, horticultural and agricultural plantings; compacted soils in corrals and campgrounds, and on hiking trails; and sites dominated by invading, normative plants. These types of disturbances are included in the five human disturbance classes in the land cover theme. If these five disturbance classes are totaled, then 283 acres, or 11.1%, of the valley floor has been heavily affected in the past.

An additional 1,400 acres of the valley floor has been impacted through the removal of snags and down logs. A total of 1,683 acres, or 66% of the valley floor, has therefore been affected by human activities. These areas are not in a pristine condition. This figure does not include historic logging activities reported earlier. If these areas are added, then 2,253 acres have been modified by human activities at some time, or 88% of the valley floor study area.

Plant Succession and Natural Disturbance - River Dynamics and Wildland Fire. The dominant ecosystem processes that affect plant succession in the valley are those associated with the river and those associated with wildfire. Tanimoto (1991) discusses river-influenced succession, starting with his designation of the riparian zone. This zone — 936 acres of the valley — basically represents the lands and vegetation that have been influenced by river processes in the past. Similar river dynamics are occurring today as have occurred in the past. Primarily, episodic flood events scour new and old channels, as well as island and peninsular point bars. On these nutrient-poor sites, three woody species are the primary invaders — alder, cottonwood, and Sitka willow.

As these species and their associated understory species grow and die, and as silt is deposited by lesser-magnitude flood events, the soil is improved and prepared for a wide range of secondary invaders. This dynamic can be repeated numerous times until river channels move a sufficient distance to preclude scouring. Then additional plant species, requiring particular soil conditions or microclimates, will continue to move in to these more nutrient-rich sites. The exact stages of succession on nutrient-rich soils were found to be unpredictable and could take many directions. Finally, since the river has a

limited distance over which to laterally move, this entire process has and will repeat itself as river channels move back again over time. (For example, Byrd (1972) reports that in 1891 the river had recently changed several miles of its course.)

Tanimoto also found both polygons and a higher degree of community diversity in the riparian zone, when compared to upland areas. Uplands tended to have larger stands and less diversity. Riparian zones likely have more diversity due to the dynamic movements of the river and the relatively short intervals between disturbances (floods). Uplands disturbances tend to be of longer interval (fires and some geologic processes). An additional study of aggregated land cover classes found that riparian, nutrient-rich sites also have slightly higher species richness for birds and small mammals compared to upland mesic sites (NPS 1993a). It is not known how past human disturbances, particularly logging, may have influenced these conditions.

Oliver and Larson (1981) found that the natural fire return interval for severe, stand replacement fires was 90 to 100 years. The last large fire occurred in 1889. This return interval is based on a valleywide study of fire scars on existing trees, and represents an overall picture of the valley. It is probable that less severe surface fires burned on the north side of the river in stands of ponderosa pine or mixed conifers at shorter intervals, perhaps every 20 to 25 years. Oliver and Larson concluded that under natural conditions, wildfire would create stands which were even-aged, that is, all the trees in a stand were basically the same age. In the absence of natural wildfire, succession has produced today's stands, which are composed of trees of many ages and are therefore not natural.

Normative Plant Species. Nonnative plants are those species that are growing in the Lake Chelan NRA as a result of deliberate or accidental actions by humans. At least 30 such species are growing in the valley (Naas and Naas 1981). Those that are most widespread or of most concern as invading species are diffuse knapweed, rush skeleton-weed, common mullein, Canada thistle, Japanese knotweed, Scotch broom, baby's breath, oxeye daisy, Himalaya blackberry, tansy, and foxglove. The primary locations of nonnative plant infestations are the edges of the Stehekin River road and other roads, NPS and private development sites, old gravel extraction sites, the Buckner orchard, the old golf course fairways, and the airstrip, which is nearly completely covered by diffuse knapweed. Currently, control efforts are continuing for diffuse knapweed and rush skeleton-weed (NPS 1993d).

ECOSYSTEM COMPONENTS AND SPECIES-LEVEL BIODIVERSITY

Fish

The diverse aquatic habitat in Lake Chelan NRA supports a varied fish community that today is considerably different from the native fish community of the early 1900s. The changes over time were caused by the introduction of nonnative species, habitat alterations, and consumptive use. Today, there are possibly 12 native and 6 nonnative species that inhabit recreation area waters.

Native Salmonid Species. The native salmonid species are the most sensitive to human activities and have substantially declined or disappeared in the national recreation area. Native salmonid species include westslope cutthroat trout *(Oncoryhnchus clarki lewisi)* and bull trout *(Salvelinus confluentus).*

Westslope cutthroat trout — The native subspecies of cutthroat trout was once the dominant sportfish in Lake Chelan. Before the 1920s newspapers documented tales of the excellent fishing for "one to three pound" cutthroat in Lake Chelan. After about 1910 a combination of factors led to the near disappearance of the high quality native cutthroat trout fishery in Lake Chelan. The

factors that probably had a major impact, include hatchery egg-taking programs, introduction of major competitors including rainbow trout, kokanee salmon, and brook trout, hybridization with rainbow trout, construction of the Chelan Power Dam and subsequent annual lake level fluctuation, and simple overfishing (Brown 1984).

O. c. lewisi has vanished from much of its range in Montana, Idaho, Washington, and Alberta, although there are some areas where essentially pure native trout are relatively common (Behnke 1979). In the Stehekin drainage, the native genotype may still exist in the upper Stehekin drainage. Examination of cutthroat trout captured from there in 1982 showed that they were *O. c. lewisi* and represent the original native trout in the area. The finding of this particular population of pure westslope cutthroat trout was important because it extended the known distribution of the westslope cutthroat trout to the Cascade Crest, much farther west than previously thought (Trotter 1987). There have been few other fishery surveys in the Stehekin drainage to determine if pure strains of the original native trout may occur elsewhere (Brown 1984).

Hatchery-reared cutthroat have been planted in Lake Chelan, its tributaries, and high mountain lakes since the mid-1920s. Cutthroat trout stock from Lake Chelan was used until 1930 and then from nearby Twin Lakes (Brown 1984). The state of Washington has used the Twin Lakes as brood stock lakes since 1915. The origin of the Twin Lakes strain is uncertain. Trotter (1987) reported that the original Twin Lakes strain was either native or originally stocked with cutthroat trout from the Stehekin River. The common practice of mixing races of cutthroat trout in propagation raises some questions about the purity of the Twin Lakes strain that has been stocked in recreation area waters (Behnke 1979).

The Stehekin River, low gradient tributaries, and Lake Chelan could provide suitable habitat for both westslope cutthroat trout and bull trout. These two species have similar habitat requirements (Nakano et al. 1992). In general, optimal riverine habitat for these two species is characterized by clear, cold water; silt-free substrate in riffle-run areas; equal areas of pools and riffles, with areas of slow, deep water; well-vegetated stream banks; abundant instream cover; relatively stable water flow regimes and stream banks; and productive insect populations. Optimal lake habitat is characterized by clear, cold, deep lakes that are typically nutrient-poor. Both species are stream spawners and require clean gravel substrate for reproduction to occur (Hickman and Raleigh 1982, Fraley and Shepard 1989). Cutthroat trout typically spawn during the spring. Westslope cutthroat trout are opportunistic feeders, feeding primarily on terrestrial and drifting aquatic insects (Nakano et al. 1992).

Bull trout — The bull trout was once reported to provide a tremendous angler and tourist attraction during their fall spawning run up the Stehekin River. Prior to 1920, captured bull trout averaged from about 3 to 5 pounds. The introduction of kokanee provided additional food for the predatory bull trout resulting in reports of some weighing 9 pounds.

Until recently, bull trout were thought to have been extirpated from Lake Chelan and its tributaries. There was speculation that bull trout were wiped out by disease, probably introduced to the system along with one or more of the many plantings of fish. In the fall of 1951, a great number of sick and dying bull trout were observed. Few were caught after that, and the last captured bull trout recorded by Washington Department of Wildlife was in 1957 (Brown 1984). However in 1993, there were several unconfirmed reports of bull trout being captured from the Stehekin River.

Recent scientific research shows that the bull trout is rapidly declining throughout its range, including Washington (also see the

"Endangered, Threatened, and Sensitive Species" subsection). Reasons for decline and disappearance of bull trout has been the result of habitat degradation, overharvest, dams and diversions, and competition and hybridization with introduced normative salmonids. The bull trout is extremely sensitive to changes in water quality, particularly increased stream sedimentation. Any land use activity that increases the risk of sedimentation poses a direct threat to bull trout (Bader et al. 1993).

Bull trout feed primarily on bottom-dwelling or drifting aquatic insects. Large bull trout are highly piscivorous, feeding on smaller fish. Bull trout typically migrate from lakes in the fall, to spawn in clear streams with flat gradient, uniform flow, and uniform gravel or small cobbles.

Pacific salmon — There are no anadromous runs of salmon from the Pacific in the tributaries of Lake Chelan. However, prior to the construction of the dam there are early reports describing catching "salmon trout" in Lake Chelan. These were either the native cutthroat trout, or they were a Columbia River salmon. Despite the almost continuous falls in the lower Chelan River (river drops 376 feet in about 3 miles), some Pacific salmon may have moved up from the Columbia to spawn in the tributaries of Lake Chelan. In 1897, the Chelan Falls Leader described a person capturing a silver salmon weighing 9 pounds, 5 ounces in the lake with his bare hands. The fish was described as being injured in some way, apparently from climbing the raging river (Byrd 1972).

Introduced Species. Introduced fish species in the recreation area include rainbow trout *{Oncoryhnchus mykiss),* brook trout *(Salvelinus fontinalis),* golden trout *(Oncoryhnchus aguabonita),* lake trout *(Salvelinus namaycush),* kokanee *(Oncoryhnchus nerka),* and chinook *(Oncoryhnchus tsawytscha).* These species are important resources to recreational fishing; however, they have displaced the native salmonid populations.

Kokanee and chinook — Kokanee were stocked in Lake Chelan in 1917 and became the dominant sport fish of the lake until the mid 1970s. With introductions of *Mysis relicta* (opossum shrimp) in 1967 by the Washington Department of Wildlife by the mid-1970s, kokanee populations declined dramatically (Brown 1984). *Mysids* were introduced to provide additional forage for kokanee. However, it appears that *Mysids* are competitors with younger cohorts of kokanee for the limited food source of the lake. *Mysids* are also generally not available to kokanee as forage because of *Mysid's* preference for deeper water during daylight hours while kokanee feed nearer the surface (Peven 1993).

Chinook were introduced to the lake by the Washington Department of Fisheries to provide for a "trophy" fishery. Chinook grew well for the first seasons, but their growth appeared to be strongly tied to the abundance of kokanee (Brown 1984). These Chinook have now established a small population, with fish greater than 15 pounds occasionally being observed on the spawning grounds. Beginning in 1990, chinook are once again being released into Lake Chelan by the Washington Department of Fisheries (Peven 1993).

In Lake Chelan NRA, the Stehekin River and its tributaries, Company and Blackberry creeks, are major producers of kokanee and chinook. Since 1984, Company Creek has accounted for 59-90% of the kokanee escapement estimates in Lake Chelan and Blackberry Creek accounted for 5-23% of the escapement estimates. Between 1985 and 1989, the Stehekin River has roughly accounted for between 3% and 47% of the peak counts (Peven 1993). Kokanee spawners begin moving into spawning streams during late August and early September, and build to peak numbers between the second and third week of September in Company Creek and the first week of October in Blackberry Creek (Fielder 1986b; Peven 1989). Spawners may remain past the first or second week of November. Chinook spawners begin moving

into spawning streams during the second week of September, reach a peak during early October, and several will remain in Company and Blackberry creeks until early November (Truscott 1987).

Nonnative trout and char — Rainbow and brook trout are found in the lower Stehekin River and tributaries. Rainbow trout have been introduced into many high mountain lakes. Golden trout and brook trout have also been introduced into some high mountain lakes (NCA-3, 1972). Researchers at Oregon State University are currently studying the effects of stocked trout on aquatic communities in high mountain lakes. Lake Trout were introduced into Lake Chelan between 1980 and 1982.

Recreational Fishing. Many of the lakes and streams in the national recreation area provide visitors the opportunity to fish. Approximately 12% of NRA visitors participate in fishing activities, according to the *Visitor Services Project* (NPS 1992b). There has not been a comprehensive survey of anglers to determine the quality of the fishing experience on the Stehekin River and tributaries. The fisheries in high mountain lakes are currently being studied. The quality of the existing fishery in Lake Chelan is considered poor because of the low number of kokanee present (Hays 1989). Fishing in Lake Chelan NRA generally is regulated by the Washington Department of Fisheries and Wildlife.

Fisheries Management. Five agencies are involved in the management of the Lake Chelan fisheries including Chelan County Public Utility District (PUD), Washington Department of Fish and Wildlife, U.S. Fish and Wildlife Service, U.S. Forest Service, and National Park Service. The Chelan County PUD, in consultation with these agencies, prepared a Lake Chelan fishery plan as part of the FERC relicensing of the Chelan hydroelectric project. However, this plan was not formally adopted by the management agencies.

Endangered, Threatened, and Sensitive Species

Endangered or threatened animals in Lake Chelan NRA are the bald eagle, peregrine falcon, northern spotted owl, grizzly bear, and bull trout. Proposed candidates for federal listing are the California wolverine, Pacific Western big-eared bat, Pacific fisher, North American lynx, cascade frog, spotted frog, northern goshawk, and harlequin duck. Additional species that are not listed federally but are listed or being monitored by the state of Washington are the golden eagle, flammulated owl, common loon, Vaux's swift, pileated woodpecker, and western gray squirrel. There are no federally listed endangered or threatened plant species documented in Lake Chelan NRA. Three plant species are listed by the state of Washington as sensitive: Victorian's grape-fern, western ladies tresses, and giant helleborine.

Although sensitive species are not protected under the Endangered Species Act, NPS policy requires that they be managed to avoid a need for placing them on the federal list. Potential impacts on these species must be evaluated prior to a final decision on any specific, proposed project. The list of plant species will continue to change, as inventories produce more information on the occurrence, number, and distribution of species. Species may be removed from the list based on additional information or added to the list if they are discovered in the Stehekin watershed.

Table 7 presents the status, habitat needs, and local or regional occurrence of the 23 listed species. Status conditions are as follows:

> **FE = Federally Endangered.** Listed by the U.S. Fish and Wildlife Service as a species that is in danger of extinction throughout all or a significant portion of its range.

FT = Federally Threatened. Listed by the U.S. Fish and Wildlife Service as a species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

FC = Candidate. Species that are under consideration for listing by the U.S. Fish and Wildlife Service as threatened or endangered for which conclusive data on biological vulnerability and threat are not currently available to support proposed rules.

PT = Proposed. Candidate species that the U.S. Fish and Wildlife Service has determined are warranted for listing as a threatened or endangered species but for which rules have not yet been promulgated.

SE = Washington State Endangered. Listed by the Washington Department of Fish and Wildlife as a species native to the state of Washington that is seriously threatened with extinction throughout all or a significant portion of its range within the state.

ST = Washington State Threatened. Listed by the Washington Department of Fish and Wildlife as a species native to the state of Washington that is likely to become an endangered species throughout all or a significant portion of its range within the state without cooperative management or removal of threats.

SS = Washington State Sensitive. Listed by the Washing Ion Department of Fish and Wildlife as a species native to the state of Washington that is vulnerable or declining and is likely to become threatened or endangered in a significant portion of its range within the state without cooperative management or removal of threats.

SC = Washington State Candidate. Under consideration for possible listing as endangered, threatened, or sensitive.

SM = Washington State Monitor. Designated by the Washington Department of Fish and Wildlife as **a** species native to the state of Washington that is of special interest because (1) it at one time was classified as endangered, threatened, or sensitive, (2) it requires habitat that has limited availability during some portion of its life cycle, (3) it is an indicator of environmental quality, (4) further field investigations are required to determine population status, (5) there are unresolved taxonomic problems that may bear on its status classification, (6) it may be competing with and affecting other species of concern, or (7) it has significant popular appeal.

SG = Washington State Game Species. Any species of wildlife or fish for which seasons and bag limits have been established by the Washington Department of Fish and Wildlife.

TABLE 7: ENDANGERED, THREATENED, AND SENSITIVE SPECIES

Species	Status[1] FWS	WA	Habitat Needs/Occurrence
Peregrine Falcon *(Falco peregrinus anatum and tundrius)*	FE	**SE**	Peregrine falcons normally nest on cliffs associated with water; they primarily hunt medium-sized birds. No known nesting occurs in the park complex; occasionally peregrines are observed in the Lake Chelan NRA as migrant. The closest breeding occurs in the San Juan Islands, about 100 miles away. (Farrand 1983; NPS 1985; Larrison 1981)
Gray Wolf *(Canis lupus)*	FE	**SE**	Historically, wolves ranged throughout the state but were extirpated by 1910. Reported sightings in the upper Skagit Valley increased over the last two decades. Three packs dens were documented in 1990 in the North Cascades area. Pups and adults were seen or heard in the national park complex near the Canadian border, and in the Okanogan and Wenatchee national forests. Additional reports of individual wolves likely indicate a natural recolonization of wolves into Washington from Canada. Primary life requirements are forested and open habitats which support ungulate populations. In this area, deer are probably the primary prey species. Wolves are socially organized into packs, with pack territories ranging from 40 to 1,000 mi^2. Den sites and rendezvous sites, used for raising pups, are critical habitat components. Human-induced mortality is the major limiting factor affecting gray wolf survival. All of the Stehekin area is considered wolf habitat, and particularly areas of winter deer range such as riparian zones and south-facing slopes along the lake. In the greater Cascades, adequate habitat requirements for a viable population may exist. There is currently no USFWS recovery plan for wolves in the Cascades. (USDI1992; NPS 1993b; Friedman 1988)
Bald Eagle *(Haliaeetus leucocephalus)*	FT	**ST**	Most bald eagle nesting in the state is associated with the coast. Wintering areas are associated with open water. Although bald eagles do not nest in Lake Chelan NRA, they have been observed from the shores of Lake Chelan to the alpine. They occasionally forage for fish and roost in the fall, winter and spring along the Stehekin River and the shores of Lake Chelan. Winter wildlife inventories of the entire Lake Chelan shoreline from 1982 to 1991 averaged 2.0 bald eagles per survey. The USFWS estimates the lake's wintering population at 5 birds. There are no known, regularly used perch or roost sites in Lake Chelan NRA. It is not known if eagle foraging in the lower Stehekin Valley is associated with salmonid spawning runs. (USFWS 1986; NPS 1985 & 1993; Fielder 1991)
Northern Spotted Owl *(Strix occidentalis caurina)*	FT	**SE**	Spotted owls prefer mature or old growth forests that are structurally complex — i.e., they contain trees of several species, sizes, and ages, contain standing and down dead trees, and have multistoried canopies. In this area spotted owls nest in stands that are younger than those that are used on the west side of the Cascades. Most nests in a Wenatchee National Forest study were located in live Douglas firs in stands dominated or codominated by this species. Nest trees averaged 137 years old, and 80% of the nests were in abandoned northern goshawk nests or on mistletoe brooms. The nesting cycle begins in February or March, with eggs normally laid in early April. Fledglings are independent by mid-July and disperse in September or October. Pair home ranges are large. Reported home ranges in Washington's western Cascades averaged over 6,000 acres, while those in Oregon mixed conifer forests, perhaps more similar to the Stehekin area, are closer to 4,000 acres. Foraging habitat is variable but generally in areas of at least 60% canopy closure, high structural diversity, and containing dominant trees of at least 24-inch diameter. Prey species are usually flying squirrels and woodrats. Roosting sites are often in cool, shady areas near streams, or in the lower canopy. Generally, owl habitat use is associated with riparian areas. The *Draft Recovery Plan for the Northern Spotted Owl* (USDI 1992) identifies the Stehekin River drainage as one of 196 "designated conservation areas" (DCAs), which are to be managed for spotted owl recovery. It is a category 2 DCA, meaning it can support fewer pairs of owls than the category 1 DCAs due to natural habitat limitations. This DCA is not recommended to be designated as critical habitat under the Endangered Species Act, since it is already a national park system unit. The recovery plan also defines goals and strategies for the Eastern Washington Cascades province, which includes the national recreation area. DCA management guidelines and provincial biological goals are discussed in the "Environmental Consequences" chapter. Extensive spotted owl surveys were completed in the valley in 1993. Five owl pairs (some with nests) were found — four are in the vicinity of the Stehekin River between High Bridge and Bridge Creek, and are on steep, heavily forested slopes; the fifth site is on a steep, heavily forested slope downlake from the landing. Two additional pairs are in the DCA up Agnes Creek in the Glacier Peak wilderness. (USDI 1992; Buchanan et al. 1993; FS and BLM 1993; FEMAT 1993)

Species	Stat FWS	WA	Habitat Needs/Occurrence
Grizzly Bear *(Ursus arctos)*	FT	**SE**	Grizzly bears are omnivores that eat a very wide range of plant and animal species, from grasses to large mammals. After hibernating for three to six months of the year, bears emerge from dens and generally move into low elevation riparian zones for the first spring plants, or into areas of large mammal winter range where carcasses may be found. In the summer bears move to subalpine and alpine areas and forage on green plants, roots, and small mammals. Before returning to the den, bears fatten on berries, other mast crops, or spawning fish if available. Home ranges are variable. In the vicinity of Glacier National Park, females ranged from 38 to 159 mi^2, and in the Cabinet/Yaak and Selkirk ecosystems, they averaged 159 mi^2. The Stehekin Valley is historical grizzly bear range; grizzlies were considered fairly common in the 1890s in this region. It is in the center of the North Cascades grizzly bear ecosystem, which has been included as a recovery area in the USFWS *Grizzly Bear Recovery Plan*. It is the largest of the six ecosystems identified in the plan. There is a small, resident, widely distributed, and reproducing population in the ecosystem. A population estimate is from 10 to 20 bears. From 1984 to 1991, 18 verified or reliable observations of grizzlies were recorded within 20 miles of Stehekin Landing. Detailed food habits studies in the North Cascades have not been completed. However, based on research in other ecosystems, it is probable that the riparian zone of the Stehekin River was significant spring habitat before human activities displaced grizzly use. For example, black cottonwood stands in other ecosystems support important understory foods. This is likely for cottonwood stands in the valley, as well as possible for bigleaf maple, red alder, and western redcedar stands. Additionally, introduced runs of anadromous fish in the spring, late summer, and fall could now provide a food source for grizzlies. Winter deer and goat ranges would also provide an early spring food source. (Almack et al. 1993; IGBC 1987; Byrd 1972)
Bull Trout *{Salvelinus confluentus)*	PT	SG	The last confirmed report of bull trout in Lake Chelan was in 1957. The disappearance of bull trout has been mostly attributed to disease, probably introduced along with the many fish plantings. There have not been any recent comprehensive fishery surveys to confirm that the bull trout has been extirpated from Lake Chelan NRA waters. If bull trout are present, the Stehekin River, low gradient tributaries, and Lake Chelan could provide suitable habitat. Optimal stream habitat for bull trout is characterized by clear, cold water; silt-free rocky substrate in riffle-run areas; well-vegetated stream banks; abundant instream cover; deep pools; relatively stable flow regime and stream banks; and productive fish and aquatic insect populations. Bull trout typically migrate from lakes in the fall, to spawn in clear streams with flat gradient, uniform flow, and uniform gravel or small cobble. Bull trout feed on a variety of aquatic macroinvertebrates and small fish. (Brown 1984; Fraley and Shepard 1989; WDOW 1991)
California Wolverine *(Gulo gulo luteus)*	**C2**	**SM**	The wolverine is an uncommon year-round resident in high elevation, coniferous forest and subalpine areas. It is an opportunistic feeder eating a wide variety of small and mid-sized animals, and carrion. It is likely that wolverines seldom enter the lower Stehekin Valley; however, tracks have repeatedly been observed in the winter on Bridge Creek bridge. About half of the recent (though mostly unconfirmed) sightings in the park complex are from the Bridge Creek drainage. (Larrison 1976; NPS 1993b)
Pacific Western Big-Eared Bat *(Plecotus townsendii townsendii)*	**C2**	**SC**	Although bats summer in the Stehekin Valley, it is unknown whether or not this particular species occurs here. Records exist for this species around the periphery of the Cascades, the closest being in the Mount Baker-Snoqualmie National Forest. The closest documented breeding occurs in western Whatcom County, about 85 miles distant. These bats hibernate in caves, and use caves, lava tubes, and abandoned buildings for breeding and roosting sites. Nursery colonies are extremely sensitive to human activity and readily abandon sites if disturbed. They are insect eaters and forage on the wing. (WDOW 1991; Hall 1981; NPS 1993b)
Pacific Fisher *(Martes pennanti)*	**C2**	**SC**	Prior to European settlement, fishers occurred throughout densely forested areas of the state. Fisher records from the east side of the Cascades are now from above 1,800 feet elevation — in the grand fir/Douglas fir zone or higher. Fishers prefer dense forests with extensive, continuous canopies, complex forest floor structure, and are often associated with wetland forests and riparian areas. Riparian areas, lakeshores, and ridgelines are used as movement corridors. Fishers feed on red and flying squirrels, birds, porcupines, snowshoe hares, and carrion. Large hollow snags or logs are used for maternity dens. Home ranges vary from 0.6 to 15 mi^2. The North Cascades area around Stehekin has had the highest density of recent fisher records in the state (10 records between 1980 and 1991). Under natural forest conditions, the valley would be considered good fisher habitat, particularly the riparian zone. The trapping season for fisher has been closed in Washington since 1933. (WDOW 1991; Larrison 1976; Hall 1981; USDI1992; Aubry and Houston 1992)

Species	Stat FWS	WA	Habitat Needs/Occurrence
North American Lynx *(Felis lynx canadensis)*	C2	ST	A study in nearby Okanogan County found that lynx home ranges averaged 15 mi^2 for females and 27 mi^2 for males, and were the same for all seasons. Lynx density was a relatively low 6.7 per 100 mi . As in all of its range, the primary prey species was snowshoe hare, which were found in greatest densities in early successional lodgepole pine stands. It is likely that snowshoe hare numbers do not fluctuate in this area, and thus do not influence lynx numbers, as they do at higher latitudes. Unlike foraging habitat, den sites were located in mature forests (at least 250 years old) of Englemann spruce/subalpine fir/lodgepole pine at elevations over 4,900 feet. Kitten survival and recruitment into the population were low, possibly due to overall poor prey habitat in the study area. In Washington, lynx generally occur only above 4,500 feet. The population in the north-central Cascades is considered stable and is estimated at 126 animals. In Lake Chelan NRA, lynx were occasionally trapped before trapping ended in 1986, and have been rarely observed in the lower valley. Based on vegetation and elevation, the lower Stehekin Valley is not considered optimal lynx habitat. (Koehler 1990; WDOW 1991 and 1993b)
Cascades Frog *(Rana cascadae)*	C2		The Cascades frog prefers quiet, sometimes temporary ponds for breeding, which begins as soon as ice is off the water. Eggs are deposited in shallow water near shoreline. The time required for development, from egg through metamorphosis, varies between 40 and 60 days depending on water temperature. Food habits are not well known. They feed on aquatic insects, as well as terrestrial insects within close proximity of water. They can be active from February to October, and hibernate in mud over the winter. In the valley, these frogs have been found on the south side of the river in three areas: on Battalion Creek; in riparian areas southeast of the airstrip; and in overflow channels of the river. These occurrences, at about 1,200 feet, are probably new distributional records for lowest elevation. (Nussbaum et al. 1983; NPS 1993; WDOW 1991)
Spotted Frog *(Rana pretiosa)*	C2	SC	The spotted frog prefers marshy edges of ponds or algae-grown overflow pools of streams. Tadpoles may overwinter as larvae and metamorphose the following spring. Adults are opportunistic feeders taking a broad range of insect prey. In the valley one specimen was observed in 1991. (Nussbaum et al. 1983)
Northern Goshawk *(Accipiter gentilis)*	C2	**SC**	There is little research on goshawk ecology specific to Washington. Generally, goshawks nest in trees in mature or old growth coniferous forests. They are nonmigratory, though may move to subalpine areas in late summer/fall. The nesting period occurs between mid-April and September. Hunting generally occurs under the forest canopy for ground-dwelling birds, ducks, and mammals as large as hares. Primary limiting factors are loss of habitat through logging, reproductive failure, and human disturbance. There is one known active nest in Lake Chelan NRA, on the lakeshore south of the landing. A second territory or nest site is suspected in the lower valley. (Farrand 1983; Ehrlich et al. 1988; NPS 1985; USDI 1992; Palmer 1988)
Harlequin Duck *(Histrionicus histrionkus)*	C2	**SG**	Nesting pairs prefer forested mountain streams with fast-flowing water. Nests are usually adjacent to the river, but can be up to 90 feet from tht water. Renesting does not occur after human disturbance. Diet consists primarily of aquatic invertebrates such as caddisfly larvae, which are captured underwater. After wintering on the coast, harlequins use the Stehekin River from April through September. Seven to eleven breeding pairs were observed in 1990, 1991, and 1993 on the Stehekin River between High Bridge and Lake Chelan (1992 not surveyed). Birds were most often observed in areas of river channel meander, which had a cobbled bed and forested banks. Most sightings occurred between Rainbow Creek and Harlequin Bridge, with the Buckner Orchard stretch having the highest concentration. (Farrand 1983; Ehrlich et al. 1988; NPS 1990 & 1993; WDOW 1991
Golden Eagle *(Aquila chrysaetos)*		SC	There are only 80 breeding pairs in the state. Usually nest on cliffs, but sometimes in large trees. Hunt primarily mid-sized mammals — probably snowshoe hares, marmots, and ground squirrels in this area. Relatively common resident in Lake Chelan NRA, but nests in high subalpine/alpine communities. In winter, roosts and forages for fish and mammals in lower Stehekin Valley. Sometimes roosts with bald eagles. (Clark 1987; NPS 1985; WDOW 1991)
Flammulated Owl *(Otus flammeolus)*		**SC**	This owl is a cavity nester usually in mature to old, ponderosa pine communities with multi-layered canopies. A recent Idaho study also found breeding in stands dominated by mature Douglas fir. This owl is migratory, spending only the breeding season (April to October) in Washington. It can nest in loose colonies. Nests are in snags or live trees of at least 12-inch diameter, often near forest openings. Home ranges in Oregon averaged 25 acres. It hunts primarily for moths and grasshoppers, but normally does not hunt or call before total darkness. No records from the national recreation area, but it possibly occurs there based on available habitat. Has been documented 60 miles to the south. ((Ehrlich **et** al. 1988; Bent 1961; WDOW 1991; IDFG 1990)

Species	Star FWS	us[1] WA	Habitat Needs/Occurrence
Common Loon *(Gavia immer)*		**sc**	The loon is a fish-eating diver that is regularly found on Lake Chelan in the winter, during its migration, or rarely in summer. Most loons winter along the Pacific Coast. In winter, individuals maintain feeding territories during the day, and gather in groups at night. It is possible that loons nested at the head of the lake before the dam caused severe water fluctuations. Breeding occurs within 30 to 40 miles of Stehekin. There is no known breeding in the national recreation area. (Ehrlich et al 1988; Larrison and Sonnenberg 1968; WDOW 1991)
Vaux's Swift *(Chaetura vauxi)*		**sc**	Vaux's swifts usually nest in a snag cavity; they prefer mature and old growth Douglas fir and hemlock forests. Nest snags are often hollow and charred by fire. In a northeast Oregon study, swifts nested in grand fir cavities excavated by pileated woodpeckers. Swifts have been occasionally observed nesting in chimneys or on cliffs, and they communally roost in broken-top, hollow trees. They forage on the wing for flying insects. They are migratory, and are only in the region from April to September. Nesting occurs from June to August. Observations in the valley have only been of birds in flight. (Ehrlich et al. 1988; Farrand 1983; Larrison and Sonnenberg 1968; WDOW 1991)
Pileated Woodpecker *(Dryocopus pileatus)*		**sc**	The pileated woodpecker is a large, conspicuous woodpecker that prefers Douglas fir, ponderosa pine, or deciduous riparian forests with two or more canopy layers. They nest in snags or live hollow trees with an average diameter of 27 inches and height of 87 feet. Numerous tree species are chosen. A new cavity is excavated each year. The woodpecker roosts year-round in old nest cavities. Old cavities are also used by flammulated, saw-whet and screech owls, Vaux's swifts, flickers, chickadees, bluebirds, flying and tree squirrels, woodrats, and bats. Pileated woodpeckers establish large, year-round territories. Oregon territories ranged from 500 to 3,600 acres. They forage for insects, primarily carpenter ants, on dead and dying trees as well as on downed logs and stumps. Snags are relatively more important in winter when downed material is covered with snow. It is likely that at least two pairs use and nest in the lower valley. (WDOW 1991; Larrison and Sonnenberg 1968; Ehrlich et al. 1988; Bull and Snider 1993)
Western Gray Squirrel *(Sciurus griseus)*		ST	Food habits studies have not been conducted in Washington. Other studies indicate that primary foods are truffles (hypogeous fungi), acorns, and pine nuts. Oaks and acorns, however, do not occur in the Stehekin Valley. Maple and fir seeds are likely used here as additional mast food items. Nests are constructed of sticks in either a tree crotch, or in a cavity in an old live or dead tree. Recorded home ranges vary from 0.75 to 16 acres. In the valley, these squirrels are not common but are usually reported from the north side of the river, within 2 miles of the lake. They have, however, been reported in a range from 5 miles above the lake all the way to Flick Creek on the north shore. It is possible that this species is not native to Lake Chelan NRA. An unnatural range expansion from southern Washington, into Chelan and Okanogan counties, probably occurred in the 1940s with the planting of walnut orchards. From the Columbia and Methow valleys, this species then appeared in the Stehekin area. It would have had to cross poor habitat in dispersal corridors along Lake Chelan shorelines, or over high, subalpine ridges. (WDOW 1991 and 1993a)
Victorin's Grape-Fern *(Botrychium minganense)*	-	SS	This is a fern-like plant of moist areas. It is found in two undisturbed sites in the lower valley. (WDNR 1990a; Hitchcock and Cronquist 1973)
Western Ladies-Tresses *(Spiranthes romanzoffiana* var. *porrifolia)*		SS	This is an orchid of moist to wet areas that blooms in July and August. It is found in one disturbed site north of the landing. (Hitchcock and Cronquist 1973; Craighead et al. 1963)
Giant Helleborine *(Epipactis gigantea)*	-	SS	This is a nonshowy orchid that prefers streambanks, seeps, and lake margins. It is found on undisturbed sites south of the landing. (Hitchcock and Cronquist 1973; WDNR 1990b)

Status:
FE = Federally Endangered
FT = Federally Threatened
PT = Proposed Federally Threatened
C2 = Federal Candidate Category 2
SE = Washington State Endangered
ST = Washington State Threatened
SS = Washington State Sensitive
SC = Washington State Candidate for Endangered, Endangered, or Sensitive
SM = Washington State Monitor
SG = Washington State Game Species

ABIOTIC ECOSYSTEM CONDITIONS

Water Quality

Water quality in Lake Chelan NRA is nearly pristine with few exceptions. The surface water is designated as Class AA (extraordinary) and given maximum protection under state water quality regulations (WAC Chapter 173-201A). The Stehekin River, the upper portion of Lake Chelan, and 15 small high mountain lakes are the primary hydrologic units within the national recreation area.

The Stehekin River and its tributaries drain about 359 square miles of mostly undisturbed watershed. Approximately 115 square miles are in North Cascades National Park, 73 square miles are in Lake Chelan NRA, and the remaining 171 square miles are within U.S. Forest Service boundaries, which are mostly wilderness. The Stehekin River is the largest hydrologic source to Lake Chelan and contributes nearly 70% of the average annual discharge from the Chelan River.

Lake Chelan is the third deepest lake in the U.S behind only Crater Lake and Lake Tahoe. The lake is 50.4 miles long, and averages 1 mile wide. Lake Chelan is divided into two distinct morphometric basins that lie on either side of a prominent sill and lake constriction. The larger Lucerne Basin, which is partly in the Lake Chelan NRA, contains over 92% of the total lake volume and a maximum depth of 1,486 feet. The smaller Wapato Basin at the lower end of the lake exhibits a maximum depth of 400 feet and receives most of its water input from the Lucerne Basin. The average residence time of water within the Lake is approximately 10.6 years (Kendra and Singleton 1987). A relatively small concrete dam at the outlet within the city of Chelan was constructed in 1927. The dam raised the lake level approximately 21 feet to facilitate power production. Full-pool water elevations are generally maintained between June and September, with lower levels during winter months.

Potential sources of water pollution within the national recreation area include nutrient or pathogen input from wastewater, pesticide use, atmospheric deposition, storm runoff from disturbed sites (including mine tailings), storage, transport, and use of fuels and other toxic material, and land management practices outside the national recreation area. Major outside pollution sources potentially affecting national recreation area resources include the Holden mine and urban and agricultural runoff near the lower end of the lake.

The majority of water components tested in the national recreation area were within the state water quality criteria for designated uses (Patmont et al. 1989; Funk et al. 1987; Washington Dept. of Health 1993; Wright 1987). Only a few lake bottom sediment and fish tissue samples taken from Lake Chelan had metal or total DDT concentrations at levels that could affect human health or wildlife (Patmont et al. 1989). Although changes in each water quality parameter have been minor, their combined effects may adversely affect recreation area resources. Therefore, the water quality parameters that follow were considered in the impact analysis.

Nutrients **and** Pathogens. The contribution of nutrients from septic drainfields, fertilizers, and other wastewater sources within the national recreation area are most likely minor compared to natural and downlake man-related inputs. Lake Chelan is classified as extremely nutrient-poor and unproductive, or ultraoligotrophic. The principal limiting nutrient to algal growth in open water areas of Lake Chelan is phosphorus. Supplies of phosphorus to the lake appear to generally control algal productivity and resultant water quality characteristics. Most of the existing nutrient input to the upper Lucerne Basin is attributable to natural sources within the basin while a substantial amount of nutrients

entering the Wapato Basin are from anthropogenic sources. An estimated 75% of the total phosphorus in the lake is from natural sources and the other 25% is from agricultural runoff (22%) and septic systems (3%) near the Wapato Basin. Although substantial amounts of phosphorus have been added to the Wapato Basin, increased algae production has not been a problem and total phosphorus concentrations remain below ultraoligotrophic criteria (Patmont et al. 1989).

The contribution of pathogens from septic drainfields and other wastewater sources to recreation area waters is probably minimal. The Washington Department of Health has routinely tested public water supplies at seven Stehekin Valley sites, and all samples have met safe drinking water standards (Washington Department of Health 1993). Also, concentrations of pathogen indicator bacteria (coliforms) measured by others were also well below levels recommended for water supply and recreation uses. Not all drinking water supplies have been tested in the national recreation area.

Pesticides. A variety of pesticide compounds, including DDT, have historically been applied to orchard lands adjacent to Lake Chelan. Very low concentrations of target pesticides have been reported in water samples collected from Lake Chelan (Beck 1983; Funk et al. 1987). However, residues of DDT still remain within lake sediments and fish tissues, although this pesticide was banned in 1972 (Patmont et al. 1989).

An analysis of 23 pesticide and herbicide compounds in Lake Chelan sediment samples collected in 1986 found only DDT and its associated metabolites in quantifiable levels. Total DDT concentrations measured for sediments from the Lucerne Basin, including near Stehekin were very low. However, high concentrations of total DDT were reported dispersed throughout the Wapato Basin. The highest concentrations (700ug/kg (dry wt.)) were found adjacent to agricultural drains.

Total DDT concentrations in fish tissue samples for six species collected in 1987 ranged from 61 to 3,750 ug/kg wet wt. and averaged 1,300 ug/kg. Variation in concentration was correlated with fish length and percent lipid concentrations indicating a possible biomagnification effect since most of the larger fish were primary predators. Total DDT concentrations was similar for fish collected throughout the lake and varied little between fish species. None of the fish sampled exceeded the FDA action level of 5,000 ug/kg wet weight. However, individuals who consistently consume large quantities of fish from the lake may increase their lifetime risk of contracting cancer. Wildlife, particularly predatory birds, may also be at risk from DDT exposure. (Patmont et al. 1989).

Atmospheric Deposition. The effects of acid deposition on water chemistry in Cascade mountain lakes, including many in and near the Stehekin watershed, have been monitored since 1981 (Duncan and Ausserer 1984; Duncan et al. 1993). Study results showed that most high lakes in the Cascades have low alkalinity (capacity to neutralize acid) and are therefore sensitive to acid input. A portion of the sulfates measured in many lakes were attributed to western Washington pollution sources. Welch et al. (1992) measured significant decreases in sulfates in high elevation lakes coincident with sharp decreases of sulfur dioxide emissions from the ASARCO smelter (Reston, Washington) and Mount St. Helens. Although sulfate deposition has occurred, the low lakewater alkalinities were attributed to bedrock composition and not acidic input. Researchers generally concluded that no significant acidification of the lakes has taken place, but recommended continued monitoring of lakes susceptible to acidic input.

Metals. The largest inputs of metals to Lake Chelan are derived from the abandoned tailings pile and mine portal located near Holden Village and adjacent to Railroad Creek. Elevated levels of zinc in sediment

samples from near Railroad Creek were reported. High concentrations of lead were also found in lake sediments collected near Manson and were and attributed to runoff from agricultural land where lead-based pesticides have been used. In general, the concentrations of other trace metals measured in the Lake Chelan sediment samples were comparable to levels reported in soils and sediments from throughout the Pacific Northwest. Pelagic concentrations of all metals determined were quite low, and also well below applicable drinking water standards and criteria for aquatic life.

All of the fish tissue residues for all metals except mercury were reported well within human health and environmental guidelines set by various agencies and organizations. The maximum measured mercury concentration of 0.21 mg/kg wet wt. in a burbot sample exceeded the 0.1 mg/kg level recommended for the protection of predatory birds and other animals, and approached the 0.25 mg/kg criterion recommended for expectant mothers. The presence of mercury in burbot may be related to its specific feeding habit, since it typically consumes deep-water benthos. Mercury residues in other Lake Chelan fish were very similar to the national average and were generally undetectable in bottom sediments (Patmont et al. 1989).

Hydrocarbons. In addition to trace metals and pesticides, sediment samples were analyzed for organic compounds selected from EPA's hazardous substance list. Polycyclic aromatic hydrocarbons (PAH), a combustion by-product, were detected in surficial sediment samples in the Wapato Basin, but none in the Lucerne Basin. The significance of existing PAH residues has not been determined. However, the measured concentrations were generally at least ten times lower than toxic effect thresholds for aquatic animals. Some PAHs are carcinogens.

Sediment Loading. Loading calculations suggest that the discharge from the Stehekin River annually contributes approximately 4,120 metric tons/year of suspended solid materials to Lake Chelan. The largest human-caused input of sediments to Stehekin River and Lake Chelan is probably attributable to erosion of roads. During the past 12 years over 25,000 cubic yards of sand, rock, and gravel were used to maintain roads in the Stehekin Valley.

Hydropattern alterations. Surface water in the national recreation area is diverted by local residents, Chelan County PUD, and the National Park Service from Lake Chelan, Stehekin River, and tributaries in various locations to be used for power, irrigation, and domestic use (Washington Department of Ecology 1993). Groundwater is extracted only for domestic use. Diversion of water could affect dependent life forms, especially from creeks with seasonal low flows like Boulder and Little Boulder Creeks. Lake Chelan surface levels fluctuate about 18 feet annually.

Air Quality

Air quality in the study area and surrounding area is generally very good, but is affected by pollution emissions within and outside the national recreation area and prevailing meteorological conditions. The study area is designated as a Class II air quality shed under the Clean Air Act. A large part of the area surrounding the Stehekin Valley has been designated as **a** Class I air shed. These bordering areas include North Cascades National Park, Pasayten Wilderness Area, and Glacier Peak Wilderness Area. Air quality is important for health, visitor enjoyment, scenic vistas, and preservation of natural systems and cultural resources. Notable air quality related values at Lake Chelan NRA are water quality and related aquatic ecosystems, visibility, and scenery.

Climate. The study area climate is generally characterized by wet winters and dry summers, and moderate daily and seasonal

temperatures. Due to the prevailing westerly winds, rain and snow are mostly from Pacific air masses. The rain shadow effect of the Cascade Range to the west dramatically reduces the amount of precipitation that falls in the study area. Average annual precipitation within the Stehekin watershed may range from more than 150 inches near the Cascade Crest (Dome Peak) to 34.6 inches at Stehekin. Most precipitation occurs from November through February (22.8 inches in Stehekin). See table 8 for a summary of weather data for Stehekin.

TABLE **8:** TEMPERATURE **AND** PRECIPITATION **DATA,** STEHEKIN

Measurement	**Minimum**	Maximum
Extreme annual temperatures		
2 years in 10	-6°F	100°F
Average daily winter temperature range	24.6°F	35.4°F
Average daily summer temperature range	50.8°F	79.4°F
Extreme annual precipitation		
2 years in 10	24.0 in.	**42.7** in.
Average annual monthly precipitation range	0.5 in. (July)	**6.6** in. (Dec.)

Air Emissions. Energy use, soil erosion, and forest fires are the primary air pollution sources within the national recreation area. Several types of emissions resulting from energy consumption are produced in the Stehekin Valley. These include particulate, carbon monoxide, and volatile organics. Total atmospheric emissions are estimated to be approximately 120,000 pounds per year. Types of pollutants in order of amount are carbon monoxide, volatile organics, and particulates. Firewood burning produces approximately 85% of the energy use emissions in the valley. The PUD diesel generators emit almost all of the nitrogen and sulfur oxides produced in the valley. Propane use has the overall lowest emission levels of all types of fuels. Increased degradation of air quality can occur when the dispersion of locally emitted air pollutants (fireplaces, diesel generators, etc.) is restricted by temperature inversions or low wind speeds (Northwest Energy Services, Inc. 1993). These conditions usually occur during the late night and early morning hours in the colder months of the year. High particulate matter concentrations can also occur when strong winds increase dust emissions from the exposed lake bottom during low water periods or from dirt roads. Control of wind erosion including cultivating native plants on exposed lake bottom and seasonal applications of natural petroleum-free dust palliatives on roads has resulted in limited success. Prescribed natural fires and prescribed burns are major sources of intermittent particulates in the national recreation area.

The primary outside emission sources affecting the national recreation area are from the western Washington urban area, between Vancouver, British Columbia, and Portland, Oregon. Lake Chelan NRA lies in the path of prevailing westerly winds that sweep Pacific and Puget Sound air masses over western Washington urban and point pollution sources. Types of pollutants injected into the air mass include ozone, sulfate, nitrate, ammonium, strong acid, carbon (organic and light-absorbing), and soil.

There is little information available about the effects of specific air emissions on soils, vegetation, water quality, and sensitive aquatic organisms in remote mountainous areas of the Pacific Northwest. However, a few studies on acid precipitation and visibility have been conducted in or near the national recreation area.

Acid precipitation. Meteorological studies show that precipitation falling on the western portion of Washington State including the Cascades is contaminated with strong acids. Moist marine air sweeps westerly over the coast, then over the urban and point sources depositing "acid rain" in the urban Puget Sound region then in the Cascades. The chemical composition of precipitation collected in the urban Puget Sound region shows the influence of anthropogenic acid oxide emissions and is more concentrated in nitrate, excess sulfate,

ammonium, and strong acid than that collected at the Pacific Coast. However, there is a substantial dropoff in contaminant concentrations in the mountain precipitation as compared to that of precipitation in the adjacent Puget Sound basin (Duncan et al. 1986).

Since 1981 winter precipitation chemistry has been studied at or near Snoqualmie Pass and Stevens Pass located 70 miles and 45 miles southwest of the national recreation area, respectively. Study results showed that sulfate was the dominant acid-forming anion the precipitation samples, with Stevens Pass samples slightly less acidic than Snoqualmie Pass samples. The sulfate, nitrate, and ammonium concentrations in snow samples were low compared to precipitation concentrations observed in other parts of the U.S. However, concentrations in ice formed from fog or cloudwater (rime) were 1.8-4.5 times more concentrated than collected snow (Duncan 1991a). Although overall concentrations in winter samples were low, the large quantity of precipitation yielded high deposition quantities for sulfate, nitrate, and ammonium. The estimated deposition loads near the study sites were below levels considered to be damaging to aquatic organisms (Duncan 1991b). Lake acidification is one of the potential consequences of acid precipitation (see "Water Quality" subsection).

Visibility. The only visibility monitoring in the national recreation area has been the systematic photographing of views from the landing toward Booker Mountain. Analysis of the photographs taken since 1987 showed that the median standard visual range (SVR) — the greatest distance that a large dark object can be seen — in the national recreation area was 91 miles with very little variation among the years. SVR values over this period ranged from a high of 234 miles to a low of 20 miles. For 1992 there were no seasonal differences in SVR, excluding the winter months. Winter photographs with white snow-covered backgrounds could not be analyzed with the methodology used (Air Resource Specialist, Inc. 1993). No aerosol monitoring has been conducted within the NRA that would provide information about the composition of particles in the air associated with visibility impairment. However, monitoring at nearby Mount Rainier showed that sulfate and organic carbon accounted for over two-thirds of the light extinction, followed by light-absorbing carbon, nitrate, and coarse particles and fine soils (Sisler et al. 1993).

ARCHEOLOGICAL RESOURCES

Beginning in the 1970s, two types of archeological surveys have been conducted in Lake Chelan NRA. Reconnaissance level surveys have defined the general nature and distribution of archeological sites. Intensive surveys in compliance with section 106 of the National Historic Preservation Act have been used to consider the effects of specific ground-disturbing activities in Lake Chelan NRA. As a result of these surveys, 16 prehistoric and 2 historic archeological sites have been recorded in the national recreation area below High Bridge.

The prehistoric sites include five lithic scatters with or without associated depressions, fire-modified rock concentrations, charcoal, and burned animal bone. There are also an additional five hearths or fire-modified rock scatters. Three more sites include pits or depressions hollowed out of boulder fields on an alluvial fan surface. Another site consists of a rock art panel on a granite cliff face covering an area about 33 feet by 33 feet. There is also a rock cairn grouping on an alluvial fan overlooking Lake Chelan and another more complex set of rock features that includes a low 197-foot-long, rock-piled wall, numerous depressions hollowed out of the alluvium, a few small rock cairns, and an abandoned trail.

One prehistoric site belongs to the Lake Prehistoric Period, but the cultural affiliations of the remaining 15 sites are unknown. Taken together, these sites represent hunting and camping activities. None of the archeological sites are currently listed on the National Register of Historic Places. However, nine of the prehistoric sites may be eligible for listing on the National Register of Historic Places due to their potential to yield information important to history or prehistory. It NPS policy to treat those sites as if they were eligible for the national register.

All of the prehistoric sites except two are well away from any proposed development contained in any of the alternatives. Except for possible impacts on the two prehistoric sites described below, there would be no impacts on any of the other sites.

One of the prehistoric sites is within walking distance of the Stehekin Landing developed area, but well outside areas to be directly affected by any of the alternatives. This site is a prehistoric lithic scatter, with about four small saucer-shaped depressions on the present ground surface, and two fire-modified rock concentrations. The size of the site is 295 feet by 98 feet. This site is being actively eroded by Lake Chelan. It is potentially eligible for inclusion on the national register.

Another archeological site is currently bisected by the Stehekin Valley road and is also potentially eligible for inclusion on the national register. This site is a prehistoric lithic scatter covering an area about 230 feet by 230 feet. There is evidence that *in situ* artifacts may be below the surface. This site could potentially be affected by improvements to the Stehekin Valley road.

The historic archeological site not in the drawdown area of Lake Chelan consists of a portion of the historic Stehekin Wagon Road. This site could potentially be affected by improvements to the Stehekin Valley road. The historic wagon road was built sometime between 1894 and the early 1900s. The known segment consists of a more or less easy-to-follow, heavily overgrown, road alignment scraped into the top of the ground. The road alignment covers an area about 3,937 feet by 33 feet and also includes a rock retaining wall about 7 feet high where the road was built around a rock outcrop. It is potentially eligible for inclusion on the

national register due to its potential to yield information important to the history of the area.

ETHNOGRAPHIC RESOURCES

This category of cultural resources pertains to the beliefs and practices of a living community of people that have been handed down through the generations. Ethnographic resources relate to the historically rooted customs, practices, ancestral knowledge, or ceremonies of a people. Historically, parts of the Stehekin Valley and Lake Chelan area were visited and occupied by the Chelan Indian people and other Native American groups who passed through the valley when crossing the Cascade Range. There are people currently residing on the Colville Indian Reservation in central Washington who trace their ancestry to bands of Chelan Indian people. Currently, no ethnographic resources have been identified in Lake Chelan NRA.

HISTORIC RESOURCES

Historic resources in Lake Chelan NRA are addressed in detail in the cultural resource component of the park's "Draft Resources Management Plan" (1993d), the *Historic Resources Study* (1986), and *Historic Structures Preservation Guide* (1987). The *Historic Resources Study* identified and developed five historic contexts that comprise the principal themes of human activity in the park complex. These contexts include (1) historic explorations and surveys, (2) settlement patterns, (3) commercial development, (4) recreation and tourism, and (5) administration of the area by government agencies, principally the U.S. Forest Service.

A variety of historic resources in Lake Chelan NRA as well as in the Stehekin watershed outside the national recreation area are currently listed on the national register. These structures and districts are significant for their association with people and /or events important in the settlement, development, enjoyment, and management of these public lands, and /or because they embody the distinctive characteristics of a type or method of construction. Collectively, they reflect how humans have altered the wilderness of the North Cascades to varying degrees in efforts to use the land.

Described below are the historic resources in Lake Chelan NRA that are currently listed on the National Register of Historic Places.

Buckner Homestead Historic District. The Buckner Homestead Historic District, comprising some 90 acres, incorporates the largest group of structures relating to the theme of early settlement within the national recreation area. Representing a time period of over six decades from 1889 to the 1950s, the district is comprised of 15 buildings, landscape structures, and ruins, and more than 40 acres of land in orchard, pasture, and crossed by hand-dug irrigation ditches.

The Stehekin River valley was unknown to white settlers until the 1880s when miners began infiltrating the region. From 1887 until the second decade of the 20th century, settlers arrived in relatively significant numbers and located homesteads at the head of Lake Chelan. Early maps indicate numerous cabins located at the head of the lake prior to the raising of the lake level in 1926 (due to the construction of a dam downlake in Chelan). Little is known about these sites, and none remain today for this land usually is submerged. Logging, mining, and ranching permitted the settlers to maintain a pioneer lifestyle in the mountains.

Continuing up the Stehekin River valley, early settlers chose homesites along both banks of the river. The farthest to locate from the settlement at the head of the lake, miner William Buzzard of Spokane, claimed 160 acres along a horseshoe bend in the river in 1889. Here he built a small log cabin and cleared land for pasture and cultivation. Farming and mining claims in Horseshoe Basin occupied most of Buzzard's time, but

he also horsepacked for other miners and sold cordwood logged from his land to the boat company operating on Lake Chelan.

Buzzard spent summers on his ranch until 1910 when he sold his property to William Van Buckner, a Californian interested in further developing the homestead. The arrival of the Buckner family in Stehekin marks a second stage of settlement in the valley. Between 1910 and 1920 more individuals and families moved uplake to settle permanently, most arriving before 1915 and filing homestead claims shortly thereafter. While some of the new settlers were still associated with mining activities, many were not but found that the remote valley offered other attractive opportunities. Intending to operate an orchard, the Buckners cleared additional acreage and designed an irrigation system, and by April 1912 the family had planted 15-20 acres in apple trees.

Gradually the Buckners increased its production until the ranch had some 50 acres of cleared and planted land. Along with improving the land for commercial production, the Buckners, who used Buzzard's old log cabin as the family home, constructed various outbuildings, including a mill house, root cellar, barn, smokehouse, cabins for guests and hired help, and sheds for general use. Rough, unfinished board and batten siding was used for all the outbuildings, giving them a rustic homogeneous appearance.

The Buckner Homestead Historic District is significant for its association with early settlement in the North Cascades. It is one of the earliest homesteads in the Stehekin Valley, and its evolution from a single cabin built by Buzzard to an intricate complex of structures, paths, irrigation ditches, and fruit orchard contributes significantly to an understanding of settlement in this wilderness region. Also, it is the only extant example of an intact homestead complex within the boundaries of the park complex.

Golden West Lodge Historic District. The Golden West Lodge Historic District, consisting of seven contributing structures built between 1926 and 1945 on a 4-acre site, is significant for its association with recreation and recreational development in the North Cascades. Also, it is the oldest large-scale resort in the park complex and the only extant example of large-scale wilderness resort development in the North Cascades — a spacious resort hotel blending rustic simplicity with elements of comfort and elegance.

Since the late 19th century, large numbers of outdoor enthusiasts have been lured to the North Cascades for physical and mental challenge, rest and relaxation, and enjoyment of scenic grandeur. Sightseeing, fishing, hunting, boating, horseback riding, and mountain climbing have been among the most favored activities. Although camping was an option, early travelers often chose the comfortable inns and hotels conveniently sited along the lakeshore between Chelan and Stehekin. The most prominent of these establishments and one of the most popular resorts in the state was the Field Hotel, situated at the head of the lake. When the Field, which stood on land destined to be flooded because of a hydroelectric project downlake, was dismantled in 1926, building materials were salvaged and reused in the construction of the Golden West Lodge. The new lodge was built on the site of the former homestead of William F. Purple, an early settler who established an inn, the Mountain View house, on the property during the late 1890s.

When the lake boat began making daily trips to and from Chelan in the late 1920s, day visitors to Stehekin increased. Because they did not need overnight accommodations, the nature of tourism at the head of Lake Chelan changed. Fewer visitors traveled uplake, most preferring to remain downlake using their automobiles on the ever-expanding roadway system in the area. Travel restrictions and gas rationing during World War II resulted in closure of the Golden

West. Following the war the Golden West reopened, its new owners expanding its facilities by adding five rustic cabins, a small swimming pool, a fish pond, a shuffleboard court, and various landscape features that enhanced the picturesque quality of the site. After the establishment of Lake Chelan National Recreation Area in 1968, the property was sold to the government, and the lodge, which has been little altered over the years, was converted for use as a visitor center/district office facility, a function it continues to serve.

High Bridge Ranger Station Historic District. The High Bridge Ranger Station is located along the Stehekin Valley road about 10 miles from Stehekin Landing near the confluence of the Stehekin River and Agnes Creek It is significant for its association with federal management of public lands in the North Cascades, which originated in 1897 (USFS administration commenced in 1905), and as an example of a distinct type of architecture (USFS design) from the 1930s. As a complex, the district, which consists of a three-room residence, a shop/garage, a barn and corral, and an outhouse on a site of less than 1 acre, is the only intact and unaltered USFS-designed complex in the park complex.

Built by the U.S. Forest Service using Civilian Conservation Corps (CCC) laborers in 1933-34 to serve as a backcountry base, the High Bridge facility was used primarily during the summer months by fire and trail crews. The use of similar materials and the scale, proportions, and overall design of the buildings give the station a cohesive and classic USFS character. Painted in a neutral earthtone and restrained in architectural details and ornament, the distinguishing features of the buildings include their rectangular shape, gable and clipped-gable rooflines, and wood shingle or clapboard siding (or a combination of both). The rustic architectural theme of the complex enables it to harmonize with its natural surroundings.

Flick Creek Shelter. The Flick Creek Shelter was built by the U.S. Forest Service using CCC laborers during the 1930s to provide backcountry hikers and campers with a place to stay. Located in the Flick Creek campground on Lake Chelan some 4 miles below Stehekin Landing, the shelter is significant for its association with the theme of recreation and USFS administration in the North Cascades and as a distinct rustic building type and method of construction. The shelter, which continues to serve its original function, is one of several such structures that remains intact in the park complex.

USFS rangers became increasingly involved with recreation issues in the national forests as public use and demands on recreational resources increased in the 1930s. As use of the national forests increased, the Forest Service expanded trail systems both for recreational hikers and better fire protection. Shelters were erected every 8-10 miles along the trails to accommodate the increasing numbers entering the backcountry. Enclosed on three sides with a roof that sloped to the rear and an overhang in the front, the rustic structures featured cut-log frames and wood shake siding and roofs. The design of these structures met all three basic USFS architectural tenets — nonintrusive appearance, economy of materials, and form based on function.

Courtney Cabin. The Courtney cabin, located along the north side of Company Creek Road near the south shore of the Stehekin River some 5 miles from Stehekin Landing, is a log and wood frame structure significant for its association with early homesteading efforts in the Stehekin Valley. Hugh Courtney came uplake with his family in the 1910s to work at Stehekin's sawmill. Filing a claim for 53 acres in 1918, Courtney and his family settled into their home, a log cabin built by a previous "squatter" about 1889. Courtney improved the rough cabin, and by the early 1920s he had doubled the size of the home by adding a rough lumber addition. He cleared and plowed land for a

garden and built a cellar, barn, and hay shed on the homestead. Hugh and his wife lived in the cabin until 1950 when they left Stehekin. After being used as rental property, the deteriorating cabin was acquired by the National Park Service in 1971.

Stehekin School. The old Stehekin School is significant for its association with the early settlement and development of the Stehekin Valley. Previous to its construction in the early 1920s by Stehekin Valley residents, various log cabins served as schools as the community of Stehekin developed. The need for a centrally located schoolhouse arose, and in 1921 Stehekin Valley residents assembled to select the site for a new school. Materials for the log building were crafted by community volunteers, funds were raised through "box socials" for flooring, windows, and doors, and construction began in the late summer of 1921. Located on public land on the east side of the Stehekin Road about 3 miles from Stehekin Landing, the school building, which serves as a source of pride for valley residents, is owned and operated by the Stehekin School District under a special use permit.

George Miller House. The George Miller house, built near Stehekin Landing on the east shore of Lake Chelan during the late 1930s or early 1940s, is significant as an excellent example of pre-World War II residential architecture and for its association with the theme of recreation. In the tradition of log cabin construction, the house is simple in form and plan and shows sensitivity to its natural surroundings by the use of native materials as well as its placement on the site, set back from and overlooking Lake Chelan. The building exhibits high artistic value in its notching: the builder carefully square-notched the round logs, squaring the crowns as well. The structure currently serves as a housing unit for NPS employees.

Stehekin Ranger Station Residence and Woodshed. The Stehekin Ranger Station residence and woodshed are significant for their association with the U.S. Forest Service era of land management in the North Cascades and as excellent examples of Forest Service residential architecture from the late 1920s. Originally located north of the Field Hotel at the head of Lake Chelan, the Stehekin Ranger Station was destroyed in the late 1920s because of rising lake waters. The primary ranger station was moved to Purple Point at the Landing. Named after the early pioneer who homesteaded the land, the complex was known as the Purple Point Ranger Station. A substantial wood frame structure on a rock and concrete foundation was built about 1926 as a combination residence and office, and a small woodshed was constructed behind the main structure. Approximately two years later, a warehouse was built that served as a new office and living quarters when needed. Concurrent with the construction of the warehouse, a bunkhouse similar in design to the main residence was constructed up the slope to the east. This building provided seasonal housing for fire crews stationed at Stehekin.

When the CCC established a temporary work camp in Stehekin during the late 1930s, a crew of enrollees constructed a barn and an oil/gas house, both of which were removed some years later by the Forest Service. At present the ranger station residence, which is used for NPS employee housing, and woodshed retain a high degree of integrity, but the warehouse and bunkhouse have undergone significant alterations.

Described below are the historic resources in the Stehekin River watershed outside Lake Chelan NRA that are currently listed on the National Register of Historic Places.

High Bridge and Bridge Creek Shelters. These structures, like the Flick Creek shelter, are significant for their association with the themes of recreation and USFS administration in the North Cascades and as representatives of a district rustic building type of Forest Service design. The three-sided log structures were constructed by the

Forest Service using CCC laborers during the 1930s to provide accommodations for backcountry hikers and campers. The High Bridge shelter is located in the High Bridge campground west of the confluence of the Stehekin River and Agnes Creek, and the Bridge Creek shelter is in the Bridge Creek campground near the confluence of the Stehekin and Bridge Creek. Both camping facilities, which continue to serve their original functions, lie just off the Stehekin Road.

Bridge Creek Ranger Station Cabin. Located near the Bridge Creek campground at the confluence of the creek and the Stehekin River, the Bridge Creek Ranger Station cabin is a board and batten structure built prior to 1926 by a miner having a special use permit from the U.S. Forest Service. Cabins built by miners at this location had served for many years as way stations for USFS employees and others heading into the backcountry. During the 1930s the Forest Service selected the site for a permanent ranger station, and this cabin became part of the station's building complex. A residence, barn, and corral were built at the site, but the infrequently used station was eventually abandoned and all USFS-constructed buildings were removed. The cabin, which currently serves as a seasonal backcountry NPS ranger residence, is one of two early mining cabins that remain in the Stehekin Valley and is significant for its association with mining in the North Cascades and as the only example of a property type associated with mining constructed or designed in the "nonlog" vernacular tradition.

Black Warrior Mine. Horseshoe Basin, located north of the Stehekin River's headquarters, was the site of the largest concentration of mineral claims historically in the park complex, and by 1899 more than 40 claims had been located in the area. Located in the lower Horseshoe Basin, the Black Warrior mine, discovered in 1889, was the second major mine to be located in the Stehekin Valley. The only one from a group of three patented claims that could boast of significant development work, the Black Warrior was sold by its original discoverers in 1891 for $30,000, making it the largest sale ever for a mining property in the valley.

A mining camp was established and further drilling and development work were conducted during the next decade, and the Black Warrior was patented in 1901. The lode mine produced quantities of lead, copper, silver, and gold during its most active years into the 1910s, but high development costs and reduced profits resulted in sporadic mining activity between the 1920s and the 1940s. Motivated by promising assays and the state's efforts to complete a mine-to-market road over Cascade Pass, a new company attempted to develop the mine during the late 1940s, but when a snow slide leveled the company's facilities in the 1950s mining operations ceased.

Harlequin Bridge. In addition to the historic properties that have been listed on the national register, the Harlequin bridge was determined eligible for listing on February 17, 1995. Located approximately 4.5 miles northwest of Stehekin Landing at the head of Lake Chelan, the structure provides vehicular and pedestrian access to private residences and NPS facilities along Company Creek road on the south side of the Stehekin River. Built by the Department of Agriculture in 1948, it replaced an older structure that was destroyed in the Stehekin River flood that same year. Although less than 50 years old, the bridge's rare Baltimore truss design and timber construction were cited by the Washington State Historic Preservation Officer as eligibility factors.

VISUAL/SCENIC RESOURCES

INTRODUCTION

Lake Chelan NRA is a powerful landscape — a gorge of glacial origin, with sheer walls surrounded by hanging valleys, high summits, and a remote valley developed by the free-flowing river. Human occupation is marked by pictographs and artifacts from past cultures, while current residential cabins and homes illustrate a lifestyle that, at times, seems more deeply rooted in the past than in the present. NPS facilities and private businesses provide amenities to visitors, who are introduced to the valley and the wilderness and begin to personally explore the dynamic events and interrelationships that make this landscape unique.

The legislation establishing Lake Chelan NRA specified conserving scenic values as one of the reasons for forming the national recreation area.

A process for understanding the visual resources of this landscape is required if management and protection of these resources are to take place. The following are the major components of this visual resource planning study: the regional landscape that provides the backdrop for all activities in the valley, the visual resources of the area, and the viewers who will experience changes to the existing resources.

DEFINITION OF KEY TERMS AND CONCEPTS USED IN ANALYSIS OF VISUAL RESOURCES

The visual resources of a landscape are determined by the intrinsic character of its landform and land cover. Landscape management determinations as well as project specific visual analysis begins by establishing a regional landscape framework. Within this framework, an inventory is conducted of the resources that make up "visual character," such as the form of the land, water bodies, vegetation, land uses, and structures. The character of the landscape is based on the visual attributes of these resources, commonly described in terms of scale, line, form, color, and texture. How these factors come together and the degree to which they are expressed determines scenic quality.

Landscape units are used as a framework for inventory, analysis, assessment, and management of visual resources. A landscape unit is defined as an area of distinct character that forms a spatially enclosed unit or "outdoor room." Landform, topography, and viewshed (the visible area or seen areas from important viewpoints) information are used to delineate boundaries of units. The edges dividing one unit from another are often defined by vegetation changes, slope, ridgelines, and other visual boundaries. Each unit is given a name based on its specific geographic location or cultural history.

Landscape types are used to characterize the landscape in terms of its sensitivity to development. A landscape type is an area of more or less uniform slope and land cover. Landscapes that are of a "type" will respond in similar fashion to the effects of similar development. As opposed to a landscape unit, which is geographically distinct, a landscape type can occur in more than one location and is described by characteristics (e.g., sloped and forested, or flat and open) rather than location, and encompasses an area that is more or less visually homogeneous.

Viewer response to an object or landscape implies the basic act of seeing and recognizing it. Thus, the first aspect of viewer response is the exposure of viewer groups to a landscape or proposed development. Viewer exposure is influenced by physical factors such as location of viewers, number of viewers, distance to

resources or development, orientation of dominant views, and viewer activities. These factors affect the duration and focus of views and, by implication, the expectations and experiences of visitors.

A second aspect of viewer response is the receptivity of viewer groups and is commonly referred to as viewer sensitivity. This variable is strongly influenced by viewer activities and land use. For example, viewers along wilderness trails or at backcountry campsites are more likely to be concerned with the visual unity or continuity of a view than viewers in residential areas or other developed areas. Sensitive viewers and their location (viewpoints) mark the point at which important views are perceived. These generally include long views to unique features, popular destinations, points of concentration of users, dramatic vistas, and areas of change that influence perspectives and create new experiences.

REGIONAL LANDSCAPE

The geology within the North Cascades mountains is complex and largely comprised of ancient sedimentary rocks. Intrusions of large granitic batholiths are also common. The average peak elevation generally rises to the north, from an average of 5,000 feet near Snoqualmie Pass to about 7,000 feet at the Canadian border. There are hundreds of cirques, many of which are filled with active glaciers. The North Cascades contains more active glaciers than any other area within the continental United States.

Rivers cut deeply into the range, but none cut through. The valleys within the range have been glaciated repeatedly in the past 2.5 million years and exhibit relatively flat floors and precipitous sides rising thousands of feet. The Stehekin River (and Lake Chelan) is one of the major rivers on the east side of the Cascade Range. Lake Chelan is a classic example of a glacial basin carved out by thick fast-moving glaciers. The depth of the lake is 1,486 feet and with the sidewalls rising out of the lake, the trough that contains the lake is a mile deep. The valley of the Stehekin River and Lake Chelan is almost 90 miles long from Cascade Pass to the Columbia River.

VISUAL INVENTORY AND ANALYSIS

The purpose of the inventory and analysis is to (1) identify areas requiring protection as mandated by Congress, (2) include visual resource information as a component for determining development suitability, and (3) characterize existing resources so that impacts brought about by development or **a** change in management practices can be determined.

Landscape Types

Sixteen different landscape types have been identified within the Stehekin Valley by combining information from two GIS plots, slope analysis and vegetation/land cover. The following descriptions identify the characteristics of the types, including their visual sensitivity to change.

Flat/Open (F/O):

Description

- little topographic relief (0^1%)
- meadow, pasture, or barren areas
- old fairways
- landing strip
- changing landscape - seasonal agricultural activities
- may include wetlands, river meanders, gravel bars
- often bounded by flat/treed landscape types
- restricted to valley floor

Significance

- pastoral landscape type, especially significant if in agricultural use
- especially significant if located on shoreline of lake or adjacent to river

Sensitivity
- high visual accessibility, views to surrounding landscape
- development not easily concealed
- scale and silhouette of development can intrude on the space
- high contrast edges (treeline) sensitive to disruption
- clearing can be visible from high ground

Flat/Semi-Open (F/S):
Description
- little topographic relief (0-4%)
- some trees and shrubs
- mainly associated with wetlands at end of lake and recently abandoned river meanders

Significance
- especially significant if located adjacent to the lake or river

Sensitivity
- high visual accessibility, partially screened views to surrounding landscape
- development not easily concealed
- moderately high contact edges
- cleared area visible from high ground

Flat/Moderately Treed (F/M):
Description
- low topographic relief (0-4%)
- moderately treed, some undergrowth (grasses)
- drier areas out of floodplain or older river meanders or partial clearing for timber

Significance
- can be significant if it forms an edge against an open landscape type or is located adjacent to the valley road

Sensitivity
- low visual accessibility, views restricted
- edge may be sensitive to disturbances
- screening of development possible if buffer is maintained
- new clearings are apparent

Flat/Forested (F/F):
Description
- low topographic relief (0-4%)
- heavily treed with undergrowth
- mainly restricted to valley floor
- covers the largest area on the valley floor

Significance
- can be significant if it forms an edge against open landscape type, especially along river

Sensitivity
- low visual accessibility, views restricted
- edge may be sensitive to change
- screening of development possible
- new clearings are apparent

Rolling/Open (R/O):
Description
- rolling slopes (5-19%)
- open small clearings, generally associated with development

Significance
- especially significant if near lake or river shoreline

Sensitivity
- visual accessibility generally high; views to surrounding landscape
- little potential to conceal development, contrasting structures and clearing
- scale and silhouette of development can intrude
- high contrast edges (treeline)

Rolling/Semi-Open (R/S):
Description
- rolling slopes (5-19%)
- some trees and shrubs
- a landscape type that covers very little area, primarily along Company Creek east of Company Creek road

Significance
- especially significant if located adjacent to the river or creek

Sensitivity
- somewhat high visual accessibility, partially screened views to surrounding landscapes
- moderately high contact edges
- development not easily concealed

Rolling/Moderately Treed (R/M):
Description
- rolling slopes (5-19%)
- moderately treed, some undergrowth (grasses)
- covers alluvial terraces of streams, particularly on the east side of valley below McGregor Meadows

Significance
- can be significant if it forms an edge against an open landscape type or located adjacent to the Valley Road

Sensitivity
- low visual accessibility, views restricted
- edge may be somewhat sensitive to disturbances
- screening of development possible if buffer is maintained
- new clearings are apparent

Rolling/Forested (R/F):
Description
- rolling slopes (5-19%)
- heavily wooded with undergrowth
- may include stream edges
- covers much of the margins of the valley floor

Significance
- can be significant if it forms an edge against an open landscape type

Sensitivity
- visual accessibility low, views restricted
- screening of development possible
- edges can be sensitive to change

Steep/Open (S/O):
Description
- sloping mountainside (20-39%)
- shrub or barren areas of scree
- on the valley wall, associated with areas of rock fall

Significance
- may include natural landmark or prominent feature

Sensitivity
- may have high visual accessibility
- scale and silhouette of development can intrude
- development not easily concealed
- high contrast edges (ridge silhouette) sensitive to change

Steep/Semi-Open (S/S):
Description
- sloping mountainside (20-39%)
- old rockfall areas with scattered shrubs and trees

Significance
- may include natural landmark or prominent feature

Sensitivity
- may have high visual accessibility
- scale and silhouette of development can puncture skyline
- development not easily concealed

Steep/Moderately-Treed (S/M):
Description
- sloping mountainside (20-39%)
- moderately treed, some undergrowth
- generally located closer to the valley floor

Significance
- can form the immediate backdrop for valley landscapes

Sensitivity
- moderate visual accessibility, views somewhat restricted
- edge may be sensitive to disturbances

- screening of development somewhat possible

Steep/Forested (S/F):

Description
- sloping mountainside (20-39%)
- generally forested
- on the valley wall, a few locations along riverbank

Significance
- may be natural landmark or part of a prominent feature
- can be significant if it forms an edge against open landscape type

Sensitivity
- may have moderate visual accessibility
- screening of development possible
- contrasting structures, clearing and erosion highly visible
- edge can be sensitive if against open landscape type

Bluff/Open (B/O); Bluff/Semi-Open (B/S); Bluff/Moderately Treed (B/M); Bluff/Forested (B/F):

Description

The four bluff landscape types (slopes greater than 40%) are treated equally in the analysis. The slope is very restrictive to most potential development making the land cover type mostly irrelevant. Bluff areas are generally inaccessible to visitors except where the occasional trail crosses a steep slope.

Significance
- may include natural landmark or prominent feature
- views from the lake or open landscape types generally encompass bluff areas

Sensitivity
- high visual accessibility
- silhouette of development on a cleared bluff is evident

Sensitivity Matrix

The land cover and slope category within each landscape type are the basic tools for determining the sensitivity of each type to development, or how capable it is of absorbing or withstanding change without detrimental effect on scenic quality. Table 9 illustrates this relationship; also refer to the High Visual Sensitivity Areas map.

TABLE 9: SENSITIVITY MATRIX

	Open	Semi-open	Moderately Treed	Forested
Flat	High	High	Low	Low
Rolling	High	Moderate	Low	Low
Steep	High	High	Moderate	Moderate
Bluff	High	High	High	High

High. Landscape types with high sensitivity lack potential intervening elements (landforms or trees) and provide a visual plane on which the addition of structures and site manipulation will be apparent and contrast with existing conditions. Flat/open, flat/semi-open, rolling/open, steep/open, steep/semi-open, and all four bluff landscape types have high sensitivity.

Moderate. Landscape types with moderate sensitivity have the opportunity for intervening elements (landforms or trees) and have a more complex makeup which could potentially conceal structures and site manipulation activities reducing the ability to see change, rolling/semiopen, steep/ moderately treed, and steep/forested have moderate sensitivity.

Low. Landscape types with low sensitivity offer the most opportunities for concealment of structures and site manipulation by a combination of landforms and vegetation. Flat/moderately treed, flat/forested, rolling/moderately treed, and rolling/ forested landscape types are the least sensitive.

The assignment of a sensitivity to each landscape type allows for the establishment of a priority for protection. Types with a

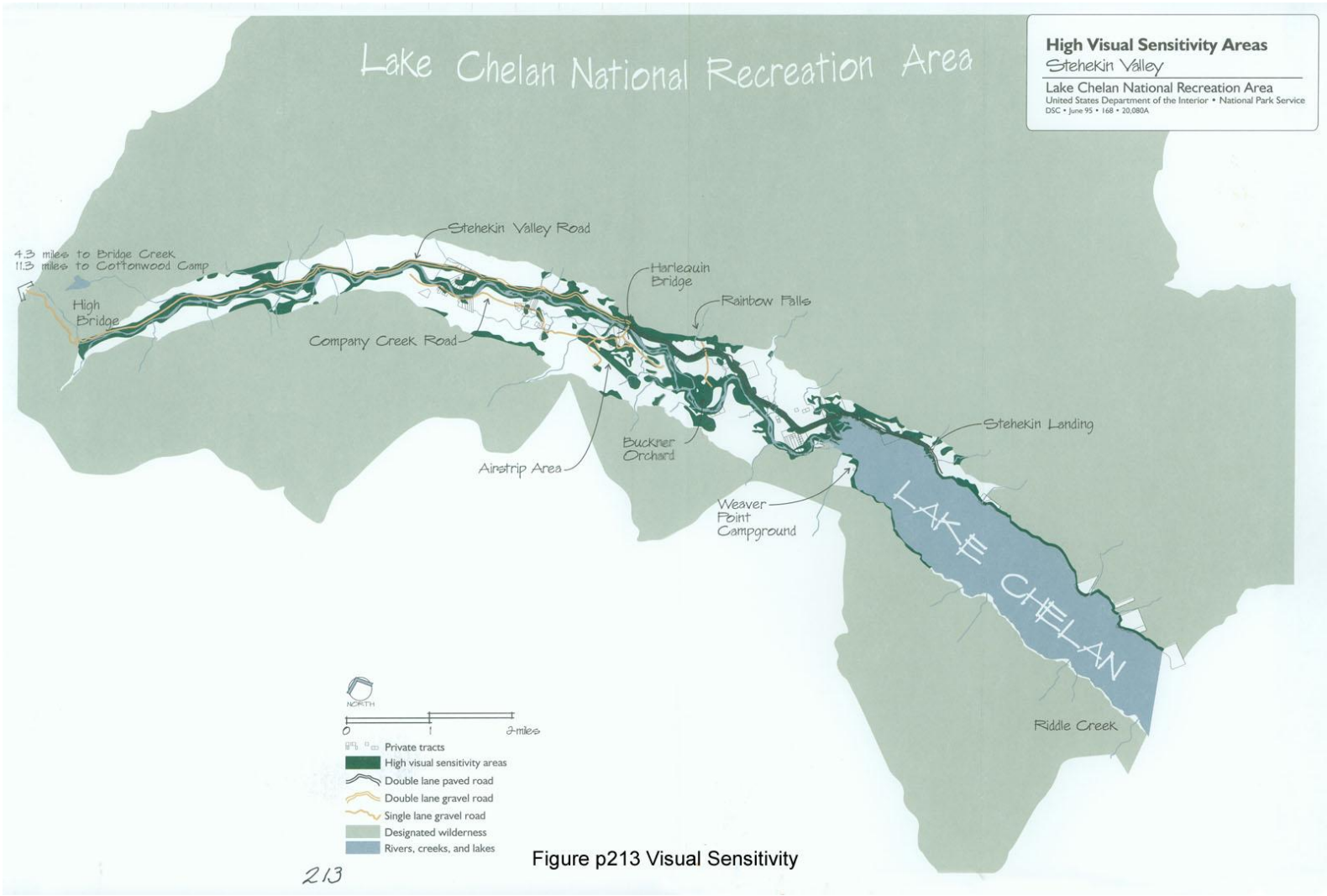


Figure p213 Visual Sensitivity

high sensitivity are less able to withstand change and are a high priority for protection, while others can accommodate change with varying, lesser degrees of apparent detrimental effect and are of lower priority.

Principal Viewer Groups and Selected Viewpoints

In all, 21 key viewpoints were identified from park staff interviews, looking at visitor activity patterns, photographic records, and onsite investigations. The viewpoints are described in table 10. Viewsheds were mapped for each viewpoint and their characteristics described. Important views include long views up Lake Chelan upon arrival, spectacular features and popular day use destinations, frequently seen and continuous corridors of concentrated day uses, places of duration like overnight areas, changes of direction that create suddenly new and unexpected perspectives, uniquely characteristic views of the national recreation area, and potential vistas to scenic landmarks.

In addition to the key viewpoints listed in table 10, other areas that receive a great deal of visitor exposure and use for viewing of scenic resources and recreation are the Valley Road, the Stehekin River, and the shoreline of Lake Chelan. A buffer on each side of the river and road and inland from the lake shoreline is included to facilitate protection of the visual integrity of these resources. The buffer is 200 feet in all areas except the flat/forest and rolling/forested landscape types. These two landscape types are better able to visually absorb development and change because of their characteristic topography and density of vegetation. Therefore, the buffer is reduced to 100 feet in these areas.

Landscape Units

Twenty landscape units were delineated in the valley from Adams Point to High Bridge. Documentation of each unit took place during a field survey, which included taking photographs and completing a visual resource inventory form. The form standardizes the description of each unit, inventories resources, flags exceptional and unique features, and describes intrusions and modifications.

The landscape unit is the framework for inventory and landscape analysis. Each unit is briefly described below in terms of its visual character, sensitivity, and views to resources.

Adams Point. This landscape unit, located downlake from the landing, encompasses a forested, alluvial terrace created by the outwash of Hazard Creek and the steep sidewalls that rise out of Lake Chelan. Almost the entire unit is of high and moderate sensitivity because of the visual accessibility of steep slopes or bluffs and the lake shoreline to arriving and departing visitors (viewpoint #1).

Landing. This landscape unit encompasses all of the Landing from the NPS boat dock to the Purple Creek campground. The landing area is a sloping terrace made up of alluvial outwash from Purple Creek. The area has been modified and vegetation removed to accommodate NPS, concession, and private facilities. Much of this development is on the shoreline of the lake and is visible to approaching visitors (viewpoint #1) as well as residences located at the head of the lake (viewpoint #3) and campers at Weaver Point (viewpoint #5). Within this unit, the exposed shoreline is of high sensitivity while much of the terrace back from the shoreline is low due to the ability of the rolling and forested landscape to absorb development. The landing may be the only opportunity that many of the visitors have to experience this area. As such, it provides views to exceptional resources; to the head of the lake, upvalley and the peaks beyond (viewpoints #2, #4, and #6), and across the lake to the opposite bluff and down lake to Castle Peak (viewpoint #20).

TABLE 10: DESCRIPTION OF VIEWPOINTS

	Viewpoints	Observer Position*	Type of View
1	Ferry arrival	Normal	Enclosed, focal to end of lake and upvalley to distant mountains
2	Imus Trail overlook	Superior	Panorama to end of valley and up to distant mountains
3	To Stehekin Landing	Normal to inferior	Semi-enclosed, directed view downlake
4	Purple Point campground-uplake	Normal to inferior	Enclosed, slightly focal to end of lake
5	Weaver Point campground-downlake	Normal	Semi-enclosed, focal view downlake
6	Head of the Lake from Landing	Normal	Focal, small scale in foreground
7	Buehler's Bluff**	Superior	Semi-enclosed, large scale
8	Bakery - to Tupshin	Normal to inferior	Enclosed, focal view through vegetation breaks
9	Road - Frog Island	Normal, slightly superior	Focal, view of river and valley, surrounding mountains
10	Buckner orchard /homestead	Normal	Enclosed, views out to surrounding mountains
11	South Trail - Rainbow Falls	Superior	Semi-enclosed, large scale panoramic views
12	Rainbow Falls from road/walk	Inferior	Feature view to falls
13	Harlequin Bridge	Normal	Feature, focal views along river
14	Road - lower field	Normal	Feature, semi-enclosed views to field backgrounded by mountains
15	Road - River at 8-mile	Normal to inferior	Focal views along river
16	Road - Stehekin Valley ranch	Normal	Enclosed, pastoral scene, views to ranch
17	High Bridge	Superior	Enclosed, detail small scale
18	Rainbow Falls - from river	Inferior	Feature
19	Bridge Creek overlook	Normal to superior	Enclosed, large scale
20	Landing to Castle Peak	Normal	Focal, feature
21	First river overlook	Normal to superior	Focal, semi-enclosed, views to river

* Inferior = observer is below the foreground and middle ground parts of the view; normal = observer is at the same level as the majority of the view; superior = the observer is above the foreground and middle ground parts of the view.

** Viewpoint is on private property and not accessible to public. Analysis conducted from photographic record.

Shoreline. This landscape unit extends along the shoreline of the lake 0.4 mile from Purple Point. The steeply sloping valley wall of Purple Mountain drops into the lake, except for the road located on a constructed base at the foot of the slope. Vegetation is limited to the east side of the road. Views are focused over the water to the head of the lake where development is evident and to distant mountains. A power line parallels the road and is located between the road and the lake. This unit exhibits high sensitivity due to the lack of vegetation on the steep slopes and bluffs along the shoreline. Moderately sensitive landscapes occur above the shoreline.

Bluff. This unit continues to the head of the lake and includes the wetland associated with Little Boulder Creek and the steep sidewall of Purple Mountain. The valley road continues at the foot of the steep slope. Residential development occurs, mostly on fill areas in the lake, between the road and the lake. Views across and down the lake are partially screened by this development and some vegetation (viewpoint #3). As in the previous unit, this unit exhibits high and moderate sensitivity because of its visual accessibility due to the presence of the road on the lake shoreline and the lack of vegetation on the steep slopes.

Head of the Lake. Much of the land in this unit is low lying, made up of shallow bays and wetlands associated with the delta of the Stehekin River or the low toe of the alluvial terrace associated with Devore Creek on Weaver Point. The area has been modified to accommodate residential development on small lots at the head of the lake and an NPS campground is located at Weaver Point. Structures on the shoreline are visible from heavily visited areas outside this unit, such as from the landing, lake, and the Stehekin Valley road. Views from the unit (viewpoint #5) are framed by the steep valley walls and are focused on the landing and downlake. The shoreline of the lake and the flat and open landscapes of the estuary are visually accessible and of high sensitivity. A large area of low sensitivity is located at Weaver Point behind the shoreline buffer.

Painted Rocks. This large unit stretches from Weaver Point downlake to the alluvial terrace associated with Castle Creek and includes Castle Rock. This unit forms the backdrop for activities of visitors to the landing. Views to this unit occur from all of the units previously discussed. The sensitivity of almost the entire unit is high.

Bakery. This unit encompasses both sides of the valley from the head of the lake to river mile 1. Most of the valley floor is of low sensitivity because of the density of vegetation and the level plain of the landform except where the road and its buffer (100 feet on each side) and the river and its buffer (also 100 feet) bisect the unit. These linear corridors are of high sensitivity. The valley walls are of high or moderate sensitivity depending on the steepness of the slope and the density of the vegetation cover. Views within the unit are limited because of the lack of openings in the vegetation and the flatness of the landform. Views to adjacent landscapes are also limited to focused views from the road, the river, and a few clearings, an example being a view to Tupshin Peak from the Bakery (viewpoint #8).

Boulder Creek. The alluvial fan of Boulder Creek, the northeast valley wall and a mile of the river make up this unit. Rocks are prevalent on the fan, which supports a more open forest and the river moves swiftly through this landscape. Most of the fan is of low sensitivity except for the road, the river, and the valley wall. There is a 200-foot buffer on each side of the road through most of this unit because of the openness of the forest and the lack of screening opportunities. The river is of high sensitivity and has either a 200-foot or a 100-foot buffer depending on the density of vegetation on its shoreline. Views within the unit are limited except for focused views along the road or at clearings along the rivers edge (viewpoint #21). Panoramic views of the

valley and surrounding mountains can be found along several trails that climb up the valley walls or follow creeks to access the surrounding wilderness areas (viewpoint #11).

River Bends. This is a large unit located on the southwest side of the valley and includes several large river bends and smaller meanders that surround Buckner orchard on three sides. The unit is equally split between low-lying floodplain and the sloping/rolling toe of Tupshin Peak. The unit is generally of low to moderate sensitivity. The few clearings in the vegetation cover as well as the river and its 100-foot buffer are of high sensitivity. Views are limited to breaks in the vegetation or along the river. The river provides several avenues for views to Rainbow Falls (viewpoint #18).

Buckner. This unit is enclosed in a looped meander of the river. It is composed of a flat valley floor that has been historically cleared of native vegetation and used as an orchard. The open field and orchard areas are highly sensitive while the surrounding flat and forested lands that enclose the orchard are of low sensitivity. The openness of this landscape allows many views out to surrounding mountains (viewpoint #10).

Rainbow Falls. This unit encompasses the steep valley wall from which Rainbow Falls emerges and the down stream talus slope of Rainbow Creek. The unit is almost equally split between steep, open slopes of high sensitivity and moderately treed, sloping and flat land of low sensitivity. The low sensitivity area is bisected by the Valley Road, which has a 200-foot buffer because of the openness of the forest in this unit. Views are generally from developed viewing stations (at the falls) and along the road. Views are of resources near the unit, such as the falls (viewpoint #12) and the river (viewpoint #9).

Harlequin. This unit stretches along the river between river miles 3 and 4 and includes the river and the steep slopes and talus of Rainbow Mountain. Almost the entire unit is of high sensitivity due to the steep and open slopes, the river and its 100-foot buffer and the road and its 200-foot buffer. Views are focused and enclosed on the river and along the road (viewpoint #13). Overhead electric lines cross the river in several locations.

Fairways. A large portion of this unit is a flat valley floor that historically was covered in forest. This unit has been modified in several ways: golf course fairways carved out of the native vegetation, clearings for houses along Company Creek road, the placement of an NPS maintenance area and seasonal housing in the fairways, and a large cleared area used as a landing strip. The flat, forested valley is of low sensitivity whereas clearings are high. Farther to the west in this unit, the steep slope of the valley wall is moderately sensitive. Views are generally limited and contained within the unit, except where openings in the vegetation are large enough to allow views to surrounding mountains (the airstrip).

Powerhouse. This unit is made up of the outwash terrace of Company Creek, which exhibits a fairly uniform slope down to the river. The unit is covered with a fairly consistent, open tree cover. The penstock that parallels the creek, the powerhouse located along Company Creek road, and the cleared end of the approach to the airstrip are apparent disturbances. Most of the unit is of low sensitivity. The openness of the vegetation cover allows some views out to the valley walls.

Rainbow Mountain. The Rainbow Mountain unit parallels the Stehekin River from river mile 4 to 5.5 and includes the river as well as the northeast valley wall. The valley wall in this unit is not as steeply sloping as it was in the Harlequin and Rainbow Falls units and is moderately treed or forested. Almost half of the unit is of low sensitivity. Areas of high sensitivity occur along the river, with its open channel and buffer and along the Stehekin Valley road with its corresponding buffer. The unit is mostly enclosed allowing

only occasional views out to surrounding mountains from the river and the road.

McGregor. The topography in this unit is mostly flat and low lying with valley walls defining the edges. The valley floor is generally forested except at McGregor Meadows and along Company Creek road where numerous clearings for residential development have occurred. The valley walls are forested or moderately treed. Most of the valley is of low sensitivity except at the clearings and where the road and river bisect the unit. These features and their associated buffers are of high sensitivity. There are few views out to surrounding resources due to the density of the vegetation cover.

Upper McGregor. This is a large unit that encompasses the entire valley from wall to wall and from river mile 6.3 to 8. The valley is narrower with mostly rolling and sloping topography. The river moves swiftly through the densely forested valley. The only openings in the canopy are associated with the river channel, the road which parallels the river and at the lower field. These areas as well as their buffers are of high sensitivity. The combination of the road paralleling the river allows for many and varied views to surrounding resources (viewpoint #15). The pastoral setting of the lower field (viewpoint #14) provides visual relief from the mostly uniform vegetative cover.

Valley Ranch. This unit surrounds the pastoral setting of the ranch which covers much of the narrowing valley floor. The steep valley walls, pas tares, river, and road are of high sensitivity. Views to distant mountains and surrounding valley walls occur from the road and across the open pastures (viewpoint #16).

Coon Creek. Coon Creek landscape unit stretches along the river from river mile 8.5 to 10 and is defined by the sidewalls of the narrow valley. The valley floor, which averages about 1,500 feet wide, is moderately treed to forested and of low sensitivity. It is bisected by the river and road, which, when combined with their buffers creates a band of high sensitivity through this unit. There are few views out to the surrounding landscape except from the river and road. These views are focused and take in the immediate surrounding valley walls.

High Bridge. This small unit forms the convergence zone of the Stehekin River and Agnes Creek and essentially acts as the terminus of the lower Stehekin Valley. The valley narrows and becomes V-shaped. Views are restricted to those from the road which parallels the river. From High Bridge (viewpoint #17), views provide a dramatic scene of interaction between water, rock, and vegetation.

The Stehekin Valley is accessible by boats, floatplanes, and wheeled aircraft, and by hiking or horseback riding on backcountry trails. Commercial boats, barges, and floatplanes carry visitors and freight to Stehekin. Private boats or planes are commonly used to access Lake Chelan NRA and the North Cascades complex during the summer. Table 11 summarizes passenger arrivals at Stehekin from 1969 through 1992 for the two primary transportation modes.

TABLE 11: PASSENGER ARRIVALS (ONE-WAY) AT STEHEKIN BY MODE (1969-1992)

Year	Passenger Commercial Boats	Passenger Commercial Air (Floatplane)
1969	16,167	1,372
1970	13,948	1,404
1971	11,855	1,544
1972	13,191	1,922
1973	15,962	2,046
1974	16,993	1,904
1975	15,229	3,543
1976	18,587	2,824
1977	17,038	3,270
1978	18,673	4,101
1979	18,525	3,629
1980	17,619	3,409
1981	19,451	2,697
1982	20,612	2,773
1983	25,603	2,801
1984	20,534	3,855
1985	18,481	4,131
1986	16,088	3,780
1987	21,467	6,059
1988	21,239	5,568
1989	26,682	4,964
1990	22,061	5,988
1991*	24,902	4,014
1992*	23,362	3,143

* July through December counts.
SOURCE: North Cascades National Park Service Complex, Visitor Statistics 1969-1991; NPS monthly public use reports.

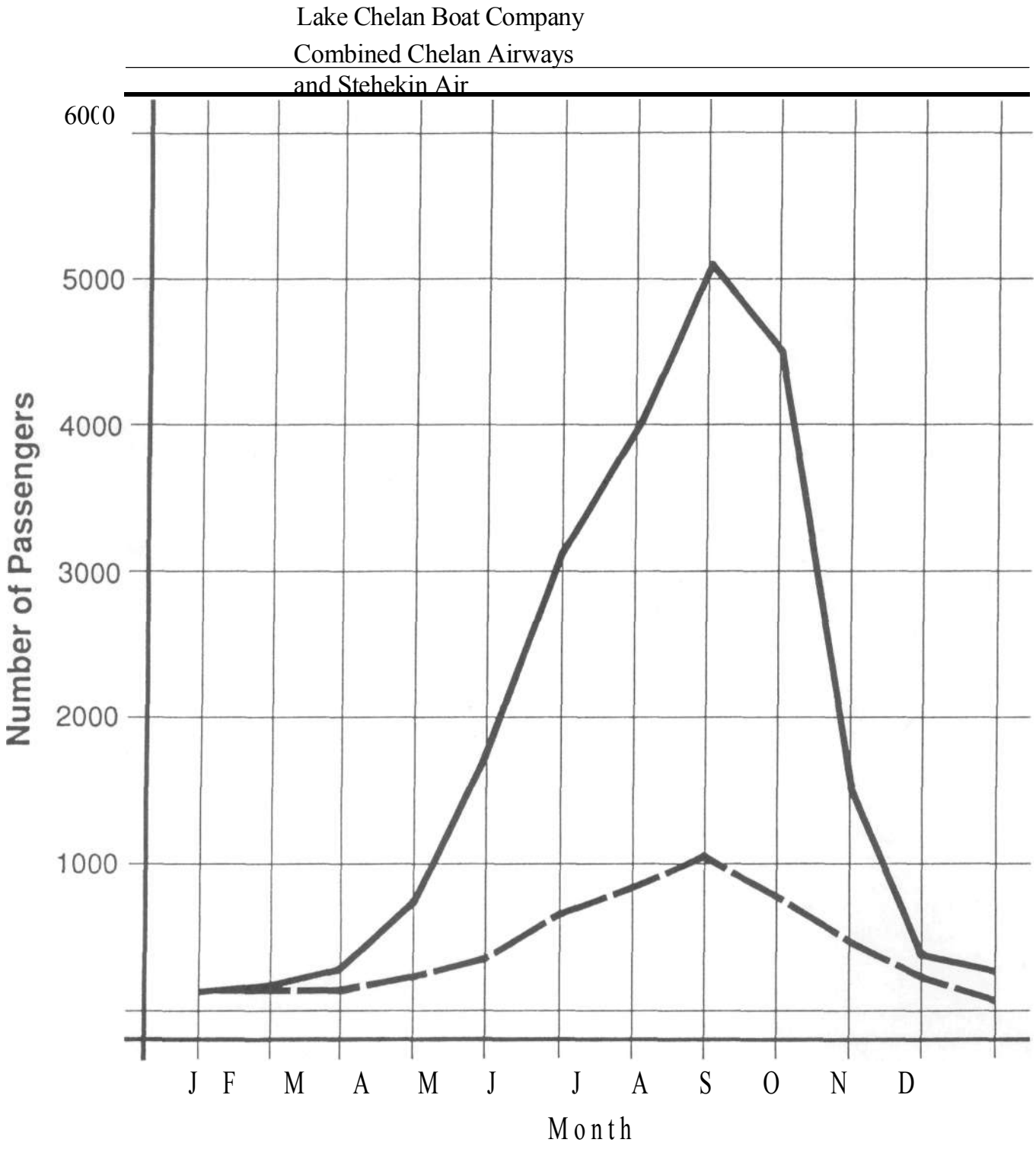
COMMERCIAL TRANSPORTATION

Two forms of commercial transportation, boat and chartered floatplane, are available to residents and visitors wishing to access Lake Chelan NRA and the Stehekin Valley. Barges are used to transport bulky materials uplake and downlake. Figure 1 shows the variation in passenger arrivals at Stehekin via commercial passenger boats and floatplanes during each month of 1992. Note that August was the peak month for ridership on both commercial passenger carriers.

Passenger Boat Service

Lake Chelan Boat Company (based in Chelan, Washington) has transported residents, visitors, mail, groceries, and freight up and down Lake Chelan since 1929 between Chelan and Stehekin on a scheduled basis as well as charter service. Service is also provided to a number of intermediate uplake destinations before reaching Stehekin and schedules vary during the season.

Until 1990 the Lake Chelan Boat Company operated only one passenger vessel, the *Lady of the Lake II,* each day between Chelan and Stehekin during the summer. A one-way trip on the 350-passenger, 100-foot-long boat takes about four hours. In 1990 the company added the *Lady Express,* a 100-passenger, 65-foot-long vessel, to its fleet. The new boat travels considerably faster and makes a one-way trip between Chelan and Stehekin in less than 2-1/2 hours.



Source: NPS Monthly Use Reports, 1990 Figure 1:

Passengers Arriving Uplake at Stehekin by Commercial Transportation (1990)

With the availability of two passenger vessels during the summer, visitors may now extend their stay in Stehekin by taking the "fast boat" uplake and the "slow boat" downlake. This combination trip allows visitors to remain in Stehekin for approximately 3Vi hours. Various fares (summer, winter, two-way, and one-way) are charged for these services. Commuter passes at discounted rates are also available. The licensing of and fare rates for the Lake Chelan Boat Company are regulated by the State of Washington Utilities and Transportation Commission.

Visitor Tour Packages. The Lake Chelan Boat Company, together with the North Cascades Stehekin Lodge and the Stehekin Valley Ranch, began promoting various optional tours for visitors during 1991. Three optional tours including a scenic float trip, a self-guided bicycle tour, and a narrated bus tour with lunch at the Stehekin Valley Ranch are offered to visitors. Tour participants must arrive on the fast boat and return on the slow boat to complete the optional tours. The bus tour with lunch at the Stehekin Valley Ranch was the most popular option and continued to be offered in 1992 and 1993. Vehicular tours of the Stehekin Valley are also offered by Discovery Tours. Lake Chelan Tours provides unscheduled boat tours to Stehekin from Chelan in a 25-foot Bayliner boat with a minimum passenger load of six.

The Lake Chelan Boat Company also occasionally transports visitors to the national recreation area during the winter. Some residents promote the area for cross-country ski trips based out of rental cabins in the Stehekin Valley.

Passenger Origins and Destinations. Lake Chelan Boat Company monthly ridership records indicate that 67.7% of the passengers originated from Chelan, 27.3% from Fields Point, 1.5% from Lucerne, and 3.5% from Manson. As expected, destinations for passengers leaving Stehekin closely reflect their point of origin. Approximately 95% of the downlake passengers are bound for Chelan and Fields Point. Uplake and downlake passenger totals for each year are not equivalent. This is most likely due to ridership by Stehekin Valley residents and from visitors that arrived or departed the national recreation area by hiking, floatplane, or private boats. July and August are the highest use months with passenger levels around 5,000.

Other Passenger Characteristics. An evaluation of the total passengers transported by the Lake Chelan Boat Company shows that uplake and downlake Stehekin passengers accounted for 76.2% of all passengers transported during the 1986-1990 period. It is estimated that about 90% of the total uplake and downlake passengers were visitors to Stehekin. NPS employees and residents comprised the remainder of the Stehekin passengers. It is estimated that approximately 71% of the visitors that used commercial passenger boat transport to access Stehekin were day visitors, 23% stayed one or more nights in Stehekin, and 6% were backpackers.

Charter Floatplane Service

Chelan Airways has provided daily floatplane service between Chelan and Stehekin since 1945. The company operates year-round and flies two floatplanes, a six-passenger deHavilland Beaver, and a four-passenger Cessna 185 from its base in Chelan. Chelan Airways operates on an as-needed charter basis rather than a fixed schedule. It is not uncommon to make at least six flights per day to Stehekin during peak visitation periods in Lake Chelan NRA. Approximately 5,000 passengers were transported one-way in 1989 and 1990, with July and August recording the highest volumes. The passenger total decreased to 4,414 in 1991 and to 3,143 in 1992. Travel time to and from Stehekin is about 25 minutes.

In addition to daily air taxi service, Chelan Airways offers scenic overflights of the North Cascades region, Lake Chelan, and the Stehekin River valley.

Chelan Airways classifies passengers by three major categories: local (generally Chelan and Stehekin residents), recreational, and government-related. The composition of passengers varies considerably by season (see table 12 for variation for several representative months of the year).

TABLE 12: TYPICAL PASSENGER COMPOSITION CHELAN AIRWAYS

Month	Local Passengers	Recreational Passengers	Government Passengers
January	20%	30%	50%
April	19%	50%	31%
July	12%	83%	5%
September	21%	70%	9%

SOURCE: Chelan Airways and NPS, Stehekin District Monthly Use Reports, 1989-91.

Barge Service

Two commercial barge services operate on Lake Chelan between Chelan and Stehekin. The Lake Chelan Boat Company and Tom Courtney Barge and Freight Service based in Stehekin, haul vehicles, fuel tanks, building materials, and other bulky freight items uplake and downlake. A significant amount of the annual barge traffic in and out of Stehekin is generated by the National Park Service. Barges typically transport park vehicles, equipment, and bulky supplies. Recreational vehicles are seldom transported to Lake Chelan NRA since facilities and other services are unavailable.

Barges typically load/unload near the Lake Chelan Boat Company docks in Chelan and at one of two barge landings at Stehekin. During the summer, barges unload north of the beach house opposite the Stehekin ranger station. The barge landing in front of the North Cascades Stehekin Lodge and along the road to the Golden West visitor center is used during the remainder of the year.

Neither barge company operates on a fixed schedule for service between Chelan and Stehekin. Both service providers currently operate on an as-needed basis making trips whenever a full load can be arranged. Barges typically run once every 10 days during the summer (mid-June through mid-September) and operate only periodically (once per month) during the remainder of the year.

PRIVATE TRANSPORTATION

Lake Chelan and Stehekin Valley visitors can access the area by private boats, floatplanes, wheeled aircraft, and by hiking through the backcountry. The number of private boats accessing Stehekin is not readily available. From a sample of private boat arrivals at Stehekin in August 1993 and monthly use reports, it is estimated that approximately 4,500 to 5,000 passengers arrived in August 1993 and that 16,000 to 20,000 arrivals were made annually in 1991 and 1992.

Stehekin State Airstrip

The Stehekin State Airstrip, located 4 miles from the Landing on Company Creek road, provides service for wheeled aircraft. It was originally constructed in 1960 and is operated by the Washington State Department of Transportation, Aeronautics Division, under a special use permit from the National Park Service. The permit does not allow commercial activities in and out of the airstrip. The airstrip exists primarily for emergency use with occasional use by residents. The Federal Aviation Agency does not recognize the airstrip as a public airstrip because it is closed for about nine months each year, and a "use at your own risk" warning is published in the description of the airstrip contained in the "State Pilots Guide to Washington Airports."

There are no aircraft permanently based at Stehekin Airstrip since the facility is open only for public use from June through September. The state of Washington officially

lists the airstrip as closed between October 1 and June 1 each year; however, the operating dates of the facility may be extended if weather and runway conditions permit.

The *Washington State Airport System Plan* classifies Stehekin Airstrip as a basic utility airstrip. This classification is based primarily on the length of the runway and means the facility can serve at least 75% of the single-engine and small twin-engine aircraft used for personal or business purposes. The facility is not listed on the Federal Aviation Administration's *National Plan of Integrated Airport Systems.*

In 1990 private aircraft use totaled 465 passenger arrivals. August was the peak month, recording 204 passenger arrivals. In August 1990, seven aircraft were at the airstrip on the peak day of the month, and an average of three aircraft were at the airstrip each day during the month. One private floatplane at Purple Point was observed during the month.

Annual Aircraft Operations

The State of Washington Department of Transportation, Aeronautics Division, estimates that approximately 300 operations (one takeoff or landing) per year occur at Stehekin Airstrip. The Aeronautics Division does not record information about the number of private floatplane trips made to or from Stehekin each year. The owner of Chelan Airways estimated that about 10 private floatplanes make trips to Stehekin each year, for a total of 20 private floatplane operations per year at Stehekin Landing.

Observations during August 1991 suggest that 300 or more annual operations at Stehekin Airstrip may be a high estimate. During the eight-day period in this peak visitation month, little aviation activity was actually observed at the Stehekin Airstrip. Three aircraft were tied down at the airstrip throughout most of the period.

HIKING/TRAIL ACCESS

Trails **and** Visitation by Hikers

Some 17 trails lead into or out of the Stehekin Valley and are used as routes for day hikes or extended trips to the back-country. Major trails to and within Lake Chelan NRA include the following:

Lakeshore Trail
Stehekin River Trail
Agnes Gorge Trail (Pacific Crest Trail - South) Bridge Creek Trail (Pacific Crest Trail - North)
Purple Creek Trail (Juanita Lake)
Rainbow Creek Trail Rainbow Lake Trail (with spurs to McAlester Lake and McAlester Creek) Boulder Creek Trail
McGregor Mountain Trail (Coon Lake)
Company Creek Trail Devore Creek Trail
Cascade Pass Trail Park Creek Trail

One of the most popular hikes for visitors to Lake Chelan NRA begins at the Cascade Pass trailhead (accessible by vehicle from Marblemount) in North Cascades National Park. Visitors can hike the Cascade Pass trail to Cottonwood Camp and meet an NPS shuttle bus for transportation to Stehekin Landing.

The estimated number of visitors hiking into the national recreation area account for approximately 1.5% to 3.0% of the total visitors to the national recreation area.

Backcountry Use

Written permits from the National Park Service required for all overnight stays in the backcountry. For the 1985-1988 period:

A total of 5,329 backcountry use permits were issued for Stehekin District camps.

The average party size for the period was 2.98 persons.

Approximately 100 permits were issued for use of horse camps in the Stehekin District. The average party size was 2.8 persons.

The average number of nights parties stayed at Stehekin District camps was 1.7 in 1985, 1.6 in 1986, 1.6 in 1987, and 1.7 in 1988. These averages include groups with horses.

The major entry points to the national recreation area are Stehekin, Cascade Pass and Rainy Pass, recording 9,186 entries or 72.9% of the total entries. A total of 78.8% of the backcountry users enter and exit via the same trail.

TRANSPORTATION FACILITIES

The primary transportation facilities in Lake Chelan NRA include the local road system, the airstrip, and marinas/boat docks. The locations of these facilities are shown in figure 2.

Road System/Landing Parking

No outside roads access the Stehekin River valley. A local road system, consisting of the Stehekin Valley road, Company Creek road, and minor roads to attractions or NPS administration and maintenance areas, serves the valley.

Stehekin Valley Road. The Stehekin Valley road is the principal roadway within the national recreation area. The road generally parallels the Stehekin River for 23 miles from the Landing to Cottonwood Camp in North Cascades National Park. Only the initial 11 miles of the road, from Stehekin Landing to High Bridge, lies within Lake Chelan NRA.

The Stehekin Valley road was constructed before the creation of the park complex. Once the system came under the jurisdiction of the National Park Service, all maintenance and construction activities have been limited to the existing roadway section. During the winter, the Stehekin Valley road is plowed only to the Stehekin Valley ranch located 9 miles north of the landing.

The lower 3.8 miles of the road (from the landing to the junction of Company Creek Road near Harlequin Bridge) has an asphalt surface that varies in width from 14 to 18 feet and operates as a one-lane road. Lengthy turnouts are in place to accommodate two-way traffic. This section of road serves most of the permanent residents of the valley and provides access to Rainbow Falls and the Buckner orchard.

The 6.4 miles of the Stehekin Valley road between Harlequin Bridge and High Bridge contains crushed aggregate surfacing and some native material surfacing. The road has an average surface width of 17 feet, which allows room for only one vehicle at a time. Turnouts exist in many locations where sight distance is limited by the road's alignment. The road's surface, width, and alignment typically keep travel speeds below 25 miles per hour.

Between High Bridge and Bridge Creek in North Cascades National Park, the Stehekin Valley Road is a narrow one-lane road with infrequent turnouts. Surfacing on this 4.3-mile-long segment consists primarily of native material. Numerous rock outcrops cause the road to be extremely narrow and difficult for vehicles to traverse. Emergency improvement projects are typically implemented by the National Park Service to repair damage to the roadway caused by heavy flooding.

The road segment from Bridge Creek to Cottonwood Camp is a narrow one-lane facility with few turnouts. The road's surface consists of native materials. The terrain in this last 7.0-mile section is gentler and contains fewer rock outcrops than the preceding section of the road.

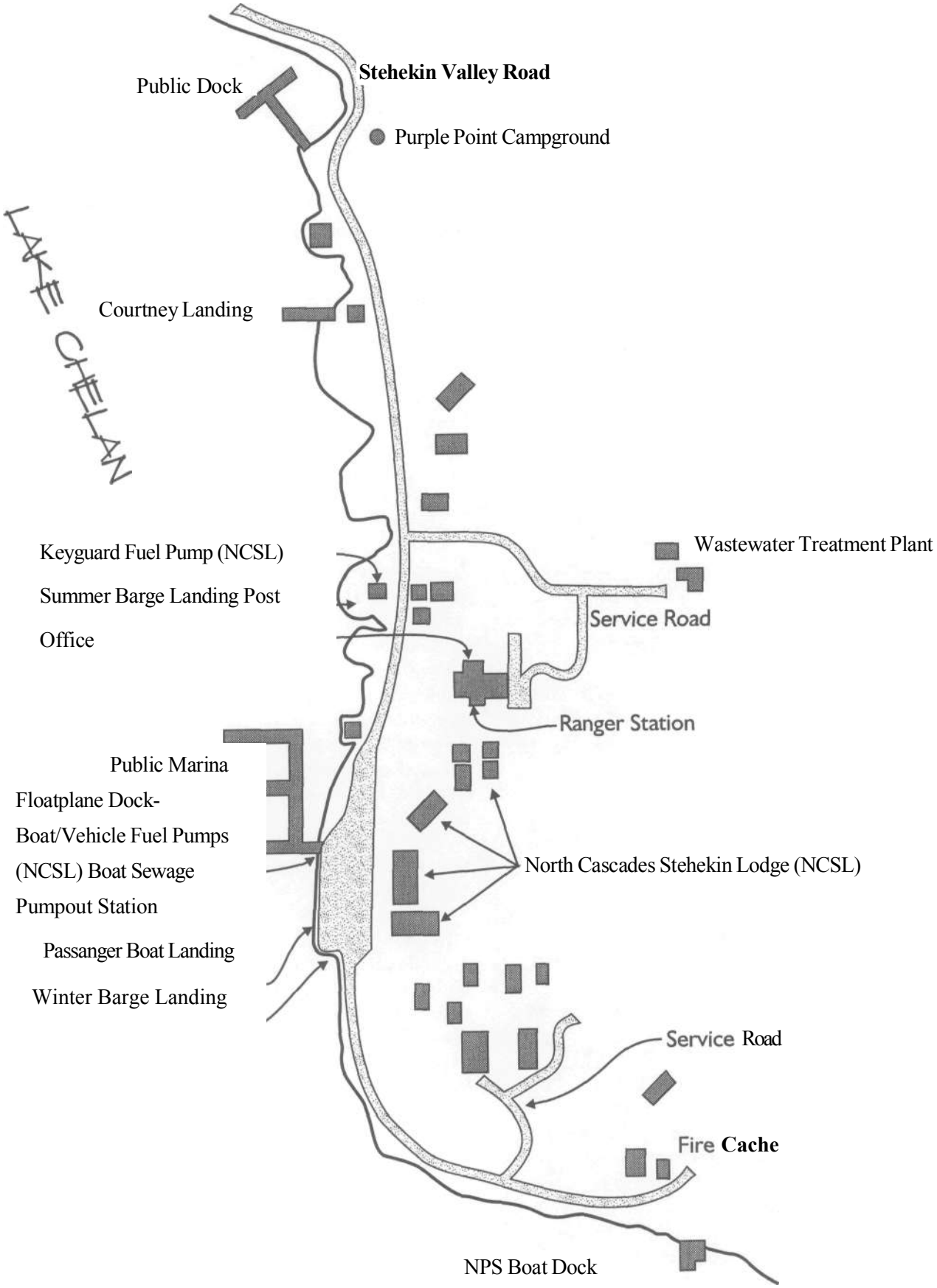


Figure 2: Transportation Facilities at Stehekin Landing

Company Creek Road. Company Creek road is a 2.2-mile-long spur road on the west side of the Stehekin River. The road begins at Harlequin Bridge and serves Harlequin Campground, the NPS maintenance area, the power station, the airstrip, and NPS and private housing areas. It is a one-lane road with occasional turnouts and contains a crushed aggregate surface. A segment of the road adjacent to the Stehekin River is prone to flooding. The road is plowed during the winter.

Minor Roads. Several minor roads have been constructed to serve visitor use areas and NPS administrative/maintenance facilities. The most notable of these roads leads to Rainbow Falls, the Buckner orchard, the airstrip, the gravel quarry, and the NPS maintenance area. A network of minor roads exists at the landing and leads to the NPS ranger station, the Golden West visitor center, the fire cache and vehicle storage area, and NPS employee housing.

Traffic Volumes and Accidents on the Road System

Hourly traffic volumes on the Stehekin Valley Road and Company Creek Road were recorded from August 7 through August 12, 1991. The average daily traffic volumes ranged from a high of 221 vehicles per day just north of the landing to 33 per day 11 miles north of the landing.

Twenty accidents were reported by the National Park Service during a five-year period (1986-90). An evaluation of the accident records and data indicates the following:

> There are no apparent high accident locations in Lake Chelan National Recreation Area.
>
> No injuries or fatalities occurred as a result of the motor vehicle accidents in the national recreation area. Most of the reported accidents involved only minor property damage to vehicles.
>
> The narrow road and/or poor sight distance appear to be contributing factors in most accidents on the Stehekin Valley road.

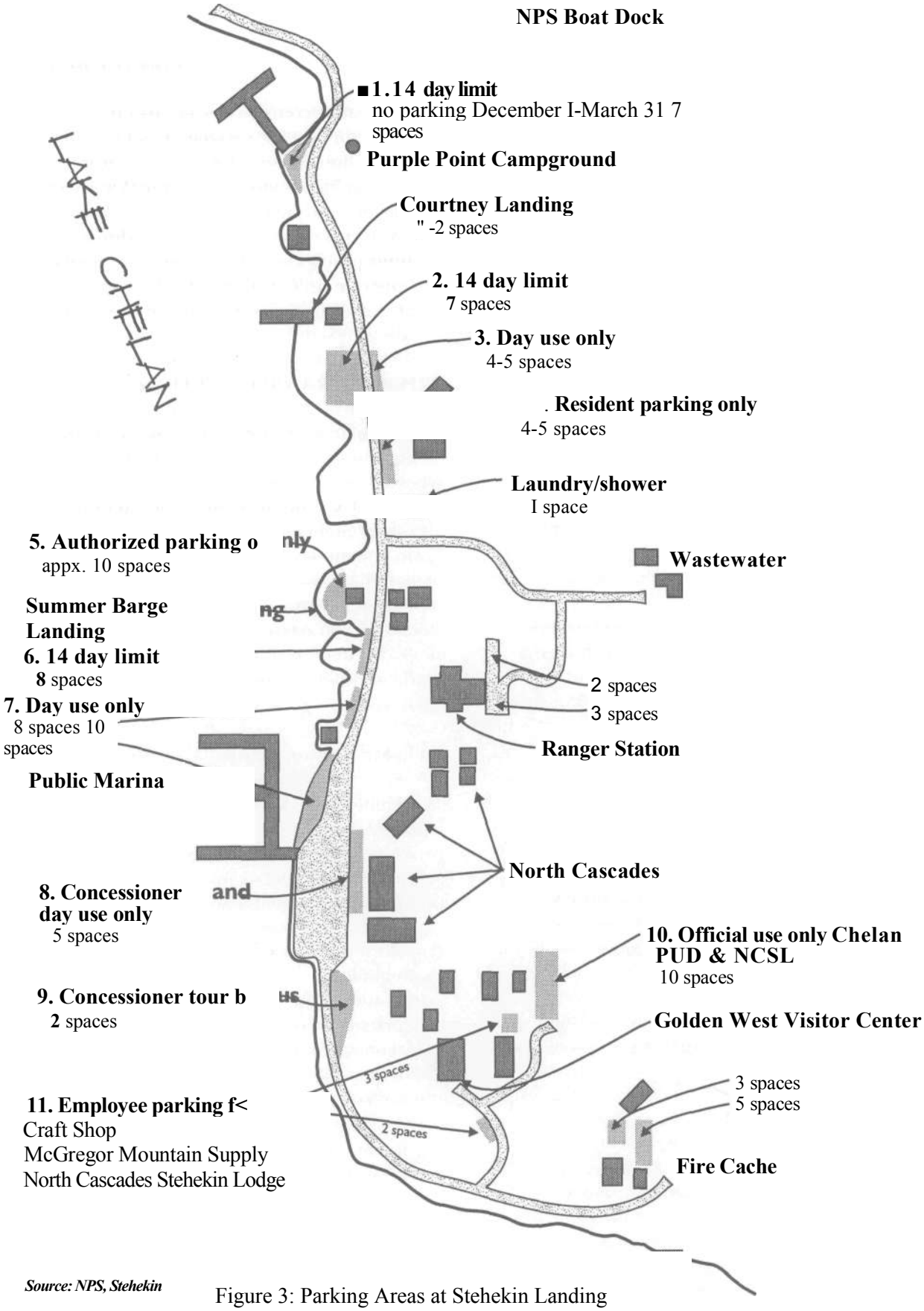
Parking at Stehekin Landing and the Valley

The area between Purple Point and the landing is the area of most vehicle parking since it is the focus of visitor activities in the NRA. Figure 3 shows the location of parking areas and NPS parking designations for each area. Since the National Park Service discourages recreational use of the Stehekin Airstrip and the facility may be officially closed or unusable due to runway conditions, Lake Chelan NRA visitors and Stehekin residents arriving by wheeled aircraft must use alternate airstrip facilities near the NRA. Approximately 75-90% of all available parking spaces at the Landing were occupied during a field inventory in August 1991. The number of available spaces for public use or lodging in the valley was estimated at 57 at various locations in August 1991.

Airstrip/Floatplane Facilities

As indicated previously, facilities are available in the Stehekin Valley for visitors arriving by both wheeled aircraft and floatplanes. Wheeled aircraft can land at Stehekin Airstrip. Floatplanes operate throughout the year on Lake Chelan and enplane/deplane passengers and light freight at the Landing dock.

The Stehekin Airstrip contains a dirt runway, 2,700 feet long and 80 feet wide (between runway markers). The runway has a northwest-southeast orientation that generally parallels the Stehekin River valley. The runway has a rough surface and is not fenced. The steep terrain of Rainbow Mountain and Tupshin Peak and the trees



Source: NPS, Stehekin

Figure 3: Parking Areas at Stehekin Landing

surrounding the airstrip pose obstruction to transitional and approach surfaces for the runway.

Cable tiedowns can accommodate up to six aircraft at one time at the airstrip. The runway is not lighted but retro-reflective markers line both sides and identify thresholds at each end. An unlighted wind sock and a segmented circle made of painted rocks are the only navigational aids at the airstrip.

STEHEKIN MARINAS/BOAT DOCKS

Public Facilities

Uplake visitors on Lake Chelan moor private boats at a large marina at Stehekin Landing or at several smaller docks. The marina is used for floatplanes as well. The NPS concessioner-assigned marina at Stehekin Landing is the largest boat facility in the national recreation area with 18 two-boat slips and space for about 8 other boats to tie onto the dock. The concession will have short-term moorage for free but will charge for partial day and overnight use.

The National Park Service also provides a public dock adjacent to Purple Point campground. This facility is much smaller than the marina at the landing and can accommodate five to ten small, private boats. Small boat docks are available at Weaver Point, Manly Wham, and Flick Creek campgrounds. A dock reserved for NPS boats is located directly below the fire cache/maintenance building behind the Golden West visitor center.

Passenger Boat and Barge Landings

Lake Chelan Boat Company docks their boats directly in front of the North Cascades Stehekin Lodge building. Barges load and unload near the passenger boat landing during the winter season when lake levels are down. During the summer, an alternate landing immediately north of the NPS beach house is used as a loading/ unloading point for barges.

Private Docks and Boat Services

The privately owned docks at numerous locations along the lake primarily serve lakeside residents. Private docks at the head of the lake, particularly those in Silver Bay, are usable only during the summer due to the drawdown of Lake Chelan.

Fuel for boats is available at the marina from the North Cascades Stehekin Lodge Company. No repair or maintenance services for boats are available in the Stehekin Valley.

NATIONAL PARK SERVICE SHUTTLE BUS SYSTEM

The National Park Service operates a shuttle bus system in the Stehekin Valley to meet some of the transportation needs of visitors to Lake Chelan National Recreation Area and North Cascades National Park. The system transports residents, visitors, USFS employees, and NPS employees from Stehekin Landing 23 miles upvalley to Cottonwood Camp in North Cascades National Park. The shuttle bus system benefits residents and visitors to the Stehekin Valley by relieving congestion on the local road system.

The shuttle system has operated as either a concessioner service or an NPS service since 1973. Its operation and use have varied substantially over the years due to weather conditions, changes in the condition of the Stehekin River road, operational expense. Much experimentation with schedules, fees, stops, and vehicle types has occurred over the years. In 1991 a reservation system was initiated to improve efficiency of staffing and number of runs, and to minimize fuel use, traffic, and wear and tear on the buses.

National Park Service Shuttle Bus Fleet, Schedule, and Fees

The National Park Service fleet (1994) consists of three vans — one 15-passenger and two 11-passenger, one with a wheelchair lift. Each van has a large roof rack to hold backpacks and other camping equipment. The shuttle bus drivers are uniformed interpreters. In addition to answering questions and providing general information about the area, each shuttle bus trip provides an interpretive program centering around a particular theme, such as the role of water shaping the Stehekin Valley landscape.

The NPS shuttle bus system typically operates from mid-May to mid-October with service all the way to Cottonwood Camp at the end of the Stehekin Valley road beginning about July 1, depending on snowpack and road conditions. The summer season, from mid-June through mid-September, is the period of highest use and requires a full commitment of vehicles and personnel. During the summer of 1991, there were four shuttle departures from the Landing each day: 7:30 A.M., 9:00 A.M., 11:30 A.M., and 2:00 P.M. The actual pattern of demand led to a simplification of the schedule in the following years to include departures at 8:00 A.M. and 2:00 P.M. only, with up to three buses departing at a time. This simplified schedule allowed a more efficient use of staff and equipment and reduced the potential for accidents on the narrow stretch of the road above High Bridge.

The shuttles make scheduled stops with brief layovers at designated locations along the Stehekin Valley road, such as High Bridge, Bridge Creek, and Cottonwood Camp. Passengers can board or leave the bus at any location along the road. A round trip between Stehekin Landing and Cottonwood Camp typically takes between 4 and 4V£ hours.

Fees are charged to help offset the cost of the shuttle system, and fee structures have changed over the years. Fees were substantially increased in 1993 when the NPS operating budget was no longer able to subsidize the operation to such a great extent.

Shuttle Bus Ridership

Passengers on the NPS buses include visitors, residents of the Stehekin Valley, and NPS personnel using the transportation to perform their duties. Backpackers, day hikers, and campers ride to and from 15 trailheads and 12 camping areas along the Stehekin Valley road. These visitors often use the morning shuttle to reach an upvalley trailhead and hike to a new location to meet a returning bus or catch one from the same stop. Other visitors ride the shuttle up and down the valley as a scenic tour. Total ridership on the system from 1985 through 1991 was 55,083. This is an average of 7,869 passengers per year with an average of 7 passengers for each one-way shuttle trip. With the 1993 fare increase from $3 to $10 per one-way trip and the start of a private bus service from the Landing to High Bridge, NPS shuttle ridership dropped to 2,844. The resulting cost to the NPS budget for that year's smaller system was substantially less.

NPS shuttle buses generally operate below their passenger capacity. The system operates near capacity during peak visitation periods, and backup buses are often required to meet additional passenger demands at these times. The National Park Service implemented a free reservation system at the start of the 1991 season to help predict passenger demands and to increase the efficiency of the transportation system. The number of backup buses required during the 1991 season (59) was significantly lower than in past years (140) indicating that the reservation system increased the efficiency of passenger transportation.

Ridership fluctuates considerably during the week. Saturdays are often the highest

ridership day of the week with a midweek peak on Wednesdays during the summer. Daily ridership during early and late months (May and October) shows fairly consistent passenger levels during the week with pronounced weekend peaks. Less than 10 passengers were transported by shuttle bus on several days of these low-use months.

CONCESSIONER TRANSPORTATION SERVICES

The North Cascades Stehekin Lodge Company — the NPS concessioner — provides most other vehicle transportation services available to visitors in Lake Chelan NRA. The North Cascades Stehekin Lodge Company offers visitors short scenic tours to Rainbow Falls, extended tours of the Stehekin Valley, and taxi service to upvalley locations. Bus tours to Rainbow Falls comprise the largest share of the lodge company's visitor transportation services. It owns four tour buses, two 42-passenger vehicles and two 32-passenger vehicles. A six-passenger van is used as a taxi. None of the company's vehicles travel above High Bridge. The North Cascades Stehekin Lodge Company provides bicycles and boat rentals and fuel for boats and vehicles.

NONCONCESSIONER TRANSPORTATION SERVICES

In 1993 Stehekin Adventure Company offered transportation services from the Landing to High Bridge four times a day. This service provided access to trailheads and the backcountry for hikers/climbers. This service complemented the NPS-provided shuttle service from High Bridge to Cottonwood Camp.

Transportation from the Landing to upvalley locations is provided by residents of the Stehekin Valley that operate private, recreational developments. This consists of shuttling passengers to and from the Landing or providing a vehicle for use by their guests.

STEHEKIN VALLEY RANCH TRANSPORTATION

The Stehekin Valley ranch provides transportation services for their guests from the passenger boats each day to transport visitors and overnight guests. Visitors staying at Stehekin Landing can also ride the ranch's 32-passenger bus to dinner at the Stehekin Valley ranch.

PRIVATE AND NATIONAL PARK SERVICE VEHICLES

The uncertain schedules and cost of barge service combined with a limited road system discourages many from transporting vehicles to Stehekin. As an alternative, valley residents and visitors often leave personal vehicles at Fields Point, some 15 miles uplake from Chelan, where the U.S. Forest Service and National Park Service operate a joint facility. The facility is accessible by highway, has inexpensive parking, and is served daily during the summer and four times per week during the remainder of the year by the Lake Chelan Boat Company.

A survey in 1991 indicated that there were approximately 200 private vehicles located in the valley with an additional 60 that appeared inoperative. The National Park Service operates approximately 23 vehicles in the valley.

Limited services for vehicles are available in the Stehekin Valley. Fuel for vehicles is available from the concessioner at the landing and a resident in the valley. Some residents also transport 55-gallon-drums of fuel uplake by barge and store the fuel on their property. The NPS shuttle buses refuel at a pump owned by the concessioner located near the summer barge landing. Other NPS vehicles are fueled at tanks

located in the NPS maintenance yard off Company Creek road.

Minor repairs and routine maintenance service for vehicles is available from a local resident. Vehicles must be barged to Chelan for major or complex repairs.

BICYCLES

Bicycle use in the Stehekin Valley consists of privately owned bicycles used by permanent and seasonal residents, visitors who rent bicycles, and visitors who transport their own bicycles via commercial passenger boat to the area. Bicycles are restricted to roads in the national recreation area. Two rental outlets, the North Cascades Lodge and Discovery Bike Rentals, currently operate at Stehekin Landing.

OVERVIEW

Visitors have been coming to the Stehekin Valley for over 100 years. The *Belle of Chelan* was commissioned in 1889 as the first commercial passenger vessel on the lake. Several additional boats followed to meet the needs of miners, loggers, sightseers, and settlers. The town of Chelan was laid out in 1889. By 1905 the Field Hotel in Stehekin offered some of the finest tourist accommodations in the Northwest. As mining and logging activities waned, tourism expanded. Accommodating recreational needs was one of the motivations for establishing Lake Chelan National Recreation Area in 1968.

An estimated 44,000 people visited Lake Chelan NRA in 1992 (see more detailed discussion of visitation numbers in following subsections). According to the *Visitor Services Project* (NPS 1992b), over 90% entered the national recreation area at Stehekin Landing. Nearly one-half stayed for less than a day, and over one-half of those for two hours or less. The 57% who stayed more than a day found lodging at the North Cascades Stehekin Lodge, a variety of private rental cabins, a guest ranch, several bed-and-breakfasts, and NPS campgrounds. Fewer than 100 people live in Stehekin year-round; about 180 are summer residents. In this section all of the above are included as "visitors" because data segregating tourists from residents is unavailable.

The term visitor experience is used here to include everything that happens to visitors while visiting the national recreation area — everything they do, learn, feel, and perceive. Obviously there is diversity here, with many visitor experiences.

Formal knowledge about Lake Chelan NRA visitors comes chiefly from the 1992 *Visitor Services Project,* statistics compiled by the park staff, and various economic and use data from the private sector. Visitor services project surveys were conducted August 25-31, 1991; 382 visitor groups were contacted at Stehekin Landing, and 83% of those returned their questionnaires. Park statistics report program and facility attendance, visitor use numbers, etc. These are reported yearly in the annual interpretive program report.

GETTING THERE

A visit to the national recreation area usually begins in the town of Chelan, 51 miles south of Stehekin at the southern end of Lake Chelan. This is apple and tourist country. Surrounding hills sprout orchards, pastures, and subdivisions. The lake is like a magnet, attracting activities stich as swimming, fishing, boating, and waterskiing. Vacation homes crowd the shoreline for about 25 miles along the southwest shoreline, and for some 20 miles along the southeast, until the roads run out.

Lake Chelan NRA area visitors start pulling into the Lake Chelan Boat Company soon after 7:00 A.M.. Passengers line up with their coolers, coats, hats, sunscreen, back and fanny packs, maps, and umbrellas. Some line up for the four-hour boat ride on the *Lady of the Lake.* Others opt for the fast lane: the two-hour ride on the *Lady Express.* At about 8:00 A.M., instructions are given for baggage and ticket procedures; loading begins soon after. Passengers find seats, and the first boat leaves at 8:30 A.M.

Being on a boat and sightseeing are apparent highlights as the boat heads north. There are families and couples of all ages, mixed groups, nuclear families, the neighbors, in-laws, college roommates, singles — all types of groups. People who seem generally to be having a good time with each other. They point to cottages, orchards, marinas along the lakeshore. They settle in; someone goes for coffee and snacks. They put on sunscreen

and hats, and attend to the needs of the young and elderly.

The scenery is spectacular. Rolling hills grow more angular, rockier, forested; apples give way to conifers. Natural beauty with a settled comfort, settled by people with the means to pay attention to landscaping; houses are too far away for the boaters to become confused at the variation in styles.

Both boats stop at Fields Point, about 20 miles uplake to pick up additional visitors. People waiting for the boat read wayside exhibits; topics range from lake history to what fish live in the lake. A large relief model of the area and some panel exhibits provide orientation. More information is on a kiosk/bulletin board.

Then the roads end — first to the east, then to the west. Necks crane to see the houses squeezed into the cul-de-sac. Milled cedar siding is replaced by Douglas firs, ponderosa, and lodgepole pines along the suddenly steep canyon walls. Passengers scan the boat newspaper, which interprets the history, scenery, and recreational opportunities from Chelan to the recreation area. The newspaper describes the hiking trail that continues a short distance north from the end of the road at 25-Mile State Park until it reaches Box Canyon.

The narrows separate the two basins of Lake Chelan — the deeper Lucerne Basin to the north and the smaller, shallower Wapato Basin to the south. The ship's loudspeaker and the newspaper describe it and most passengers learn a bit of geology. In the newspaper, spectacular cliffs, forested hillsides, bouldered canyons, and rocky lake edges are settings for mines, forest fires, camps and now-extinct ventures. Readers also learn a bit of natural history. Occasional boat-in cabins are nestled at the lake edge, attracting sightseers' attention. In the cooler months of the year, mountain goats are frequently seen along a certain stretch, and the boat pulls in for a closer look. Mule deer, black bears, and eagles can be spotted as well. And there's a bit of interpretation of the animals seen. There's still time for a beverage refill before landing.

By the time the boat slows to land, passengers have entered the visual environment of the North Cascades. Mountains tower in the distance, glaciers topping steep forested hillsides. The lake edge rises into cliff faces and craggy slopes. At the northeast corner the land flattens out in a forested plain — the floodplain of the Stehekin River, still only a map reference to most passengers. Buildings claim a piece of the shoreline here, boats and a floatplane moored to docks. Belongings are sought, found, tucked away; groups reassemble and prepare to disembark.

In 1991, to arrive and depart, 59% of the visitors used the four-hour tour boat, 38% used the two-hour boat, 16% came or left on a private boat, 9% used a floatplane, and 6% hiked in or out.

WHO VISITS LAKE CHELAN NATIONAL RECREATION AREA?

According to the *Visitor Services Project* survey, 75% of visitors came from Washington and Oregon; 6% were California residents. About 1% were from other countries (mainly Canada). Nearly one visitor in two was 30-50 years old; 17% were over 60; and 16% were under 16. First-time visitors totaled 68%. The most common group size was two, and the most common group type was the family. See figures 4, 5, 6, and 7.

WHY DO THEY COME?

The *Visitor Services Project* survey showed that most visitors were attracted by the area's natural beauty and the opportunity to have a quality visitor experience in a relatively relaxed and minimally developed environment. Approximately 78% of visitors came for scenery and the natural setting,

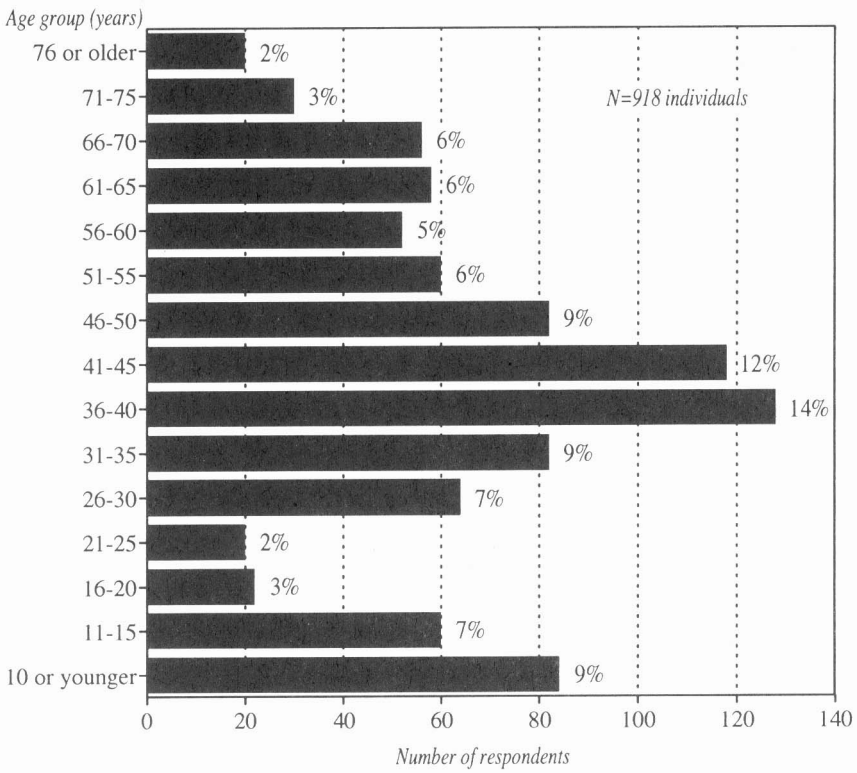


Figure 4: Visitor Ages

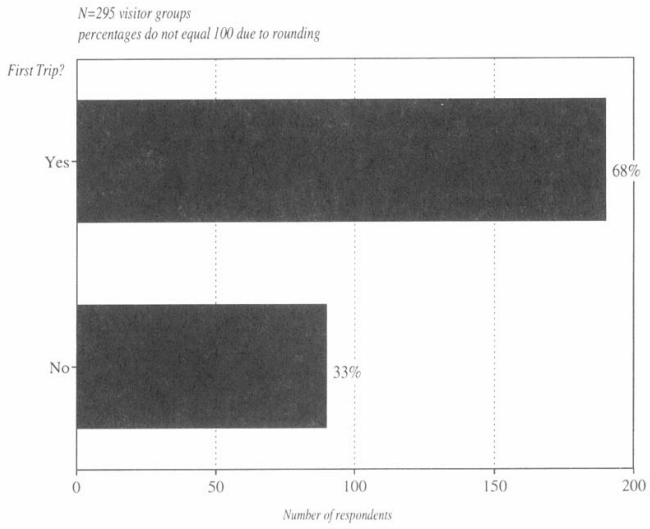


Figure 5: Number of First-Time Visitors

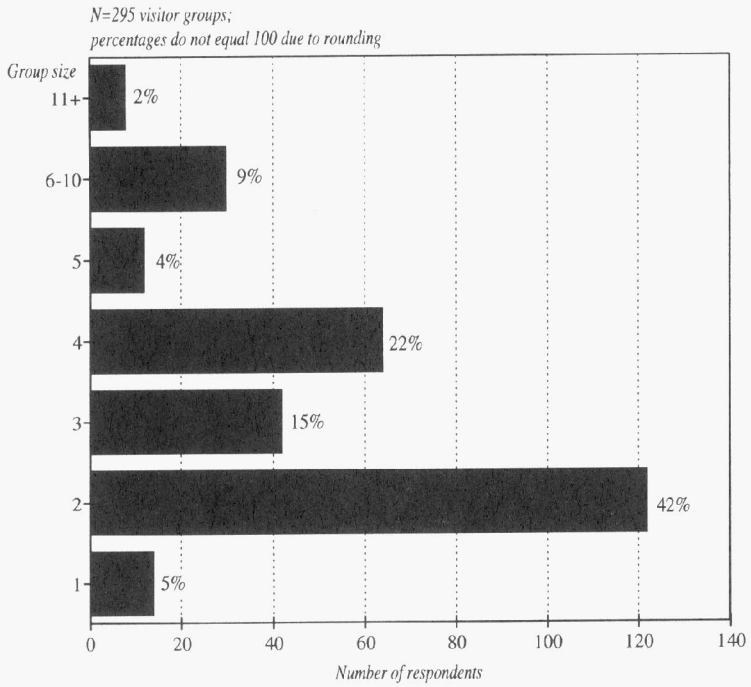


Figure 6: Visitor Group Sizes

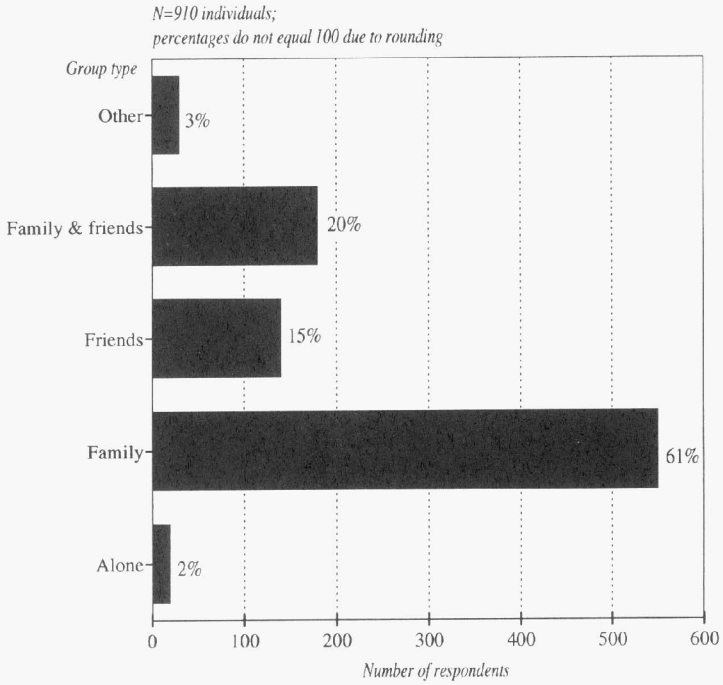


Figure 7: Visitor Group Types

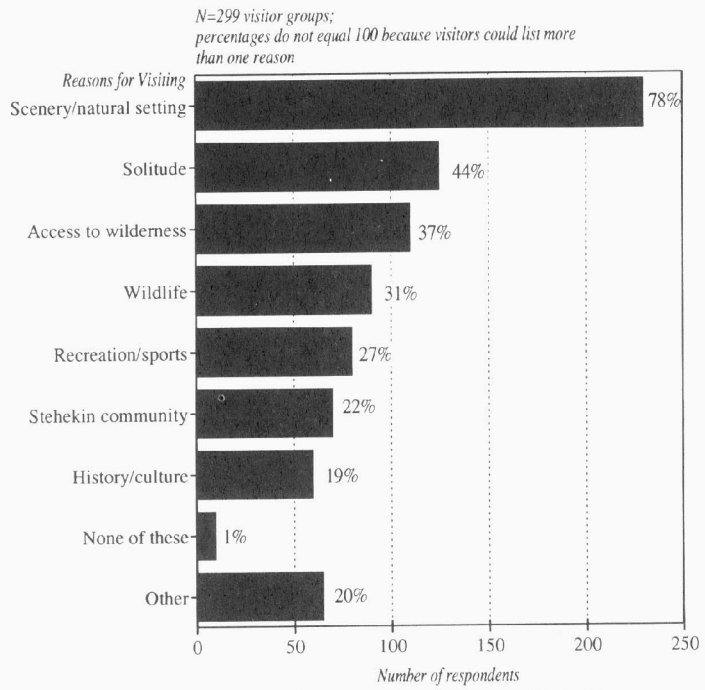


Figure 8: Visitors' Reasons for Visiting Stehekin

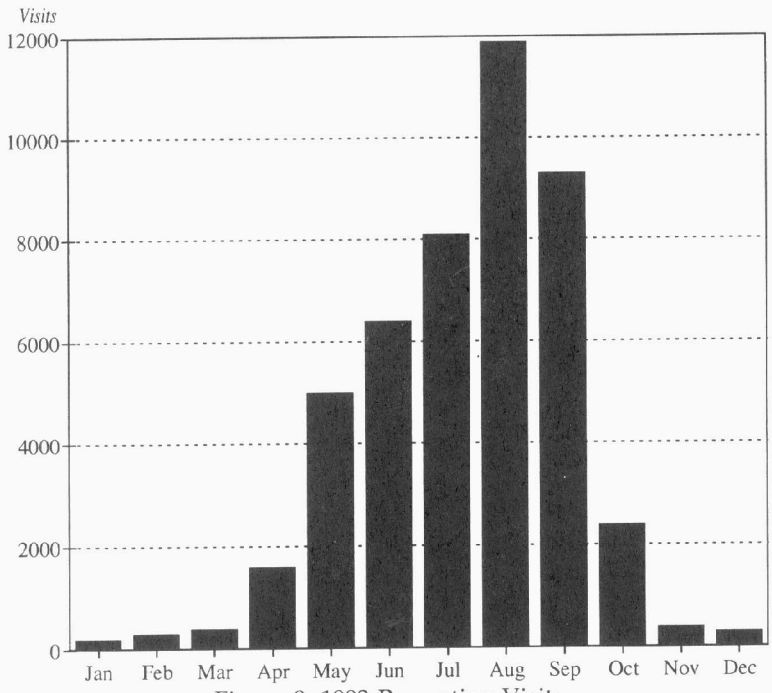


Figure 9: 1993 Recreation Visits

44% sought solitude, 37% wanted access to wilderness, 31% hoped to see wildlife, 27% were seeking recreation and sports, 22% were attracted by the Stehekin community, and 19% were interested in history and culture (see figure 8).

WHEN DO THEY VISIT?

Visitation varies strongly with the season. In 1993, the summer months (June-August) received 56% of annual visitation, with 26% in fall (September-November), 15% in spring (March-May), and 2% in winter (from the statement for interpretation) - see figure 9. Boats, transportation, and lodging are available year-round.

WHAT DO THEY DO?

Visitors can choose from a variety of activities. Many passengers who are returning on the same boat sign up on the boat for one of the guided trips offered by the concessioner. Buses take visitors to Rainbow Falls and a picnic lunch before bringing them back to Stehekin Landing for departure downlake in a little more than an hour. Another group gets to ride bikes before lunch and return. Many head up to the right after departing the boat to visit the local crafts and tackle shops and the NPS Golden West visitor center. Some rent bicycles, canoes, boats, or horses. Quite a few lounge around the Landing after having lunch in the restaurant.

Of those who are staying a night or more, some will check in at the lodge, others are met by a car from a cabin camp or bed-and-breakfast, some walk to the Purple Point campground, and others wait for the shuttle to take them and their backpacks to the end of the road at Cottonwood Camp or one of the several other campsites and trailheads found en route.

Sightseeing was the most popular activity (85%) for visitors who stopped at the landing in August 1991; followed by visiting the visitor center (73%), hiking (53%), wildlife observation and photography (32%), and bicycling (30%).

The sightseeing experience in Lake Chelan NRA includes splendid long views of the Cascades — tall peaks, glaciers, alpine vegetation. These are seen mostly from the boat, the landing, the lakeshore, a few points in the valley, and from hiking trails that head upwards from the valley. Views from the valley road are largely foreground and midground Cascades, shielded from panoramas by steep valley walls and roadside forests. The Stehekin River comes into view from the road now and then. The road provides a country lane experience from the landing to High Bridge; it is paved from the landing to Harlequin Bridge (4 miles), and gravel thereafter. From High Bridge the road narrows and gives visitors a more primitive experience in transit to Cottonwood Camp.

The landscape of the valley contains significant cultural elements: mostly homesteads, lodging, historic structures, NPS and community infrastructure. Many are fascinated by the residents of the Stehekin community as an integral part of the valley environment; one can hear and read observations expressing archetypes such as the rugged individualist, conquering the frontier, man and nature, and small town as Utopia. Despite the recent arrival of electricity and satellite TV dishes, the archetypes live on.

There are many transportation options. The schedules, operators, reservations, and fees have changed over the past few years. More than one-half of 1991 recreation area visitors rode a bus in the valley. In 1993 the National Park Service operated a shuttle bus twice a day to Cottonwood Camp, 23 miles north at the end of the road. North Cascades Stehekin Lodge operated a shuttle every few hours to Rainbow Falls, High Bridge, and the old schoolhouse. Reservations were encouraged for the NPS shuttle, but were not needed for

the lodge shuttle. Both shuttles charged fees; schedules of both varied with the season. The lodge also operated a taxi service. A guest ranch and other private lodgings offered shuttles for their customers.

A significant change in transportation and tour services in 1993 was the provision in the interim lodge concession contract, which allowed for other businesses to offer tours in the valley. The most significant one for transportation was the four times per day bus service from Stehekin Landing to High Bridge provided by Stehekin Adventures, Inc.

One in four summer visitors in 1991 rented a bicycle to ride the valley roads (VSP); two companies rent bikes. The terrain being fairly level, traffic being minimal, and the scenery includes the charming, the picturesque, and the spectacular, this is a great biking experience for a wide variety of ages and physical capabilities. Visitors can rent paddleboats, canoes, and motorboats. Various horseback riding trips are also available. Hiking is extremely popular, and a variety of options are available. Cross-country skiing is a favorite winter activity.

More than 38% of 1992 overnight stays were in campgrounds (NPS 1992b). All are tent sites. One (Weaver Point) is on the lakeshore and can be reached by boat or a short hike; one (Purple Point) is on the edge of the developed area, a short walk from the landing, and has restrooms, showers, and its own dock; and several are more primitive and located upvalley.

Other overnight visitors stay in the North Cascades Stehekin Lodge, a guest ranch, rental cabins or houses, and bed-and-breakfast establishments. Accommodations generally are rustic, comfortable, and without television.

Three facilities provide interpretive services. An information station in Chelan delivers important information prior to visitors' arrival in the national recreation area. Waysides, exhibits, and brochures provide information before visitors board a boat at Field's Point. Both facilities are operated in cooperation with the U.S. Forest Service. The Golden West visitor center is about 200 yards uphill from the Landing in Stehekin. The Golden West was built as a lodge in 1927; it was converted to an NPS visitor center in 1976. The historical appearance has been retained. Inside are a bookstore, an information desk, exhibits, and an activity room. On the second floor are interpretation offices, work areas, and storage space.

Other interpretive media include a 1-mile self-guided Imus Creek trail that begins near the visitor center and ends near the Purple Point campground; the 1/8-mile McKellar Cabin trail features six interpretive signs; and the 1/4-mile Rainbow Mist nature trail offers signs and a brochure. Wayside exhibits are located at the landing, near the visitor center, and at High Bridge, Cottonwood Camp, and several other places. An 8-minute slide orientation program is available in the visitor center.

Personal interpretive services include information services at the landing and visitor center, interpretive talks, guided walks, and evening programs. Evening programs were reduced, and interpretive talks on boats were discontinued in 1993 due to staffing limitations. Volunteers provided significant services, including information services and interpretive programs.

Visitors also receive interpretive services from the concessioner and residents. Boat passengers receive an informative newspaper and commentary that interprets the views. Bus drivers explain the history of Stehekin. Residents provide informal interpretation. A private concern began offering guided fee tours of Buckner Homestead and the lower Stehekin Valley in 1993.

Some bus tours, scenic vistas, interpretive programs, and several other activities are accessible to physically challenged visitors. Accessibility at the North Cascades Stehekin

Lodge, by the landing, and at the District Office was improved in 1993 with the addition of ramps and the renovation of a housekeeping unit. Additional improvements are underway or planned. The Golden West visitor center is accessible to visitors in wheelchairs if they can make the rather steep grade from the Landing. Accessibility to the lodge, restaurant, and other buildings varies. The availability of shuttles makes much of the valley accessible to physically challenged and elderly visitors; one NPS shuttle bus and one tour bus are equipped with a wheelchair lift. Access to backcountry areas is readily available for ambulatory visitors, with several trails beginning near the Landing.

The visitor center, information from a boat ranger (not offered in 1993), shuttle buses, publications, and outdoor exhibits and bulletin boards were the most used services and programs in 1991 (see figure 10).

WHAT DO THEY KNOW?

There are few quantitative measures of what visitors know, what information they brought with them, or what they learned while in the national recreation area.

Since most visitors are from Washington or Oregon, many probably have read or heard about issues relating to Lake Chelan NRA planning and management. Visitors can also hear about current issues by talking to non-NPS residents and to park staff. The 1991 VSP showed a significant number of general comments that related to issues being debated at that time. At least six commented that they enjoyed the community, five asked "please settle differences between NPS/residents equitably," two would "prefer more private enterprise," two others indicated that they "support NPS goals — community should follow," and 14 advised the National Park Service to "keep it as unspoiled/uncrowded as it is."

Visitor awareness of interpretive themes and resource management issues is largely unknown. It is likely that the preferences for rustic, less-developed experiences correlates with a greater than usual knowledge of natural and cultural history. Visitors have good opportunities to learn basic information before their visit — at the two information stations, on the boat, and through mailings, phone inquiries, and services at the other North Cascades visitor facilities. More than one-half of visitors questioned by the 1991 VSP knew about reservations needed for the shuttles and campgrounds; more than 40% did not. Sources of information for reservation systems included friends and relatives, the Golden West visitor center, a previous visit, a ranger, a phone inquiry, the park newspaper, and another visitor center (see figure 11).

RESIDENTS

Residents include families who have lived several generations in the valley, as well as newcomers. About one-third of the year-round residents are employed by the National Park Service or its concessioner; most of the other residents make their living from the tourist trade. Many residents express disagreement over issues such as development guidelines, land acquisition, use of firewood and other resources, alteration of the Stehekin River and its banks, and exclusive concession agreements. Frequently expressed is the idea that limits on development are not needed, since the residents live there mostly for the isolation and natural beauty, and are not about to "pollute their own backyard." Visitors have ready access to the various positions taken in deciding the future of Lake Chelan NRA.

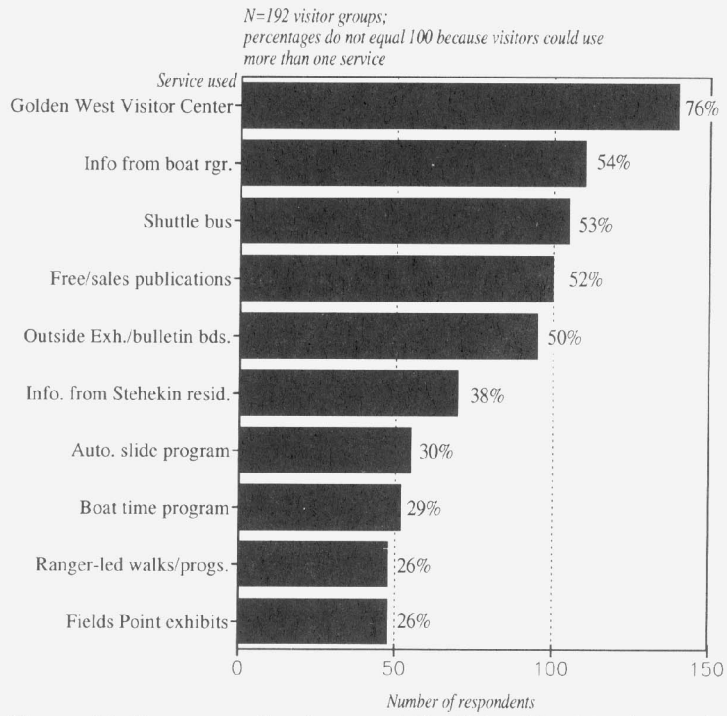


Figure 10: Programs, Services, and Facilities Used in the Park

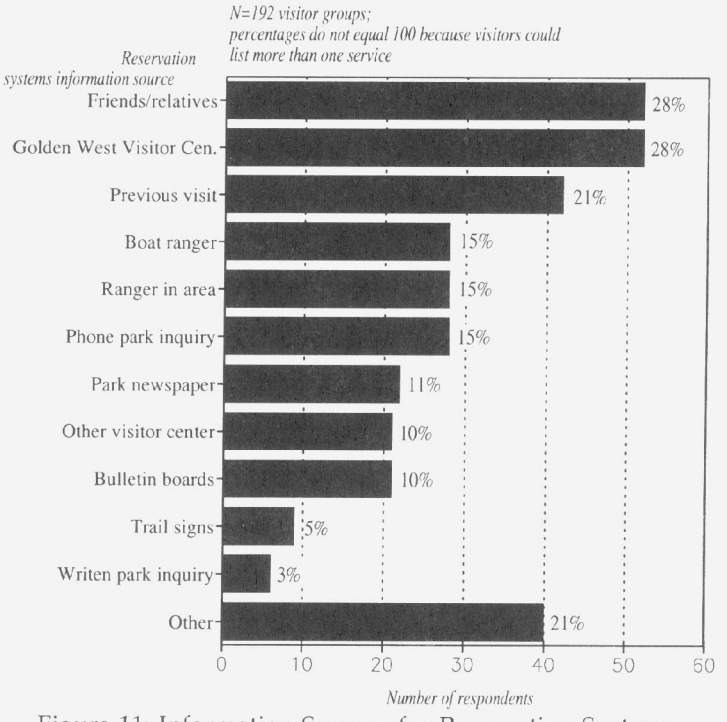


Figure 11: Information Sources for Reservation Systems

CAMPFIRES AND HORSE GRAZING IN WILDERNESS

These two wilderness aspects of the visitor experience have been raised in the consent decree (see appendix A). There are three management classes for wilderness within the Stehekin River drainage: day use area, trailed /established camp area, and a cross-country area (NPS 1989b). Current management restrictions on campfires and grazing vary by the type of area and unit, and are summarized in table 13. The day use area includes Cascade Pass, Sahale Arm, Horseshoe Basin, and Park Creek Pass. Within the Stehekin River drainage, the cross-country area is limited to the national recreation area, and includes the headwaters of three drainages — Rainbow Creek upstream of the North Fork (and McAlester Creek), Boulder Creek upstream of Rennie Creek, and upper Fourmile Creek. All remaining areas, not specified here, are in the trailed/established camp area.

The maximum stock party size in cross-country areas is 6 pairs of eyes (people or stock); in trailed/established camp areas, 12 pairs of eyes; and in some designated campsites, 30 pairs of eyes. Horses are primarily used for packing into the backcountry. Guided trips occur throughout the summer, and hunters pack into the national recreation area's cross-country area during the fall, "high hunt" deer season.

TABLE 13: CAMPFIRE AND GRAZING RESTRICTIONS IN STEHEKIN RIVER DRAINAGE

Management Class	National Park Within Stehekin Drainage	Lake Chelan National Recreation Area
Day Use	Campfires: Prohibited Grazing: Prohibited	Campfires: Prohibited Grazing: Permitted, except within 200 feet of water sources
Trailed / Established Camp	Campfires: Permitted only in fire grates at designated campsites Grazing: Prohibited	Campfires: Permitted only in fire grates at designated campsites Grazing: Permitted, except within 200 feet of water sources
Cross-country	N/A	Campfires: Prohibited Grazing: Permitted, except within 200 feet of water sources

SOCIOECONOMIC PROFILE

AREA DESCRIPTION

Lake Chelan NRA is administered as a part of the North Cascades National Park Service complex of parks and recreation areas. It is surrounded by the Glacier Peak wilderness area, the Lake Chelan /Sawtooth Wilderness area, the Wenatchee National Forest, and North Cascades National Park. It is entirely within Chelan County.

The closest incorporated city that provides services and access to the area is the city of Chelan, located on the south end of Lake Chelan. Other major population centers within a day's drive of Lake Chelan NRA include Wenatchee, Spokane, Seattle, and Yakima, Washington.

The Stehekin community is a settlement of year-round and summer homes, and scattered recreation-based businesses. The majority of local private businesses have come into existence during the last decade.

The National Park Service has assumed responsibilities for some activities normally dealt with at the local government and community levels. It owns and/or controls a substantial portion of the public service infrastructure in Stehekin Valley, with the notable exceptions being the Chelan County Public Utility District facilities and on-lake transportation.

POPULATION

County patterns of population growth and change reflect differences among counties in their ability to attract and retain people as both producers and consumers. Population growth for Chelan County can be put into perspective by comparing the county's population with the state's population.

The April 1, 1992, population in Chelan County was estimated by the Washington State Office of Financial Management at 54,600 persons. With a total land area of 2,915 square miles, the density of the county is only 18.7 persons per square mile or about one-fourth of the Washington State average of 73.4 persons per square mile. As shown in table 14, slightly more than half of the population is located in incorporated areas of the county. The population of the city of Chelan was estimated at 3,070 persons in 1992.

Population growth for the county has been modest between 1960 and 1991, averaging 0.85% (average annual rate of growth) per year. However, between 1960 and 1970 population growth was negligible. During the decade of the 1970s, the county population grew by 0.95% per year or considerably more than the previous decade. However, the population of the city of Chelan dropped slightly during the 1970s. Regional population growth rates of under 1.0% per year reflect a pattern of stable economic conditions in which the existing labor force is adequate to meet the needs of industry without the addition of substantial numbers of immigrating workers. However, population growth between 1980 and 1990 for the county increased at an average rate of 1.45% per year, or an amount substantially above the growth rates experienced during the previous two decades. The data for the most recent period between 1990 and 1992 confirm the perception of a rapidly growing population in the county.

TABLE 14: POPULATION IN CHELAN COUNTY AND CITY OF CHELAN, 1960-1992

Year	Total County	Unincorp. Area	Incorp. Area	City of Chelan	State of Washington
1960	40,744	17,888	22,856	2,402	2,853,214
1970	41,100	17,696	23,407	2,837	3,413,244
1980	45,061	20,791	24,270	2,802	4,132,156
1990	52,250	22,757	39,493	2,969	4,866,692
1991	53,200	23,395	29,805	3,020	5,000,400
1992	54,600	24,055	30,545	3,070	5,116,700
Average	**Annual Percent Change**				
1960-91	0.85%	0.85%	0.85%	0.75%	1.85%
1960-70	0.09%	-0.11%	0.24%	1.68%	1.81%
1970-80	0.95%	1.85%	0.35%	-0.09%	1.95%
1980-90	1.45%	0.91%	1.98%	0.58%	1.67%
1990-91	**1.81%**	2.85%	1.05%	**1.71%**	2.74%
1991-92	2.63%	2.82%	2.40%	1.66%	2.33%

SOURCE: *Census of Population,* Washington State Office of Financial Management, Forecasting Division, April 1 Populations of Cities, Towns, and Counties

AREA HOUSEHOLDS

According to the 1990 census, the Stehekin area including Holden Village (Stehekin Division, which encompasses an area of 709 square miles) had 68 persons in 30 households, of which 19 were classified as family households. There were 2.27 persons per household and 2.84 persons per family on average. In addition, 56 persons were in group quarters. The total population count for the Stehekin Division amounted to 124 persons. Support for a higher population figure is given by the 1992-93 Stehekin School District No. 69 enrollment of 23 pupils, which would be consistent with a total year-round population in Stehekin of about 100 persons.

There were 132 housing units in the Stehekin Division, of which 30 units were occupied and 102 units were vacant at the time of the 1990 census count. Among vacant units, 86 units were for seasonal, recreational, or occasional use. Thirteen of the occupied housing units were owned by the occupants, with a median home value of $71,300 (this compares to the median value for Chelan County of $71,500). The remaining renter-occupied units (17 units) had a median contract rent of $150 per month (this compares to a median contract rent for Chelan County of $306 per month).

Since the Stehekin Division encompasses an area greater in size than the community of Stehekin, the total population indicated from the 1990 census probably overstates the number of year-round residents located in the community of Stehekin. According to the 1988 GMP, the year-round population of the community of Stehekin was approximately 75 persons, increasing to a seasonal peak of 175 persons during the summer. A more recent estimate obtained by NPS personnel (NPS Alternative Working Group, March 2-6, 1992), places the year-round population between 70 and 90 persons, with an increase of the resident population between 175 and 200 persons during the summer. In 1990 there were 10 NPS personnel permanently assigned to the Stehekin District (currently, there are 10 permanent employees).

ECONOMY

Personal Income Change

Along with the fairly rapid increase in population experienced by Chelan County during the 1980s, there was also a parallel growth in personal income. As shown in table 15, personal income in current dollars grew steadily from $9,785 per capita in 1980 to $16,589 per capita in 1990. Nonetheless, measured as a proportion of per capita income at the state level, the county's relative share of personal income declined from about 96% to about 88% over the period. The relative decline in personal income appears to reflect the dominance of manufacturing and high-value business service industries at the state level, compared to the regional economy of Chelan County, which is dependent on agriculture and tourism. The relative decline is across-the-board, as there has been no apparent change in the composition of personal income (i.e., differences in the growth of earned and unearned income or transfer payments, the major components of personal income) experienced by the county in comparison to the state.

TABLE 15: PERSONAL INCOME GROWTH, 1980-1990

	1980	1985	1990
Chelan County Per Capita Personal Income	$9,785	$12,669	$16,589
Percent of State Per Capita Personal Income	95.5%	89.9%	88.3%

SOURCE: U.S. Department of Commerce, Bureau of Economic Analysis, *Local Area Personal Income,* various issues.

Employment and Earnings

A significant feature of the Chelan County economy is the extreme variation in seasonal employment, which is associated with both agriculture and tourism, the two dominant industries in the county. The peak activity for both sectors occurs roughly at the same time — July through September. In 1990 total covered employment varied from 25,535 workers in January to 36,750 in July, a difference of 44% when measured from the lowest level. The average for the year was 29,757 workers. (Washington State Employment Security, *Employment and Payrolls in Washington State by County and Industry, 1990 Annual Averages,* No. 182, February 1992)

As shown in table 16, total employment (including proprietors as well as covered wage and salary employment) in Chelan County expanded substantially between 1985 and 1990. The greatest percentage gains were registered in the transportation and public utilities sector, followed by the government and construction sectors. Retail trade and services also grew substantially, contributing 1,435 jobs or 35% of the total employment growth for the period. Growth in all these sectors, with the possible exception of government, is normal in an area with an expanding tourism market.

TABLE 16: CHELAN COUNTY EMPLOYMENT BY INDUSTRY SECTOR, 1985 AND 1990

Industry Sector	1985	1990	**Percent Change**
Total Employment*	32,483	36,564	12.6%
Wage and Salary	25,250	28,926	14.6%
Proprietors	7,233	7,638	5.6%
Farm	3,079	3,289	6.8%
Nonfarm	29,404	33,275	13.2%
Private	25,316	28,292	11.8%
Agric. Serv., Forestry, Other	1,684	NA	NA
Mining	135	NA	NA
Construction	1,793	2,094	16.8%
Manufacturing	2,917	2,845	-2.5%
Transport. & Public Utilities	903	1,225	35.7%
Wholesale Trade	2,309	2,279	-1.3%
Retail Trade	5,482	6,108	11.4%
Finance, Insur., & Real Estate	2,156	2,281	5.8%
Services	7,937	8,746	10.2%
Government	4,088	4,983	21.9%
Federal, Civilian	586	733	25.1%
Military	282	254	-9.9%
State & Local	3,220	3,996	24.1%

* Full- and part-time employees by place of work
SOURCE: U.S. Department of Commerce, Bureau of Economic Analysis, *Regional Economic Information System,* April 1992.

Table 17 provides more sectoral detail for industries engaged in tourism-related activities as well as other basic (export-oriented) production of goods and services. The data reflect covered employment for July 1990 (the peak employment month) and the annual average wage by industry sector, also for 1990. Clearly, agriculture and forestry are the largest employment generators during the summer peak. (About 85% of the employment indicated for the agriculture, forestry, and fishing sector is related to crop production.) The tourism industry directly generates employment in many sectors of the regional economy — seasonal construction, air and water transportation, automotive dealers and service stations, eating and drinking establishments, hotels and other lodging places, automotive repair, services and parking, and amusement and recreation services.

Tourism is the single-most important source of economic activity in Stehekin and as discussed above, is a primary source of growth in employment and earnings in Chelan County. Lake Chelan NRA is an important recreation attraction in Washington State. It is part of the Cascade Loop, which can be reached from the Seattle metropolitan area by traveling east on the North Cascades Byway to Winthrop, a tourist-oriented town in Okanogan County, and then south to Lake Chelan and Wenatchee. The traveler completes the loop by heading west on State Route 2 to Leavenworth, another tourist-oriented town in Chelan County, and further over Stevens Pass to Seattle.

TABLE 17: CHELAN COUNTY COVERED EMPLOYMENT AND PAYROLLS BY INDUSTRY SECTOR, 1990 - (JULY EMPLOYMENT; ANNUAL WAGES)

Industry Sector	Employment*	Percent Employment	Average Wage**
Agr., forestry & fishing	13,383	6.4%	$ 8,518
Mining	244	0.7%	39,297
Construction	1,475	4.0%	20,587
Manufacturing	2,414	6.6%	26,180
Food and kindred products	603	1.6%	15,024
Lumber and wood products	210	0.6%	19,513
Printing and publishing	258	0.7%	19,600
Transport, and public util.	873	2.4%	18,146
Water transportation	NA	NA	NA
Transportation by air	NA	NA	NA
Wholesale trade	2,362	6.4%	18,502
Retail trade	4,857	13.2%	10,689
Automotive dealers & service stations	607	1.7%	17,041
Eating & drinking establishments	1,976	5.4%	6,745
Finance, insurance, & real estate	1,229	3.3%	19,151
Services	5,412	14.7%	15,608
Hotels and other lodging places	1,070	2.9%	8,112
Automotive repair, services, & parking	164	0.4%	14,284
Amusement and recreation services	293	0.8%	8,507
Government	4,501	12.2%	24,612
Federal	745	2.0%	26,776
Total	36,750	100.0%	$16,231

* Represents seasonal peak employment

** The average wage for the state of Washington in 1990 amounted to $22,635

SOURCE: Washington State Employment Security, *Employment and Payrolls in Washington State by County and Industry, 1990 Annual Averages,* No. 182, February 1992.

VISITOR USE SERVICES AND EXPENDITURES

Total visitors are estimated separately by the National Park Service based on information on passenger arrivals (figure 12 and table 18) and registrations at NPS facilities (tables 19 and 20). These represent passenger arrivals as opposed to visitor counts. Annual visitor arrivals have risen from 17,539 persons in 1969 to 27,234 persons in 1992, based on NPS data, as shown in figure 12. Slightly more than one-half of visitor arrivals occurs during July and August. June and September are also heavy visitor activity months, together accounting for nearly a third of total visits or arrivals. Annual overnight stays at NPS or concession lodging facilities and campgrounds are shown in table 19 and have increased from 4,546 persons in 1969 to 20,534 persons in 1992. In 1992 there were 7,184 overnight stays at the North Cascades Stehekin Lodge (operated as a concession), or just over 30% of the total in NPS facilities and campgrounds.

A closer examination of visitor use is provided for 1990 and 1991 based on monthly visitor activity, as indicated in table 20. Table 20 presents NPS visitor arrivals by month (this is shown in years in figure 12); these figures indicate a decrease in 1990 and a slight increase in 1991. Overnight recreation-related stays are modestly higher for the North Cascades Stehekin Lodge in 1991 compared to the previous year as shown in table 20. However, overnight stays at other NPS facilities decreased substantially

in 1991, based on the NPS counts as shown in table 20.

NPS- and Concession-Provided Visitor Services

Visitor services are provided by the National Park Service and its lodging concessioner, the North Cascades Lodge Company, who operates the North Cascades Stehekin Lodge. The National Park Service regulates commercial operations conducted on federal property within Lake Chelan NRA. There are also several special use permits and commercial use licenses, which allow certain commercial activities.

The North Cascades Stehekin Lodge operates under a contract with the National Park Service. The North Cascades Lodge Company provides lodging, a restaurant, a general store, marina activities, bus transportation, fuel, and bicycle rentals. This is a large share of the Stehekin economy, mostly located at or centered around the Stehekin Landing. In addition, two small operations, a craft shop, and a backcountry equipment store operate under concession permits. There are also eight commercial use licenses and 34 special use permits/rights-of-way issued by the National Park Service.

Downlake Businesses (Chelan)

Lake Chelan Boat Company and Chelan Airways are located in Chelan. In addition, Safeway Stores, Inc., provides grocery delivery service to the Lake Chelan Boat Company passenger runs. Visitors to Stehekin who depart from Chelan may stay in a motel or resort lodge room there. Persons driving from outside Chelan County use local service stations for purchases of fuel, minor service and repairs for vehicles, and sundries. Likewise out-of-county tourists purchase food and drink in restaurants, delicatessens, fast food outlets, food markets, and convenience stores. In addition, purchases of camping and related outdoor supplies, and of local recreational services are also made by out of county visitors. Many Stehekin visitors use private boats that require purchases of gasoline and other supplies and services in Chelan. Finally, private airplane travel to Stehekin may originate from Chelan Municipal Airport or other airfields in the county, thereby requiring purchases of fuel and other supplies and services from fixed-base operators at such locations.

Visitor Expenditures

Table 21 provides a breakdown of estimates of visitor expenditures for the national recreation area for 1992. Expenditures are categorized as from Stehekin Valley day and overnight visitors, and those occurring downlake, primarily in the town of Chelan. Visitors from outside Chelan County are estimated at 25,872. These (almost entirely) nonlocal visitors are estimated to generate expenditures for commercial transportation in the first section, for lodging in the second section, for food and drink, shopping, entertainment, automobile repair and services, private boat, and private aircraft in subsequent sections of the table. It is likely that some of the downlake expenditures would have been made by visitors taking trips to the uplake area even if the national recreation area did not exist. Nonetheless, the visitor expenditures estimated for the downlake area are considered to be associated directly with visitor activity in the national recreation area.

Total visitor expenditures are estimated to be $1.75 million for Stehekin and $3.91 million for Chelan for a grand total of $5.67 million.

Visitor-Related Economic Activity

Table 22 is based on visitor purchases totaled for each of the sections in table 21 and presented as the second column of figures. The corresponding IMPLAN (U.S. Forest Service Micro IMPLAN Version 91-08, 1985)

industrial sectors are detailed in the left hand column. NPS purchases are given in the first column of figures with small amounts for construction materials and services and for repairs. (Construction expenditures that took place in previous years are not reflected in the analysis.) It is assumed that all federal government expenditures are made in Chelan County. The major direct expenditure is for personnel, which is from federal employment. Total federal purchases add about $1.0 million for a grand total of about $6.7 million.

Employment, Earnings, and Output

Table 23 indicates full-time equivalent (FTE) direct employment and associated earnings for the workforce associated with the visitor-related expenditures of visitors to Lake Chelan NRA and the National Park Service shown in table 22. These are given by the same sectors as table 22 and were derived from IMPLAN direct multipliers.

Direct employment totals about 221 FTE workers of which about 22 are federal government and about 200 are private sector workers. Earnings of these workers total about $2.4 million for an average of about $10,715. Federal government earnings average $27,086, considerably above those for the private sector.

A substantial share (possibly one quarter) of NPS and North Cascades Lodge concession workers at Stehekin are area residents. Several of the workers at the North Cascades Stehekin Lodge are residents of Stehekin; some are children of NPS employees. A few NPS workers, including former USFS employees, obtained employment while residents of Stehekin.

Table 24 gives IMPLAN multipliers for employment, earnings, and output. These multipliers link direct expenditures, employment, and earnings given in tables 22 and 23, respectively, to gross or total employment, earnings, and output (expenditures) provided in table 25.

The multipliers embody estimates of the additional indirect and induced effects beyond the direct effects due to re-spending of expenditures and earnings by recipients. For example, in the case of construction activity in the national recreation area, where direct employment is estimated at 1.1 FTEs (as shown in table 23), applying the construction industry multiplier (shown to be 1.259 in table 24) results in total employment for that industry of 1.4 FTEs (as shown in table 25).

Table 25 provides the "bottom line" figures for employment, earnings, and output including direct, indirect, and induced effects. Total employment of about 286 workers and earnings of about $3.25 million are associated with expenditures (output) of about $10.6 million related to Lake Chelan/Stehekin Valley tourism and NPS operations in Chelan County in 1992. These again are distributed by sectors in the table as in earlier tables.

FIGURE 12

Mode of Transportation Used by Visitors Arriving at Stehekin 1969-1992

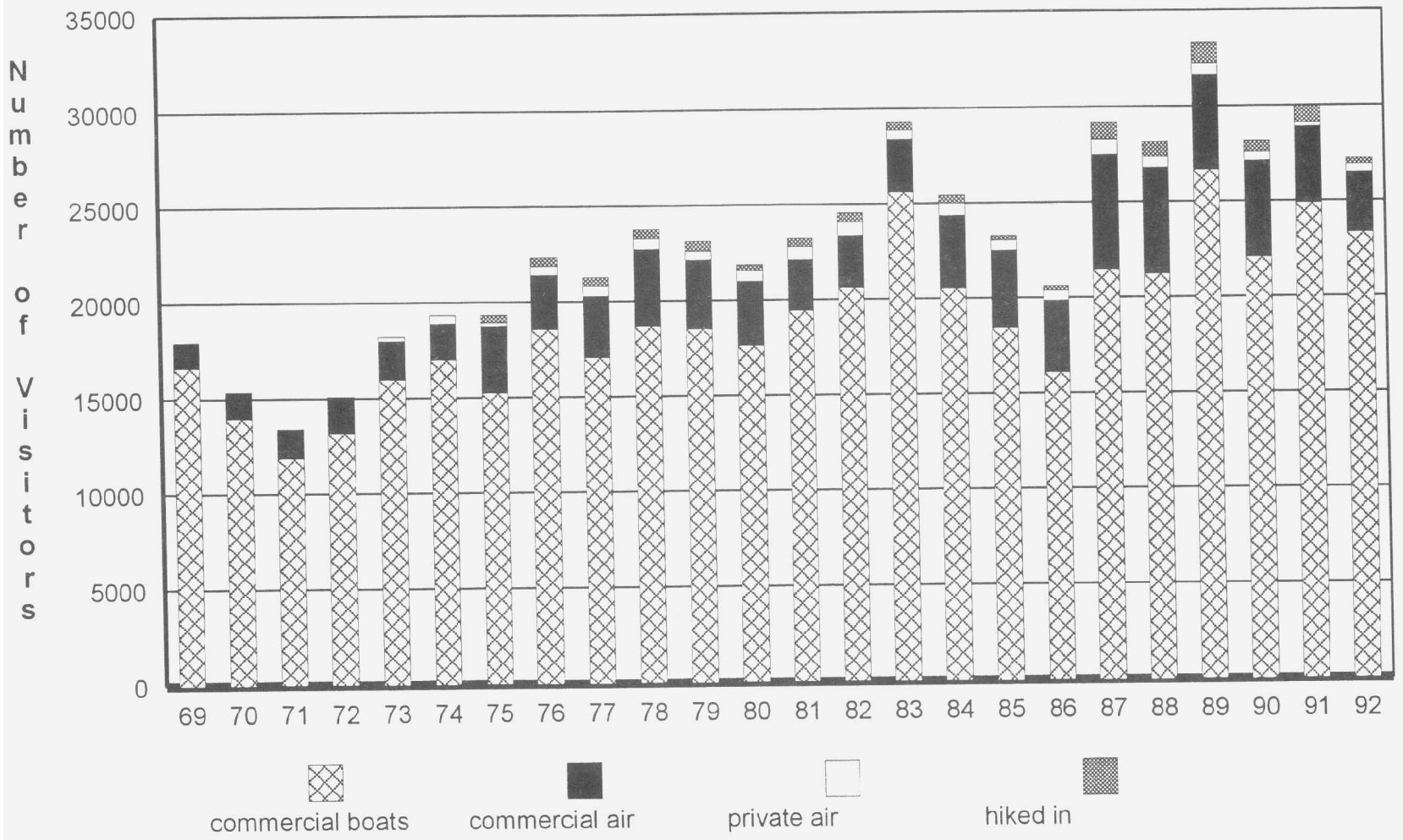


TABLE 18: ARRIVING VISITORS AT STEHEKIN BY MONTH, 1990-1992

Month	Visitor Arrivals*	Arrivals by Comm. Boat**	Arrivals by Comm. Air	Arrivals by Private Air	Hiked In
1990					
January	301	143	158	**0**	**0**
February	264	148	116	**0**	**0**
March	414	273	125	**0**	**16**
April	979	717	217	**12**	**33**
May	2,211	1,793	**342**	**18**	**58**
June	3,942	3,158	693	**57**	**34**
July	5,135	3,981	818	**111**	**225**
August	6,530	5,134	1,052	204	**140**
September	5,411	4,533	797	**45**	**36**
October	2,044	1,519	492	**18**	**15**
November	604	378	226	**0**	**0**
December	336	284	52	**0**	**0**
Total	**28,171**	**22,061**	**5,088**	**465**	**557**
1991					
January	240	165	**75**	**0**	**0**
February	204	177	**25**	**0**	**2**
March	**319**	265	**54**	**0**	**0**
April	984	856	125	**0**	**0**
May	2,110	1,746	332	**7**	**251**
June	3,830	3,317	393	30	**90**
July	6,352	5,206	886	**35**	225
August	6,967	6,006	606	**52**	310
September	5,453	4,693	597	43	120
October	2,310	1,673	541	**16**	**80**
November	682	462	200	**5**	**15**
December	514	334	180	**0**	**0**
Total	**29,974**	**24,902**	**4,014**	**191**	**1,093**
1992					
January	340	180	110	**0**	50
February	351	181	**95**	**0**	75
March	721	433	**195**	**18**	75
April	1,012	831	172	**9**	0
May	2,595	2,258	303	24	10
June	3,719	3,283	373	48	15
July	3,764	3,233	437	66	**28**
August	6,443	5,723	594	102	**24**
September	5,527	4,879	522	105	21
October	1,890	1,598	233	**45**	14
November	557	466	**91**	**0**	0
December	315	297	**18**	**0**	0
Total	**27,234**	**23,362**	**3,143**	**417**	**312**

* Total visitor arrivals are enumerated from passenger/visitor counts by transportation mode.
** Reliable information on passenger arrivals by private boat is not available.
SOURCE: National Park Service, North Cascades National Park Service Complex, Visitor Statistics: 1969-1991, tabulated March 2, 1992; National Park Service, Monthly Public Use Reports, 1990, 1991, and 1992.

TABLE **19: VISITOR USE AT STEHEKIN, 1969-1992**

Year	Total Visitors	No. Cascade Lodge*	Overnight Stays NPS Campground	NPS Backcountry	NPS Misc.**
1969***	18,735	4,546	0	**0**	0
1970	17,668	2,396	0	0	0
1971	12,222	869	2,365	1,370	801
1972	14,034	848	2,710	3,304	90
1973	20,019	3,535	4,377	4,311	892
1974	31,867	4,545	8,131	5,341	1,046
1975	23,851	5,910	5,215	3,822	266
1976	33,009	4,850	2,919	3,162	636
1977	31,132	4,061	3,408	3,596	900
1978	34,939	4,611	4,732	2,896	**939**
1979	32,483	5,411	5.323	3,630	717
1980	26,266	4,858	3,265	3,004	2,647
1981	29,809	5,364	5,036	2,708	2,462
1982	33,310	5,196	6,511	2,000	1,990
1983	40,178	6,534	3,401	2,536	1,754
1984	40,611	7,950	4,155	1,915	2,499
1985	36,347	7,179	3,068	1.920	2,927
1986	28,132	5,675	2,963	2,522	1,872
1987	40,871	5,430	7,357	1,553	40
1988	38,057	5,651	5,843	1,879	0
1989	45,454	7,562	7,428	2,085	0
1990	49,682	7,162	9,347	1,528	0
1991#	58,089	7,604	1,469	4,351	76
1992	44,446	7,184	0	5,671	7,679

* During 1969 and 1970 overnight stays were in private accommodations.

** Includes overnight stays at RV boats and group camp.

*** July through December counts.

Overnight stays at NPS campgrounds and backcountry appear to be incorrectly tabulated (in the raw data) for 1991.

SOURCE: National Park Service, North Cascades National Park Service Complex,
Visitor Statistics: 1969-1991, tabulated March 2, 1992.

TABLE 20: VISITOR ACTIVITY COUNTS BY MONTH, 1990 AND 1991

Month	Visitor Arrivals	Recreation Overnight Stays: North Cascade Lodge	Recreation Overnight Stays: Other NPS Facilities*
1990			
January	301	1 **13**	0
February	264	21	0
March	414	57	19
April	979	391	34
May	2,211	813	**247**
June	3,942	1,890	879
July	5,135	2,041	3,192
August	6,530	1,295	3,667
September	5,411	477	2,570
October	2,044	**95**	245
November	604	68	8
December	336		0
		7,162	
Total	**28,171**		**10,861**
1991			
January	240	0	0
February	204	0	
March	319	**0**	3
April	984	26	
May	2,110	371	5
June	3,830	1,222	**46**
July	6,352	1,895	**110**
August	6,976	2,153	331
September	5,453	1,451	1,258
October	2,310	427	2,893
November	682	46	1,006
December	514	**13**	238
			17
Total	**29,974**	**7,604**	5
			5,858

* Includes campgrounds and group camp accommodations.
SOURCE: National Park Service, North Cascades National Park Service Complex, Visitor Statistics: 1969 and 1991, tabulated March 2, 1992; National Park Service, Monthly Public Use Reports, 1990/1991.

TABLE 21: VISITOR EXPENDITURES, 1992
LAKE CHELAN NATIONAL RECREATION AREA

	Total Stehekin Valley	Stehekin Day Visitors	Stehekin Overnight Visitors	Chelan (Downlake)	Total
Adjusted arrivals (a)	27,234				27,234
Commercial boat passengers	23,362				23,362
Commercial air passengers Private	3,143				3,143
boat passengers	NA				NA
Private airplane passengers Hiked	417				417
in	312				312
	Subtotal	43,550			43,550
Tourism-related visitors (b)	25,872				25,872
Commercial Transportation					
Boat					
Passengers				23,362	23,362
Expenditures (c)				$609,748	$609,748
Air					
Passengers				3,143	3,143
Expenditures (d)				$257,569	$257,569
Local shuttle (NPS)					7,708
One-way trips (1991data)	7,708				$23,124
Expenditures (e)	$23,124				
Local tour (concession)	7,750				7,750
Passengers (1991 data)	$25,725				$25,725
Expenditures (f)					
Parking					
Lot days				13,253	13,253
Fee				$4.50	
Expenditures (g)				$44,727	$44,727
Private Transportation					
Automobile					
Vehicle miles (h)				2,496,76	2,496.760
Cost/mile				$0.08	
Expenditure				$187,25	$187,257
Private airplane					
Operating hours (i)				278	278
Cost/hour				$20.00	
Expenditure				$5,560	$5,560

TABLE 21 (CONT.)

	Total Stehekin Valley	Stehekin Day Visitors	Stehekin Overnight Visitors	Chelan (Downlake)	Total
Lodging					
North Cascades Lodge					
Overnight stays	7,148		7,148		. 7,148
Room nights (j)	3,592		3,592		3,952
Rate (k)	$60.00		$60.00		$60.00
Expenditure	$215,520		$215,520		$215,520
Other Lodging					
Overnight stays (1)	6,630		6,630	12,936	19,567
Pillows/room nights (m)	6,630		6,630	6,468	13,098
Rate			$29.31	$75.00	
Expenditure	$194,336		$29.31	$485,106	$679,443
NPS Campgrounds					
Overnight stays	5,671		5,671		**5,671**
Permit fee			$5.00		
Expenditure	$28,355		$28,355		$28,355
Other Expenses					
Food and Drink					
Person days	25,872	12,058	13,814	25,872	25,872
Per diem		$5.00	$20.00	$20.00	
Expenditure	$573,938	$90,434	$438,504	$905,531	$1,479,469
Shopping (camping supplies, etc.)					
Person days	25,872	12,058	13,814	25,872	25,872
Per diem		$5.00	$20.00	$20.00	
Expenditure	$267,506	$60,289	$207,216	$905,531	$1,173,036
Entertainment					
(biking/rafting/riding)					
Person days	44,387	30,147	13,814	25,872	25,872
Per diem		$5.00	$20.00	$20.00	
Expenditure	$427,023	$150,735	$276,288	$517,446	$944,469
Total Expenditures	**$1,755,528**	**$301,459**	**$1,405,220**	$3,918,474	**$5,674,002**

(a) The adjusted counts are used for assessing expenditure activity (excludes private boat arrivals).

(b) Tourism-related visitors are assumed to require commercial lodging or campground facilities.

(c) Based on 70% using *Lady of the Lake II* at an average round-trip cost of $21.00 and 30% using the "fast boat" *Lady Express at an average round-trip cost of $38.00.*

(d) Based on round-trip rate of $80.00 for passengers traveling between Chelan and Stehekin. Also, it assumes that 3% of the visitors take a flight-seeing tour at an average cost of $65.00.

(e) Based on $3.00 per one-way trip.

(f) Based on $3.50 per person for the Rainbow Falls tour and total passengers estimated at 7,350.

(g) Based on two persons per auto and *75%* of Chelan Boat Co. and Chelan Airways passengers using paid parking.

(h) Based on 2-person automobile occupancy and 75% of recreation-related visitors using automobiles with average round-trip travel in Chelan Co. of 150 miles and local purchases of $0,075 per mile (or half of average per mile operating cost).

(i) Based on 3-person private airplane occupancy, 2-hour operating time, and $20.00 per hour operating cost.

(j) Based on two persons per room occupancy on average.

(k) Represents the mid-range of prices for available units.

(1) Based on 74% occupancy during the 112-day period (6/15-10/7), 59.2 pillows used on average, and $29.31 per person per night.

(m) Based on two persons per room occupancy on average for accommodations downlake.

SOURCE: 1992 NPS Monthly Public Use Reports; Lake Chelan National Recreation Area Baseline Socioeconomic Inventory, August 1992.

TABLE 22: ECONOMIC ACTIVITY BY INDUSTRY SECTOR (IMPLAN), 1992 (VISITOR RELATED) - LAKE CHELAN NATIONAL RECREATION AREA

Industry Sector	NPS (a) Purchases		Visitor (b) Purchases
Construction sand and gravel	$ 61,800		
Industrial and commercial construction	28,119		
Maintenance and repair other facilities	135,650		
Local passenger transportation Water			$ 48,849
transportation Air transportation			609,748
Hotels and lodging places Eating and			257,569
drinking places Automobile repair and			894,963
services Recreation-related retail trade			1,479,469
Amusement and recreation services			231,984
Government-federal			1,178,596
			944,469
Total	815,454		28,355
Total NPS and Visitor Purchases	**$1,041,023**		**$5,674,002**
		$6,715,025	

(a) Based on NPS information regarding operating costs, including interpretive program amounts, and special project amounts for general maintenance and road repair.
(b) Based on visitor expenditures as indicated in table **21.**

TABLE 23: DIRECT EMPLOYMENT AND EARNINGS BY INDUSTRY SECTOR (IMPLAN), 1992 (VISITOR RELATED) - LAKE CHELAN NATIONAL RECREATION AREA

Industry Sector	FTE Employment	Earnings
Construction sand and gravel	**1.1**	$ 22,773
Industrial and commercial construction	**0.3**	7,117
Maintenance and repair other facilities	**1.6**	32,732
Local passenger transportation Water	**0»**	19,681
transportation Air transportation		129,876
Hotels and lodging places Eating and	3.3	81,366
drinking places Automobile repair and	40.0	325,050
services Recreation-related retail trade	46.7	315,571
Amusement and recreation services	3.0	45,098
Government-federal (a)	37.4	410,976
	64.8	440,123
Total	22.3	604,040
	221.4	**$2,434,404**

(a) Federal (i.e., NPS) employment is derived from NPS data on permanent and temporary employees in 1991.
SOURCE: Employment and Payrolls in Washington State by County and Industry, Second Quarter 1992, Washington State Employment Security (Chelan County data).

TABLE 24: TOTAL EMPLOYMENT, EARNINGS, AND OUTPUT MULTIPLIERS (IMPLAN) FOR CHELAN COUNTY

Industry Sector	Employment	Earnings	Output
Construction sand and gravel	1.259	1.1696	1.3446
Industrial and commercial construction	1.2774	1.2963	1.3325
Maintenance and repair other facilities	1.2454	1.253	1.299
Local transportation services Water	1.308	1.2512	1.4595
transportation Air transportation	2.1461	1.7806	1.6998
Hotels and lodging places Eating and	1.4024	1.1795	1.2597
drinking places Automobile repair and	1.2137	1.2889	1.5824
services Recreation-related retail trade	1.2079	1.4332	1.5145
Amusement and recreation services	1.3437	1.4564	1.377
Government-federal	1.2336	1.2984	1.5936
	1.1527	1.2923	1.8975
	1.5261	1.2999	1.4547

SOURCE: U.S. Forest Service, IMPLAN, 1985 version.

TABLE 25: TOTAL EMPLOYMENT, EARNINGS, AND OUTPUT - 1992 CHELAN COUNTY (VISITOR RELATED)

Industry Sector	Employment	Earnings	Output
Construction sand and gravel	1.4	$ 26.636	$ 83.096
Industrial and commercial construction	0.4	9,226	37,469
Maintenance and repair other facilities	2.0	41,014	176,209
Local transportation services Water	1.2	24,625	71,295
transportation Air transportation	12.6	231,258	1,036,450
Hotels and lodging places Eating and	4.6	95,971	324,459
drinking places Automobile repair and	48.5	418,958	1,416,189
services Recreation-related retail trade	56.5	425,276	2,240,655
Amusement and recreation services	4.0	65,680	319,442
Government-federal	46.1	533,612	1,878,211
	74.7	568,770	1,792,130
Total	34.0	785,192	1,259,021
	86.0	$3,253,217	**$10,634,626**

SOURCE: U.S. Forest Service, IMPLAN, 1985 version.

PUBLIC SERVICES

Public services and finance data for 1991 and 1992 are provided for several affected local government entities in Chelan County. Most information is in regard to Chelan County government since Stehekin is located in unincorporated Chelan County. The Chelan County government and the Chelan County road fund are included separately. Stehekin School District No. 69, Chelan County Public Utility District, Chelan-Douglas County Health District, and National Park Service provision of public services are also considered.

Chelan County Government

Table 26 provides historical revenues by source for fiscal years 1991 and 1992 as indicated in county budget documents, both in current dollars. Revenues are dominated by local sources, especially local options sales and use tax revenues and general property tax revenues. Other major local sources include nontaxes such as licenses, fines, and other governmental charges. State sources, dominated by the PUD privilege tax, also include several other grant and subvention sources. Federal and other intergovernmental sources are relatively modest. Overall, total available revenue of $235.34 per capita in 1992 was about a 2% increase from 1991, which is slightly below inflation of about 3%. Local sources expanded by somewhat more than this rate, but this was offset by drawdown of beginning fund balance. Local sources accounted for about two-thirds of total available revenue in 1992.

Table 27 gives figures for 1991 and 1992 for several categories and subcategories of governmental services, again in current dollars as budgeted. General governmental services include commissioners, assessor, auditor, treasurer, and facilities as well as others. Judicial services consist of superior court, district court, prosecutor, clerk, juvenile services, and coroner. Planning and environment include planning and building/fire safety. Law enforcement consists of the sheriff. A few other small activities are included under community and educational. Per capita expenditure of $238.86 in 1992 was a negligible decline from that in 1991. Of the major expenditure categories, general government, judicial, and law enforcement, the only increase was in judicial.

Table 28 provides revenues by source and expenditures by function for the Chelan County road fund, again for fiscal 1991 and 1992 as budgeted. This table also includes demographic, assessed valuation, and general property tax levy rates and total collections for those years. The road fund includes major revenues from the property tax and motor fuel and vehicle taxes. The 1992 figure of $126.70 per capita is about 5/6 of the previous year. This mostly reflects a decline in federal forest yield revenues and one in beginning fund balance. Expenditures on road construction and road maintenance and administration are the major items followed by traffic and pedestrian services and others. A similar decline in expenditures for 1992 as that for revenues is noted in the table.

Tables 29, 30, and 31 include translation of base year (1992) figures for Chelan County into Stehekin base year flows for general fund revenues, general fund expenditures, and road fund revenues and expenditures, respectively. This is done by adjustments to overall county per capita figures in most, but not all, cases. The tables indicate, in the final column, the rationale for calculation. For instance, the sales and use tax is based on 50% of per capita for Chelan County plus 90% of visitor expenditures times the adjusted local option rate, which is given as 0.0084. The general property tax revenues are estimated directly from Stehekin assessed valuation and the county general levy rate. Planning fees and costs, sheriff costs, and PUD privilege tax revenues are estimated from direct information as noted in the tables for the general fund. Similarly, the

road fund property tax, motor fuel/vehicle taxes, and state rural arterial grant revenues were directly estimated. Note the 0.25, 0.50, 0.75, and 1.0 per capita shares given in the final columns of these three tables. The 0.75 figure reflects isolation of Stehekin; the 0.5 figure indicates a reduced direct effect and indirect effect. The 0.25 rate signifies an indirect effect only. Finally, table 30 includes demographic, assessed valuation, and levy rate information corresponding to the base year, 1992. Stehekin is shown to generate positive fiscal balances in both the general fund and the road fund under baseline conditions.

Stehekin School District No. 69

Stehekin School District No. 69 has had a student enrollment of 17 and 23 in years 1991/92 and 1992/93 respectively. The average school enrollment population share is approximately 20% of the average population of Stehekin (about 100 persons).

The base year figures for school revenues and expenditures are found in table 32. The primary source of school funding is from state apportionment. Instruction is the major expenditure. Expenditures per pupil amount to $7,728 in the base year.

Chelan-Douglas Health District

The Chelan-Douglas Health District operates on a fee for service basis. Normally inspections of private sector eating establishments are done once a month from April through September in Stehekin. NPS inspects the North Cascades Stehekin Lodge. The district also inspects sewer/water facility developments as it has jurisdiction over such environmental regulations. These are mostly done independently of restaurant inspections. The costs of full day inspection trips include $0.28 per mile for 76 mile driving from Wenatchee to Stehekin, and back, $80 for round-trip air between Chelan and Stehekin, and $0.28 per mile for 20 miles at Stehekin, and $58.90 per hour for labor which includes all overhead (office, file maintenance, court activity, miscellaneous supplies and services, etc.).

Chelan County Public Utility District No. 1

The Chelan County Public Utility District No. 1 operates the Stehekin power system. The Stehekin system is isolated electrically from the Chelan County PUD power grid, which serves all other areas in Chelan County. Generation of electricity is provided by a combination of small hydro and diesel generation. The 200 kW hydro plant carries the base load. Diesel generation is used for peaking. Peak demand is about 350 kW in summer. The hydro plant provides about 80% of the annual energy generation of about 1.1 million kWh. According to the Chelan County PUD the average cost of providing energy from diesel-powered generators is about 15 cents per Kwh. Hydro power is much cheaper. Chelan County PUD ships diesel to Stehekin by barge and stores adequate reserves in underground tanks adjacent to their generation facility.

The utility indicates that the Stehekin system is a chronic deficit operation. Operating expenses over the past 10 years averaged about $126,000 not including cost share allocations for utility overhead, debt, or depreciation. After a rate increase in January 1990, operating revenues at Stehekin increased from about $50,000 to about $83,000 and the operating deficit for 1989 of about $52,000 was changed in 1990 to an operating surplus of about $5,000. However, even a small increase in revenues to about $85,000 in 1991 was insufficient to offset higher operating expenses in that year. The operating deficit in 1991 was about $29,000.

A study for the National Park Service entitled "Stehekin Energy Study & Strategy Recommendations," (conducted by Mark Longmeier, Northwest Energy Services, Spokane, WA, October 1992) indicates that the average sale price of energy is 8 cents

per kWh. Thus the marginal cost of higher peak use requires additional diesel powered generation costing about 7 cents above average revenue per kWh.

Power costs are definitely a limiting factor in Stehekin development or redevelopment. Since the utility can easily adjust the rate structure to more fully capture the full costs of Stehekin operations, the increased demand for energy in Stehekin must be coordinated with the utility in order to determine the incidence of the impacts of increased costs of power generation to accommodate load growth.

National Park Service

As part of the NPS mission in Stehekin a number of services are provided. Some of these are public services that are provided for the benefit of NPS workers, visitors, and permanent and seasonal residents. These include sewerage collection and treatment in the vicinity of NPS headquarters, road repair, mail delivery, garbage compacting and removal, and maintenance of emergency medical service and rescue boat capabilities. Facilities and services are maintained by the National Park Service that have benefits for the entire community including shuttle bus service (which has partly been turned over to private providers in the lower Stehekin Valley), parking, laundry and shower at the North Cascades Stehekin Lodge, public restrooms, marina services, trail maintenance, communications including a public telephone located at the ranger station, apple orchard care at the Buckner orchard, the community center, and other NPS-maintained public facilities. In addition, the National Park Service provides administrative services, including review and enforcement of state and local land use and environmental regulations.

In detailing the services provided by the National Park Service that benefit local residents, it is also important to note that the local community provides services that support the NPS mission. For example, the local community provides a labor pool; some of the residents have construction capabilities when needed routinely or in emergencies. Members of the community provide assistance to visitors; information about the trail system is contained in the *Stehekin Guidebook*. Help is given with EMS and interpretation by members of the community. Of course Stehekin School District No. 69 provides education services to the children of NPS personnel. The Stehekin School is the focus of community events, as such, it serves a social function which benefits all members of the community.

The National Park Service has provided information (letter communication, September 15, 1993) on costs for provision of some of these services for which records are available. Solid waste removal and compaction costs were $43,530 in FY 1992. Also the Stehekin District participates in a recycling program but costs are not recorded separately. A two-year contract for hazardous materials disposal begun in FY 1992 required funds of $13,000 for both years. Road maintenance expenditures totaled $102,446 in FY 1992. Bridge maintenance for FY 1992 came to $26,727, while trails maintenance was estimated to require expenditures of $234,367. A sewage pumpout station at the marina was purchased for $66,000 in FY 1992. Utility costs included $625 for propane and $3,881 for electric power for laundry/shower, community building, and warming hut. The National Park Service provides about $15,000 per annum for tree maintenance at the Buckner orchard. Local residents harvest most of the apples. While these items represent costs in support of the NPS mission, they provide substantial support to the local community and would probably vary considerable with different visitor use and development levels.

TABLE 26: CHELAN COUNTY GOVERNMENT HISTORICAL REVENUE
(Current Dollars)

Revenue by Source* 1991 and 1992	FY 1991 Budget	FY1992 Budget
Local Source		
Sales and Use Tax	$2,035,200	$2,150,000
General Property Tax	3,318,320	3,617,419
Leasehold Excise Tax	6,000	6,000
Private Forest Yield Tax	5,000	5,000
Business Taxes	15,000	25,000
Delinquent Tax and Penalties	260,000	270,000
Charges for Services		
General Government	409,825	613,485
Security of Persons and Property	19,900	26,370
Planning Fee and Charges	140,600	203,700
Other	89,000	93,594
Fines and Forfeits Licenses,	745,600	905,600
Permits, and Fees	202,400	294,900
Miscellaneous Revenue	313,045	339,530
Subtotal	$7,559,890	$8,550,598
Per Capita	$142.10	$156.60
State Source	$211,764	$182,093
State grants		
1990 Growth Management Act	213,500	246,000
Motor Vehicle License Fee	220,000	114,498
Liquor Excise Fee	19,000	20,500
Liquor Board Profit	45,000	50,200
PUD Privilege Tax	875,000	1,075,000
State Prosecuting Attorney	74,344	107,846
Other State	55,000	66,000
Subtotal	$1,713,608	$1,862,137
Per Capita	$32.21	$34.11
Federal Source	$436,490	$428,392
Direct and Indirect Grants		
USFS Law Enforcement Reimbursement	67 ,500	67,500
Subtotal	$503,990	$495,892
Per Capita	$9.47	$9.08
Other Intergovernmental Per Capita	$377,236	$699,883
	$7.09	$12.82
Total Revenue by Source	$10,154,724	$11,608,510
Beginning Fund Balance	1,573,411	873,766
Interest Earnings	569,000	367,300
Total Available Revenue	$2,297,135	$12,849,576
Per Capita	$231.15	$235.34

* Includes Current Expense Funds only.

TABLE 27: CHELAN COUNTY GOVERNMENT HISTORICAL EXPENDITURE
(CURRENT DOLLARS)

Expenditures by Function 1991 and 1992	FY 1991 Budget	FY1992 Budget
General Government Services		
County Commissioners	$286,109	$280,448
Assessor	767,717	752,526
Auditor/Election/State Exam	712,264	753,148
Treasurer	401,105	395,919
Employee & Adm Services/Civil Service	10,335	11,920
Board of Equalization/Boundary Review Board	9,262	9,697
Facilities	880,757	778,513
Nondepartmental	885,135	942,304
Subtotal	$3,952,684	$3,924,475
Per Capita	$74.30	$71.88
Judicial		
Superior Court	$483,516	$483,837
District Court	661,272	731,580
Prosecuting Attorney	1,005,276	1,063,507
Clerk	338,302	418,518
Juvenile Services	1,266,304	1,408,556
Coroner	72,183	78,142
Subtotal	$3,875,853	$4,184,140
Per Capita	$72.87	$76.63
Planning and Environment		
Planning	$536,412	$514,291
Building and Fire Safety	237,337	261,262
Subtotal	$773,749	$775,553
Per Capita	$14.54	$14.20
Law Enforcement		
Sheriff	$3,559,961	$3,551,909
Per Capita	$66.92	$65.05
Community and Educational		
Parks	$156,504	$160,489
Extension Service/Horticulture	217,744	229,801
Fair	206,627	214,929
Noxious Weed Control	59,653	27,013
Subtotal	$580,875	$605,219
Per Capita	$10.92	$11.08
Total Operating Expenditures	$12,744,122	$13,041,296
Per Capita	$239.55	$238.85

TABLE 28: CHELAN COUNTY ROAD FUND HISTORICAL REVENUE AND EXPENDITURES (CURRENT DOLLARS)

	FY 1991 Budget	FY1992 Budget
Revenue by Source - 1991 and 1992		
Consolidated Road Prop Tax	$2.348.056	$2.538.056
Motor Vehicle and Fuel Tax	1,388,393	1,414,000
State Rural Arterial/Capa	742,000	192,000
Federal Forest Yield	1,330,000	900,000
Other Federal	50,000	41,000
Other Intergovernmental/Private	178,000	41,000
Miscellaneous	12,500	24,800
Beginning Fund Balance	2,000,730	1,637,897
Interest	0	20,000
Total Revenue	$8,049,679	$6,917,753
Per Capita	$151.31	$126.70
Expenditure by Functions - 1991 and 1992*		
Road Construction	$4,722.973	3,120.002
Road Maintenance and Administration	2,127,264	2,321,370
Extraordinary Operations	80,100	243,664
Storm Damage	147,480	157,815
Traffic and Pedestrian Services	979,835	1,074,902
Total Expenditures	$8,057,652	$6,917,753
Per Capita	$151.46	$126.70
County Population	53,200	54,600
Unincorporated Population	23,398	24,058
Co-assessed Valuation ($ in thous) - 1990-91	$2,007,094	$2,095,751
Uninc-assessed Valuation ($ in thous) - 1990-91	$1,072,568	$1,140,743
Stehekin School District ($ in thous) - 1990-91	$3,951	$3,824
General Levies for 1992 Collection Road District (uninc only)	2.2500	2.2500
State School	3.8259	3.4632
County Gen.	1.6999	1.7625
Regional Library	0.5000	0.5000
Stehekin School District	0.0000	0.0000
Total County Tax Collections**	$29,890,840	$31,717,845
Average Levy	14.8926	15.1344

* Includes County Roads Fund only.
** Includes local and state schools, county, cities and towns, road district, fire districts, regional library, port districts, Manson Park and Recreation, and cemetery districts.

TABLE 29: STEHEKIN IMPACTS - COUNTY GENERAL FUND (CURRENT DOLLARS)

Revenue by Source* 1992	FY1992 County $ Per Capita	Stehekin Base-Year Flows		Rationale
Local Source				
Sales and Use Tax	39.38	$15,241		per capita 0.5+0.9 of visitor spending x 0.0084
General Property Tax	66.25	$6,740		AV x County general levy
Leasehold Excise Tax	0.11	2		per capita x .025
Private Forest Yield Tax	0.09	0		resource based
Business Taxes	0.46	23		per capita x 0.5
Delinquent Tax and Penalties	4.95	247		per capita x 0.5
Charges for Services				
General Government	11.24	843		per capita x 0.75 per
Security of Persons and Property	0.48	12		capita x 0.25 1/3 of
Planning Fee & Charges	3.73	1,998		cost, based on Planning Dept. info
Other			**1.71**	per capita x 0.75 per
Fines and Forfeits			16.59	capita x 0.5 per
Licenses, Permits, and Fees			5.40	capita x 0.5 per
Miscellaneous Revenue			6.22	capita x 0.5
Subtotal	156.60		$26,800	
Per Capita	0.00		$263.06	
State Source				
State Grants	3.34	$334		per capita x 1.0
1990 Growth Mgmt Act	4.51	451		per capita x 1.0
Motor Vehicle License **Fee**	2.10	210		per capita x 1.0
Liquor Excise Fee	0.38	38		per capita x 1.0
Liquor Board Profit	0.92	92		per capita x 1.0
PUD Privilege Tax	16.69	1,819		2.14% of gross rev. ($85K)
State Prosecuting Attorney	1.98	198		per capita x 1.0
Other state	1.21	121		per capita x 1.0
Subtotal	34.11	$3,261		
Per Capita	0.00	$32.61		
Federal Source				
Direct and Indirect Grants			7.85	per capita x 1.0
USFS Law Enforcement Reimb			1.24	per capita x 1.0
Subtotal	9.08		$908	
Per Capita	0.00		$9.08	
Other Intergovernmental	12.82	$320		per capita x 0.25
Per Capita	0.00	$3.20		
Total Revenue by Source	212.61	$31,289		
Beginning Fund Balance	16.00	n/a		
Interest earnings	6.73	990		ratio of int. to tot. revenue
Total Available Revenue	235.34	$32,279		
Per Capita	0.00	$322.79		

* Includes Current Expense Funds only.

TABLE 30: STEHEKIN IMPACTS - COUNTY GENERAL FUND
(CURRENT DOLLARS)

Expenditures by Function 1992		FY1992 County $ Per Capita	Stehekin Base-Year Flows	Rationale
General Government Services				
County commissioners		5.14	$514	per capita x 1.0
Assessor		13.78	1,378	per capita x 1.0
Auditor/Election/State Exam		13.78	1,035	per capita x 1.0
Treasurer		7.25	544	per capita x 0.75
Employee and Admin Serv/Civil	Serv	0.22	16	per capita x 0.75
Board of Equalization/Bndry Rev	Bd	0.18	13	per capita x 0.75
Facilities		14.26	1,069	per capita x 0.75
Nondepartmental		17.26	1,294	per capita x 0.75
Subtotal		71.88	$5,864	
Per Capita		0.00	$58.64	
Judicial				
Superior Court		8.86	$443	per capita x 0.50
District Court		13.40	670	per capita x 0.50
Prosecuting Attorney		19.48	974	per capita x 0.50
Clerk		7.67	383	per capita x 0.50
Juvenile Services		25.80	1,290	per capita x 0.50
Coroner		1.43	143	per capita x 1.0
Subtotal		76.63	$3,903	
Per Capita		0.00	$39.03	
Planning and Environment				
Planning		9.42	$4,300	based on Ping. Dept. info
Building and Fire Safety		4.79	1,700	based on Ping. Dept. info
Subtotal		14.20	$6,000	
Per Capita		0.00	$60.00	
Law Enforcement				
Sheriff		65.05	$5,160	$160 car transport plus 1/2 deputy cost per Sheriff's
Per Capita		0.00	$51.60	Dept. info
Community and Educational				
Parks		2.94	$147	per capita x 0.50
Extension Service/Horticulture		4.21	210	per capita x 0.50
Fair		3.94	197	per capita x 0.50
Noxious weed control		0.49	25	per capita x 0.50
Subtotal		11.08	554	
Per Capita		0.00	$5.54	
Total Operating Expenditures		$238.85	$21,481	
Per Capita		0.00	$214.81	
Net Revenue/Expenditure Flow			$10,798	
Per Capita			$107.98	

TABLE 31: STEHEKIN IMPACTS - COUNTY ROAD FUNDS (CURRENT DOLLARS)

	FY1992 County $ Per Capita	Stehekin Base-Year Flows	Rationale
Revenue by Source - 1992			
Consolidated Road Prop Tax	46.48	$8,604	AV x County Road levy
Motor Vehicle and Fuel Tax	25.90	932	per capita x 0.36 - pop. share of redist. formula
State Rural Arterial/Capa	3.52	127	proportionate share of fuel tax revenues
Federal Forest Yield	16.48	0	resource based
Other Federal	2.75	69	per capita x 0.25
Other Intergovernmental/Private	0.75	19	per capita x 0.25
Miscellaneous	0.45	11	per capita x 0.25
Beginning Fund Balance	30.00	**n/a**	
Interest	0.37	n/a	
Total Revenue	126.70	$9,762	
Per Capita	0.00	$97.62	
Expenditures by Function			
1992			
Road Construction	57.14	$2,857	per capita xO.50
Road Maintenance and Administration	42.52	2,126	per capita xO.50
Extraordinary Operations	4.46	223	per capita xO.50
Storm Damage	2.89	145	per capita xO.50
Traffic and Pedestrian Services	19.69	984	per capita xO.50
Total Expenditures	126.70	$6,335	
Per Capita	0.00	$63.35	
Net Revenue/Expenditure Flow		$3,427	
Per Capita		$34.27	
Stehekin Population		100	
Unincorporated Population		100	
Co-assessed Valuation ($ in thous) -1990-91		$2,095,751	
Uninc-assessed Valuation ($ in thous) - 1990-91		n/a	
Stehekin School District ($ in thous) - 1990-91		$3,824	
General Levies for 1992 Collection			
Road District (uninc only)		2.2500	
State School		3.4632	
County gen.		1.7625	
Regional Library		0.5000	
Stehekin School District		0.0000	
Total Co Tax Collections*		$31,717,485	
Average Levy		15.1343	

* Includes local and state schools, county, cities and towns, road district, fire and hospital districts, regional library, port districts, Manson Park and Recreation, and cemetery districts.

TABLE 32: STEHEKIN SCHOOL DISTRICT NO. 69
BASELINE REVENUES AND EXPENDITURES
(15-YEAR FULL IMPLEMENTATION)

	Base-year (1992-93)
Revenue by Source	
Local Taxes	$0
Local Nontaxes	28,300
State General Purpose	276,274
State Special Purpose	0
Federal General Purpose*	1,700
Total Revenue	$306,274
Per Pupil	$13,316.26
Expenditures by Function	
Regular Instruction	$117,998
Support Services	59,753
Total Expenditures	$177,751
Per Pupil	$7,728.30
Net Revenue/Expenditure Flow	$128,525
Beginning Fund Balance	$618,000
Ending Fund Balance	$746,523
Data:	
Pupils	23

No federal P.L. 81-874 Impact Aid is provided to the district.

ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

The "Environmental Consequences" chapter describes the impacts associated with the proposed action and each of the other alternatives, including the impacts of their respective implementation plans. It is organized by "impact topics," which distill the issues and concerns raised in scoping into distinct topics for discussion. These topics focus the presentation of environmental impacts, and allow a standardized comparison between alternatives based on the most relevant topics. This chapter begins with a summary of the general methodology, describing the analysis approach used to determine impacts, and a discussion on the rationales used in selecting each of the impact topics.

SUMMARY OF THE GENERAL METHODOLOGY

Many of the impacts discussed in this chapter were determined using a complex process and set of assumptions called the general methodology. This methodology is summarized here and explained in detail in appendix D. It involves five main steps:

(1) construction of a geographic information system (GIS)
(2) identification of resources of concern
(3) determination of lands in the valley with resources to be considered for high priority protection
(4) creation of EIS analysis assumptions for land/resource protection
(5) creation of a data spreadsheet using information from these components

The GIS contains the raw information on where resources and other parameters are located in the valley. It is a map database in which information sets, or "themes," are entered into a computer. These information sets can then be manipulated within the computer or compared to each other. There are 26 themes (e.g., vegetation, floodplain) in the GIS (see appendix D).

Resources of concern are select, mappable resources considered for high priority protection. They form a core set of resource parameters that are potentially affected by action items in the different alternatives. There are five as follows: wetlands, 100-year floodplain, high flood influence area, riparian communities, and high visual sensitivity areas. The rationales for selecting these resources vary, but include the maintenance of natural ecosystem processes, the protection of ecosystem components, and the requirements of federal mandates. Refer to the following section, "Derivation of Impact Topics," for further discussion on these resources.

Lands that do not contain resources of concern may be suitable for additional development. In this document, they are also called "areas of low protection priority," because after initial examination, they do not appear to contain any of the identified resources of concern.

Analysis assumptions are necessary to assign priorities to land and resource protection. An EIS must disclose the environmental impacts that would result from implementing its alternatives. Some of these future impacts in the valley would stem from activities on private lands. In this park area, however, private property or interest in property (e.g., easements) may be purchased by the National Park Service only with the consent of the owner (unless a private land use is deemed incompatible with the purposes of the unit). Since it cannot be determined how many individual owners would actually be interested in selling property or interests in property in the future, a set of assumptions was established to estimate future protection priorities. These are based primarily on the size of the parcels, and whether or not resource concerns are located on individual

parcels. These assumptions vary by alternative and are explained in appendix D.

Based on the above information and assumptions, a data spreadsheet then tracks parameters for each of the 169 nonfederal parcels. This final step calculates resource acreages to be protected under each alternative. Its logic is presented in a column-by-column explanation in appendix D.

IMPACT TOPICS Derivation

of Impact Topics

To provide a focus for environmental discussions and to ensure that alternatives are compared on the basis of the most relevant topics, the impact topics presented below were selected. Their inclusion was based on federal laws, regulations, and orders; NPS *Management Policies;* NPS analysis of limited or easily affected resources; issues and concerns expressed during public scoping; and requirements of the 1991 consent decree (see appendix B). (See the "Consultation and Coordination" section for further discussion of scoping.) A brief rationale for including particular topics follows.

Stehekin River/Floodplain. This impact topic includes overall hydrologic/river processes, floodplain and high flood influence area concerns, and the issue of woody debris in the river channel. Numerous issues identified in public scoping involve river management alternatives. NPS *Management Policies* address the protection of natural ecological processes which include river processes. Executive Order 11988 ("Floodplain Management") requires an examination of impacts on floodplains, and of potential risk involved in allowing structures within floodplains. The 1991 consent decree addresses the need to examine impacts on river hydrology. (Also see appendix I for statement of findings on floodplains and wetlands.)

Wetlands. Executive Order 11990 ("Protection of Wetlands") requires an examination of impacts on wetlands, as well as alternatives to siting structures in wetland areas. Wetlands are critically important areas for the preservation of natural habitats and processes. This impact topic also incorporates the open water land cover class, which has been identified as an important wildlife habitat (NPS 1993c). (Also see appendix I for statement of findings on floodplains and wetlands.)

Riparian Communities. The riparian zone is ecologically important for many reasons. These include its high degree of community and species-level biodiversity, provision of habitat for at least 10 sensitive wildlife species, the maintenance of the overall hydrologic river process, and as a source of input for large woody debris (see the "Affected Environment" chapter for a discussion of these points). Additionally, the 1991 consent decree addresses the need to examine impacts on riparian vegetation.

Upland Communities. The National Environmental Policy Act calls for an examination of the impacts on all components of affected ecosystems. NPS policy is to protect the natural abundance and diversity of all of the park's naturally occurring communities. Upland communities also contribute to the community and species-level biodiversity of the Stehekin Valley (NPS 1993c). This impact topic addresses all nonriparian communities, including the active erosion/talus class which is important for reptile and amphibian species (NPS 1993c). The 1991 consent decree also addresses the need to generally examine impacts on plant and animal resources.

Native Fish. Fish are important components of the aquatic environment of the national recreation area. Several issues related to fish species were raised during scoping including exotic fish species in Lake Chelan, stocking of backcountry lakes, and fish spawning in the lower valley. The 1991 consent decree

addresses the need to examine impacts on fish.

Threatened, Endangered, or Rare Species. The Endangered Species Act requires **an** examination of impacts on all federally threatened or endangered species. NPS policy requires examination of the impacts on state-listed threatened, endangered, or rare species, and federal candidate species. A total of 23 such species is addressed.

Water Quality. The Clean Water Act authorizes certain federal agencies to regulate pollution discharges into waters of the United States. Water quality issues related to possible septic and drain field pollution sources entering the Stehekin River were raised during scoping. The 1991 consent decree addresses the need to examine impacts on water quality.

Air Quality. The Clean Air Act requires federal land managers to protect park air quality, while NPS *Management Policies* calls for air resource management to be integrated into NPS operations and planning, and for all air pollution sources within parks to comply with all federal, state, and local air quality regulations. Furthermore, because the current and future quality of park air resources depends heavily on actions of others, the National Park Service will acquire information needed to participate in decision making that affects park air quality.

Cultural Resources. The National Historic Preservation Act, the National Environmental Policy Act, NPS *Management Policies,* and the NPS-2 *(Planning Process)* and NPS-28 *(Cultural Resource Management)* guidelines call for the consideration of historic and archeological resources in planning proposals. During the planning process, significant historic and archeological sites were identified that could be affected by the proposed action or the other alternatives.

Visual/Scenic Resources. Conserving the scenery of national park units is a fundamental purpose in the 1916 National Park Service organic act, as well as a purpose of this park unit under its enabling legislation. Management options considered in this document may affect scenic resources of the national recreation area. The 1991 consent decree also addresses the need to examine impacts on scenery.

Transportation. Transportation issues raised during scoping include commercial boat service, maintenance, or closure of roads, shuttle service, and operation of wheeled planes and floatplanes.

Visitor Experiences. Providing for visitor enjoyment is one of the fundamental purposes of the National Park Service according to the 1916 organic act. Many management options considered in this plan would affect visitor use patterns and the type and quality of experiences. Additionally, the 1991 consent decree requires an examination of campfire and horse grazing issues in the wilderness area.

Regional Economy. The National Environmental Policy Act requires an examination of socioeconomic impacts caused by management alternatives. The issue has also been raised during scoping.

Impact Topics Dismissed from Further Analysis

Wilderness Values. Impacts on wilderness values per se are not addressed. Two wilderness components are addressed under the visitor experience impact topic. A discussion of campfires and horse grazing issues in wilderness is required by the 1991 consent decree. Otherwise, general wilderness values are not addressed. The Washington Park Wilderness Act of 1988, which designated the Stephen Mather Wilderness in the park complex, states that the "fact that nonwilderness activities or uses can be seen or heard from areas within the wilderness shall not, of itself, preclude such activities or uses up to the boundary of the wilderness area."

IMPACTS ON STEHEKIN RIVER/FLOODPLAIN

Summary of Regulations and Policies

NPS *Management Policies* require that federal facilities not be placed in areas where natural processes pose a persistent threat unless no practicable alternative site exists (NPS, 1988d, 9:2). The occupancy and modification of floodplains and wetlands will be avoided wherever possible. Where no practicable alternative exists, mitigating measures will be implemented to minimize potential harm to life, property, and the natural values of floodplains and wetlands (NPS, 1988d, 4:16).

EO 11988 directs each federal agency to "provide leadership and take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health, and welfare, and to restore and preserve the natural and beneficial values served by floodplains." The NPS *Floodplain Management Guidelines* (NPS Special Directive 93-4, August 11, 1993) provides requirements for carrying out EO 11988. The specific floodplains that are subject to regulation by the executive order and the guideline include the 100-year floodplain, 500-year floodplain, and extreme floodplain.

Section 10 of the Rivers and Harbors Act and section 404 of the Clean Water Act require the U.S. Army Corps of Engineers grant permits for construction and disposal of dredged material in waters of the United States; and the Fish and Wildlife Coordination Act requires that equal consideration be given to wildlife when proposing to control or modify any stream or other water.

The primary state regulations that affect development activities in and near floodplains and wetlands include the Shoreline Management Act, State Hydraulic Code, the State Water Pollution Control Act, and the Floodplain Management Program.

The Shoreline Management Act (chapter 90.58 RCW) was passed to manage appropriate uses of the shorelines of the state of Washington. Under this act, development of the state's shorelines is intended to be done in a way that promotes and enhances the public interest, and that protects against adverse effects on the public health, the land and its vegetation and wildlife, and the waters of the state and their aquatic life. The Stehekin River and Lake Chelan and associated wetlands, excluding federal land, have been designated Shorelines of Statewide Significance (WAC 173-18-080, WAC 173-20-110). Associated wetlands include (a) lands extending 200 feet on a horizontal plane from the ordinary high water mark, (b) floodways and adjoining floodplain areas landward 200 feet from such floodways, and (c) adjoining wet areas. Development and use on these shorelines are regulated by Chelan County under their Shoreline Master Program (WAC 173-19-120). The State Department of Ecology acts primarily in a supportive and review capacity with primary emphasis on insuring compliance with the policies and provisions of the Shoreline Management Act.

The State Hydraulic Code (chap. 75.20.100-140 RCW) is intended to protect fish life from damage by construction and other activities in all state waters. It is carried out through a permit called a hydraulic project approval obtained from the Washington Department of Fish and Wildlife. Hydraulic project approval is required for any work within the high water areas of state waters, which often include wetlands.

The Floodplain Management Program (Chapter 86.16 RCW) establishes statewide authority for floodplain management through the adoption and administration by local governments of regulatory programs

that are compliant with the minimum standards of the National Flood Insurance Program.

Also refer to the "Impacts on Wetlands" and "Impacts on Water Quality" sections.

Methodologies for Assessing Impacts

The focus of this impact assessment is on natural river processes, aquatic habitat, and hazards associated with flooding and other natural processes. Impacts on other natural floodplain values were also assessed under the wetlands, riparian, fisheries, and water quality sections. The primary impact analysis for resources within the 100-year floodplain of the Stehekin River and its tributaries was completed using the GIS. Areas disturbed, protected, or restored under each alternative were measured. Areas affected in the high flood influence areas were also measured. Existing impacts include areas disturbed by river control structures, roads, borrow pits, lawn/pasture, orchard/large garden, development, and other disturbed sites.

The potential hazards of NPS buildings, facilities, and roads in relation to regulatory floodplain and other geological processes were evaluated. Changes in flood hazards to private property caused by the alternatives were qualitatively evaluated. Impacts not quantified were evaluated by analyzing the sensitivities of key components of floodplain habitat to actions under the alternatives.

Assumptions. For purposes of analysis, the following relationships between actions and impacts were assumed.

Impacts Associated with Private Land — Unless interests in privately owned lands are acquired with owner's consent, impacts on natural resources in the floodplain would depend on the level of cooperation between private landowners and the National Park Service and the willingness of other agencies to apply their river and floodplain management programs.

Natural River Processes — Development and activities near or in the river may adversely affect the river system directly through physical alteration, and indirectly through nonpoint discharges of sediment-laden water. Direct modification of the stream channel or increased sediment loading may cause channel instability and shifting, increased bank erosion, increased bed deposition or erosion degradation, or changed flood flow elevations. It is usually difficult to predict the degree of changes because of the large number of hydraulic variables that affect change.

Subtle river changes would be expected from disturbances in the vegetation-soil complex of the floodplain that increases sediment load, but these changes would ordinarily be slow and not obviously related to changes in the floodplain. More distinct changes in the river may be caused by bank armoring or by the inflow of large quantities of sand and gravel from highly erodible areas, such as roads (Dunne and Leopold 1978). Flood flows may result in immediate and potentially large changes in the river channel and adjacent floodplain. Flood waters normally follow a path of least resistance, therefore any development or modification of vegetative cover in the floodplain could cause flood flow patterns to change. During a major flood event, modifications in the high flood influence area would be expected to cause the greatest change (see the "Affected Environment" chapter).

Aquatic Habitat — Surface-disturbing activities in or near a stream can reduce its productive capabilities. Important impacts are associated with the (1) modification of stream morphometry, (2) loss of riparian vegetation, and (3) accelerated erosion and sediment transport. Instream modifications, such as the removal of woody debris or placement of erosion control structures, can influence important habitat characteristics such as riffle/pool complexes, substrate type and locations, and cover. These physical aspects often determine composition of the aquatic biological community, distributions

of organisms, and salmonid spawning, nursery, feeding, and winter sites. Riparian land uses and nonpoint pollution from disturbed areas have been shown to reduce stream production potential for aquatic organisms. Most energy inputs to cold-water streams are in the form of terrestrial vegetation and terrestrial insects (Meehan et al. 1977).

Impact Assessment

The proposed action would generally provide additional protection for natural river processes and improve habitat conditions for fish and other aquatic species. The overall reduction of disturbed areas in the floodplain would result in decreased erosion and sediment loading, increased riparian vegetation, and increased instream cover. Measured impacts within the 100-year floodplain are summarized in table 33.

TABLE 33: MEASURED IMPACTS, 100-YEAR FLOODPLAIN - PROPOSED ACTION

Source of Impact	Impact on Stehekin River/Floodplain
Within the Study Area:	
Acquire land or interests in private parcels	149 acres in floodplain, including 70 acres in high flood influence area would be protected in the long-term, (beneficial impact)
Restore old borrow pits to natural conditions	11 acres of floodplain would be restored, (beneficial impact)
Relocate maintenance area and restore all fairways to natural conditions	9 acres of floodplain would be restored, (beneficial impact)
Restore the natural character within 200 feet of the river and lake edge on public land	7 acres of currently disturbed floodplain would be restored, (beneficial impact)
Manage six forest fuel reduction areas	Up to 131 acres of vegetated floodplain would be modified, (adverse and beneficial impact)
Maintain existing road system	15 acres in floodplain, including 3 acres in high flood influence area, would continue to be disturbed, (adverse impact)
Continue to maintain the airstrip at current size	10 acres of vegetated floodplain would be maintained in an unnatural condition, (adverse impact)
Preserve the Buckner homestead and orchard	7 acres of vegetated floodplain would be maintained in an unnatural condition, (adverse impact)
Study Area Totals:	176 acres of floodplain beneficially affected Up to 131 acres of floodplain modified 32 acres of floodplain adversely affected

The National Park Service would restore about 27 acres of floodplain, including 12 acres in the high flood influence area to more natural conditions. Areas that would be restored include the NPS maintenance area, the "fairways," old borrow pits, and floodplain within 200 feet of the Stehekin River and lakeshore. Approximately 15 NPS-owned nonhistoric buildings now located in the 100-year floodplain would be removed and the damaged habitat restored.

Instream woody debris would not be manipulated and all NPS-owned river control structures would be removed and natural conditions restored, except those necessary to protect roads and bridges. Woody debris could also be trimmed or

turned in the lower 9 miles of the Stehekin River to allow safer river running only if it did not alter the function or stability of woody debris accumulations and was permitted by the appropriate regulatory agency. Woody debris would not be removed from the river system in any case. Natural accumulations of woody debris would benefit fish by providing important cover habitat. Removal of control structures could temporarily increase streambank erosion and flooding at sites and downstream.

Approximately 32 acres of vegetated floodplain, including 7 acres in the high flood influence area, would be maintained in an unnatural condition. Areas that would be affected include portions of the airstrip, the Buckner orchard, and roads. Burying powerlines might also cause short-term disturbance on an unknown amount of floodplain.

Prescribed burns and thinning of trees within six forest fuel reduction areas would affect up to 131 acres of vegetated floodplain, including 22 acres in the high flood influence area. To reduce potential adverse impacts, no thinning of trees would be allowed within 300 feet of the Stehekin River or 50 feet of any tributaries that support fish. Any soil disturbance caused by vegetation management activities in the floodplain would be mitigated to help prevent erosion from runoff. For a discussion of potential impacts of modifying the floodplain, see the "Assumptions" section under the "Methodologies for Assessing Impacts."

Erosion of gravel or dirt roads and shoulders would continue to carry sediments to the Stehekin River and its tributaries adversely affecting natural river processes and aquatic habitat. Hardening the Stehekin Valley road surface between Harlequin Bridge and 9-mile and other mitigating measures to conserve sand, rock, and gravel eroded from roads, would reduce these impacts. An unknown amount of unnecessary side roads within the floodplain would be closed and restored, also reducing impacts.

River control structures for protecting roads and bridges would continue to be maintained. The road protection structures on the upper Company Creek road would be replaced with a new erosion control system affecting about 2,200 feet of riverbank. A new road protection structure would also be built on the Stehekin Valley road at 8-Mile affecting about 400 feet of riverbank. The new systems would use rock barbs protruding into the channel and bioengineering techniques to reestablish vegetation. Construction activities would occur in the fall, during low flow, to minimize suspended sediment and turbidity in the stream. Rock and vegetation used to protect the site would improve fish habitat by providing cover and macroinvertebrate habitat. The structures would not raise flood elevations significantly. However, the new structures could reroute flows that might cause more severe flooding or erosion downstream or across the river.

The river management planning process would address additional strategies for protecting and restoring the river and its tributaries and associated floodplain. Alternative methods and designs for protecting streambanks and controlling erosion would also be examined. The Park Service would study the suitability of the Stehekin River for wild and scenic designation. The proposed action would not compromise the potential for designation.

The proposed action would substantially reduce potentially hazardous conditions on NPS land associated with flooding and other geological processes. All NPS buildings and most facilities including those in the 100-year floodplain and those at the Landing in a debris cone area would be relocated. The upper Company Creek road and the Stehekin Valley road at 8-Mile would be modified to withstand frequently recurring floods. Other roads and bridges would only be protected from damage under conditions described in the "Alternatives, Including the Proposed Action" chapter. Fuels and toxic materials stored at the maintenance area

would be relocated outside the 500-year floodplain and other geological hazard areas. The river management planning process would also consider specific visitor protection measures related to flood and other geological hazards. In addition, acquiring interests in lands designated as high priority for protection of other resources might indirectly reduce hazardous conditions within the 100-year floodplain.

Flood hazards on private property would depend on the level of cooperation between private landowners and the National Park Service and the willingness of other agencies to apply their floodplain management programs. Hazardous conditions on private land would be the greatest in the high flood influence area. The maintenance of Company Creek and Stehekin Valley roads could indirectly support continued development and occupancy of private property located in the floodplain. Fuels and toxic materials stored at four sites on private and Chelan County PUD land would remain within the 100-year floodplain.

Conclusion

The proposed action would generally have beneficial effects on natural river processes and habitat for fish and other aquatic species, including restoration of about 27 acres of the Stehekin River floodplain and reduced instream modifications. Acquiring interests in private lands would eventually provide additional long-term protection for another 149 acres of floodplain. Potentially hazardous conditions associated with flooding would be substantially reduced by relocating NPS and acquiring land interests located in floodplain or geohazard areas.

Cumulative Impacts

The total cumulative impact on the river and floodplain is composed of past impacts, external impacts, and impacts predicted under this alternative. Past land use activities have had an adverse impact on 90 acres of floodplain, 22 acres in the high flood influence area, and about 4,600 feet of riverbank in the study area (see the "Affected Environment" chapter). The floodplain impacts ranged from complete removal of vegetative cover and soil to minor vegetation cutting. Past river channel impacts included armoring the riverbank, removal of sand, gravel, and woody debris, and diversion of water. Hazardous conditions associated with flooding and other geohazards have increased with past development. Existing NPS development within the 100-year floodplain includes 16 buildings (one historic), 7 miles of roads, and one fuel/toxic material storage site. Another 98 buildings and four fuel/toxic material storage sites on private land are also in the 100-year floodplain. The construction of Lake Chelan Dam in 1927 inundated an unknown amount of the Stehekin River and adjacent floodplain. The annual fluctuation in the surface elevation of Lake Chelan does not affect flood profiles at the mouth of the river. Because of past development within the floodplain of the Stehekin River, measures to restore habitat, reduce the potential for new development, and reduce hazardous conditions would have an important beneficial cumulative impact on natural river processes, aquatic community, and safety of human occupants.

IMPACTS ON WETLANDS Summary

of Regulations and Policies

EO 11990 requires that leadership will be provided by involved agencies to minimize the destruction, loss, or degradation of wetlands. The NPS *Floodplain Management and Wetlands Protection Guidelines* (45 FR 35916 [minor revisions in 47 FR 36718]) provide procedures for carrying out this order. The order and guidelines direct the National Park Service to consider factors relevant to a proposal's effect on the survival and quality of wetlands by maintenance of natural systems, including conservation and

long-term productivity of existing flora and fauna, species and habitat diversity and stability, and hydrologic utility. Also refer to the "Impacts on Stehekin River/Floodplain" and "Water quality" sections.

Methodologies for Assessing Impacts

The primary wetland impact analysis was completed using the GIS. Wetland impacts were quantified by measuring the area in or near wetlands disturbed, protected, or restored under each alternative. The analysis included all four wetland classes. Disturbance types evaluated included roads, airstrip, firewood/fuel reduction, borrow pits, dredge and fill areas along the lakeshore, lawn/pasture, orchard/large garden, development, and other disturbed areas (see the "Affected Environment" chapter). Also, the amount of privately owned wetlands that would be protected if the Park Service acquired interests were measured. Impacts not quantified were evaluated by analyzing the sensitivities of key components of wetland habitat to alternative activities. For purposes of analysis the following were assumed:

- Any restoration or disturbance within 200 feet of the Stehekin River or Lake Chelan would affect wetlands.
- Impacts of maintaining wetland vegetation in an unnatural condition would be less severe than other types of disturbance such as filling wetlands.
- Interests in all wetlands identified for protection would eventually be acquired.
- Unless interests in privately owned wetlands are acquired, potential development impacts would depend on the level of cooperation between private landowners and the National Park Service and the willingness of other agencies to apply their wetland protection programs.

Impact Assessment

The proposed action would restore and provide additional protection for wetlands in the Stehekin watershed benefiting a variety of dependent lifeforms and physical processes. Actions that would have beneficial impacts on wetlands include restoring damaged wetlands, closing some roads, acquiring interests in wetlands, limiting river channel modifications, cooperative management with landowners, and carrying out pollution control measures. Proposed actions that could have adverse impacts, include managing vegetation for airstrip maintenance, protecting the Company Creek road from river erosion, and burying powerlines. Impacts related to wetlands **are** also discussed in the "Impacts on Stehekin River/Floodplain" and "Impacts on "Water Quality" sections. Measured impacts on wetlands are summarized in table 34.

Under the proposed action, the National Park Service would actively restore about 26 acres of damaged habitat in or near wetlands to more natural conditions. Areas that would be restored include the NPS maintenance area, the "fairways," old borrow pits, and wetlands within 200 feet of the Stehekin River and lake edge. Complete restoration could take a long time depending on the availability of funds and specific techniques employed. The two NPS-owned nonhistoric buildings now located in wetlands would be removed and damaged habitat restored.

Instream woody debris would not be manipulated, and all NPS-owned river control structures would be removed and natural conditions restored, unless necessary to protect roads and bridges. Protecting and restoring natural river processes could result in the natural development of additional wetland areas near the river. The river management planning process would address additional strategies for protecting wetlands along the river corridor.

TABLE 34: MEASURED IMPACTS, WETLANDS - PROPOSED ACTION

Source of Impact	Impact on Wetlands
Within the Study Area:	
Acquire land or interests in private parcels	62.9 acres of wetlands would be protected in the long-term, (beneficial impact)
Restore the natural character within 200 feet of the river and lake edge	18.8 acres of currently disturbed areas near or in wetlands would potentially be restored, (beneficial impact)
Restore old borrow pits to natural conditions	6.9 acres of wetlands would potentially be restored, (beneficial impact)
Relocate maintenance area and restore all fairways to natural conditions	0.3 acre of wetlands would potentially be restored, (beneficial impact)
Continue to maintain the airstrip at current size	5.5 acres of wetlands would be maintained for clearance in an unnatural condition, (adverse impact)
Maintain existing road system	1.2 acres would continue to be affected, (adverse impact)
Study Area Totals:	88.9 acres of habitat in or near wetlands beneficially affected 6.7 acres of wetlands adversely affected

Maintenance of the airstrip would require the occasional cutting of tall vegetation within a wetland area covering 5.5 acres. This would not reduce the size of the wetland, but would adversely affect wetland functions. Cutting of wetland vegetation would cause losses of food, cover, and nesting sites used by dependent wildlife. More area of open water could be exposed to direct sunlight causing increased ultraviolet light exposure and evaporation and slightly increased temperatures. Reduced survival of early life stages of amphibians may be correlated to increased exposure to ultraviolet light. Water temperatures would probably not exceed optimal ranges. Wildlife would likely avoid the area during vegetation-cutting activities. The majority of the tall vegetation, including red alder and bigleaf maple, would be expected to grow back quickly after being cut. To help reduce the impacts of maintaining the wetlands at the lower end of the airstrip in an unnatural condition, the National Park Service would allow only minimal cutting of vegetation within wetlands as necessary to meet Washington State Department of Transportation standards for this type of airstrip. Wetland vegetation would not be removed, but it could be pruned by the Washington Department of Transportation, Aeronautics Division, under the permit and supervision of the National Park Service. Herbicide use would not be allowed. Cutting activities would not be allowed during the reproductive season of any wildlife species occupying the area. Wetland soils would likely be disturbed during wetland vegetation cutting activities.

Burying powerlines might cause short-term disturbance on an unknown amount of wetlands. Any soil disturbance caused by vegetation management activities near wetlands would be mitigated to prevent runoff carrying sediment from disturbed areas to wetlands.

The roads near wetlands that were not identified for closure would continue to be maintained. Runoff from gravel or dirt roads and road shoulders would continue to carry sediments to wetlands. Increased sediment in palustrine wetlands can decrease depth and area of open water, decrease area annually flooded, and increase susceptibility to drought resulting in habitat loss. Hardening the Stehekin Valley road surface between Harlequin Bridge and 9-Mile and other

mitigating measures to conserve sand, rock, and gravel eroded from roads, would reduce these impacts.

River control structures for protecting roads and bridges would continue to be maintained. Road protection structures on the upper Company Creek road and Stehekin Valley road at 8-Mile would be replaced. River control structures could change natural river erosion processes locally and flow patterns resulting in decreased area annually flooded, decreased channel movement, or increased sediment deposition along the river corridor. This could indirectly reduce wetland area or reduce potential for natural wetland development along the river corridor.

Conclusion

The proposed action would have generally beneficial effects on wetlands. Approximately 26 acres of habitat in or near wetlands would be restored where possible and another 63 protected by acquiring interests. Existing road disturbance and vegetation management activities to maintain the airstrip would adversely affect 6.7 acres of vegetated wetlands.

Cumulative Impacts

The total cumulative impact on wetlands is composed of past impacts, external impacts, and impacts predicted under this alternative. Past land use activities have had an adverse impact on at least 11 acres of wetlands (see "Affected Environment" chapter). The severity of impacts ranged from filling and complete loss of wetland to minor vegetation cutting. The consequences of disturbing wetlands include reductions in abundance, biomass, species diversity, reproductive success, and survival of dependent wildlife and aquatic life (see also "Impacts on Native Fish" and "Impacts on Endangered, Threatened, or Rare Species" sections).

The construction of the Lake Chelan Dam in 1927 inundated an unknown amount of vegetated wetlands near the original mouth of the Stehekin River and lakeshore. Release of water from the Lake Chelan Dam annually exposes large wetland areas at the head of the lake. This results in the drying of wetland soils and subsequent wind erosion. The fluctuating lake surface elevation also reduces the productivity of aquatic invertebrates and plants, and the availability of fish spawning habitat along the lakeshore. Wetland impacts on a regional scale are similar to those discussed under the "Impacts on Riparian Communities" section. Because of past impacts on wetlands in the national recreation area and the region, the beneficial impacts of this alternative would have a beneficial cumulative impact on wetlands.

IMPACTS ON RIPARIAN COMMUNITIES

Summary of Regulations and Policies

NPS policies on the management of natural resources, including all vegetative communities, are based on park management zoning. Natural resources in natural zones are to be managed for fundamental ecological processes. Management goals are to maintain all the components and processes of naturally evolving park ecosystems, including the natural abundance, diversity, and ecological integrity of plants and animals (NPS 1988d, 4:1). Additionally, one of the primary goals in the overall mission statement of the Department of the Interior is to protect biological diversity on public lands. In development zones, lands can be managed and maintained for intensive visitor use and natural resources may be manipulated. EO 11988 ("Floodplain Management") also applies to many riparian areas (see discussion in "Impacts on Stehekin River/Floodplain" section).

Methodologies for Assessing Impacts

See the introduction to the "Environmental Consequences" chapter for a summary of the methodologies used for assessing impacts on riparian communities (see complete explanation in appendix D).

Impact Assessment

Measured impacts on riparian communities are summarized in table 35.

The NPS maintenance area and some NPS housing are located in the old "fairways." These fairway areas were riparian communities before being cleared of forest cover. All fairways would be restored to natural conditions under this alternative, reclaiming 18 acres of riparian. Table 36 describes the six forest fuel reduction areas that would be created and maintained indefinitely under the proposed action.

Fuel management techniques would vary over these six areas. All areas of all units would be periodically treated with prescribed fire. This is the only technique that would be used in the Weaver Point unit. In the Orchard/Rainbow and Company Creek units, portions would be manually thinned to 40% canopy closure. In the other three units, portions would be thinned to 40% canopy closure and other portions would be thinned in patches. In these patch thins, existing thickets of large diameter trees would be retained, while conifers between these thickets would be thinned to 50%-60% canopy closure.

The Stehekin Valley is probably in a natural fire frequency category described as a moderate severity fire regime (see *Forest Fuel Reduction / Firewood Implementation Plan,* NPS 1995). In this regime, periods of intense fire behavior are mixed with periods of moderate and low intensity fire behavior. Natural fire return frequencies range from 25 to 100 years and individual fires often show a wide range of effects. The overall effect is a patchiness over the landscape as a whole.

Within the forest fuel reduction area boundaries, 28 acres of riparian are included in zones to be treated only with prescribed fire. An additional 46 acres of riparian are within zones to be manually thinned and treated with prescribed fire. Coniferous trees within riparian communities may be manually thinned in the fuel reduction areas. Prescribed fires would occur in upland forests and would be allowed to burn themselves out as they enter cooler, moister riparian areas. This would provide a more natural, irregular edge between upland and riparian communities. Therefore, an unknown acreage (up to 74 acres) of riparian would be impacted through prescribed fire and thinning. These are considered to be beneficial impacts.

Due to the analysis assumptions of the *Land Protection Plan* (see appendix E), all 118 acres of riparian lands located in private parcels would eventually be protected through acquisition of either the lands, or easements on their riparian portions. Some of these riparian lands are already degraded from past development activities. These degraded lands would return to more natural riparian conditions after purchase.

Fifteen old borrow pits would be reclaimed to natural conditions for a total of 10 acres of restored riparian communities.

Conclusion

A total of 146 acres of riparian communities would be protected or restored, and up to 74 acres would be affected by prescribed fire. Given that there are only 936 acres of riparian on the valley floor, this would be a major beneficial impact on community-level biodiversity in the valley.

TABLE 35: MEASURED IMPACTS, RIPARIAN COMMUNITIES - PROPOSED ACTION

Source of Impact	Impact on Riparian Communities
Relocate NPS maintenance and housing area, and restore all fairways to natural conditions	18 acres of riparian communities would be restored, (beneficial impact)
Manage six forest fuel reduction areas	Up to 74 acres of forested riparian would be affected, (beneficial impact)
Acquire land or interests in private parcels	118 acres of riparian would be protected in the long-term, (beneficial impact)
Restore old borrow pits to natural conditions	10 acres of riparian would be restored, (beneficial impact)
Restore the natural character within 200 feet of the river edge	An unknown amount of currently disturbed riparian acreage would be restored, (beneficial impact)
Study Area Totals:	28 acres riparian restored in lower valley 118 acres riparian protected Up to 74 acres riparian affected by fuel management

TABLE 36: FOREST FUEL REDUCTION AREAS - PROPOSED ACTION*

Name of Unit	Location/Description	Acres	
Orchard/Rainbow	On the north side of the river, near Buckner orchard. On both sides of the road. Includes alluvial fan. The orchard would not be affected.	Forested riparian Forested upland Unforested Total acres	**32** 72 10 **114**
Boulder Creek	On the north side of the river and north side of the road. Includes Boulder Creek alluvial fan.	Forested riparian Forested upland Unforested Total acres	0 **123** 3 **126**
Company Creek	On the south side of the river at the west end of the airstrip. Includes the Company Creek alluvial fan.	Forested riparian Forested upland Unforested Total acres	1 116 18 135
Coon Run	On the north side of the river, just west of the private parcels farthest upvalley. On both sides of the road.	Forested riparian Forested upland Unforested Total acres	8 144 23 175
McGregor	Between the lower field and McGregor Meadows, on both sides of the river. Includes a small meander on the south side of the river.	Forested riparian Forested upland Unforested Total acres	30 **149** 20 199
Weaver Point	On the south side of the river, between Weaver Point and the mouth of the river. On either side of Devore Creek.	Forested riparian Forested upland Unforested Total acres	2 32 5 39

* Rounding errors may make these totals slightly different than those in the *Forest Fuel Reduction / Firewood Management Plan* (NPS 1995)

Cumulative Impacts

It is estimated that 188 acres of the valley's riparian communities have been disturbed or completely lost in the past (NPS 1993d). This does not include past logging impacts on 1,650 acres (see the "Affected Environment" chapter, "Terrestrial Processes and Communities, Existing and Past Human Disturbances" section), nor the probable major riparian loss when the river's natural delta area was flooded with the damming of Lake Chelan. The existing amount of riparian vegetation in the valley floor study area is 936 acres. Combined with past disturbance of 188 acres, a total of 1,124 acres existed at some time in the past. Therefore 17% (188/1,124) of the historic riparian area has been lost. This alternative would have a net recovery of about 116 acres.

On a national scale, past losses of riparian communities have been drastic. It is estimated that one-half of the riparian and wetland zones of the contiguous United States has been destroyed, while documented losses in many western states have been extreme (Lamb and Lord 1992; Rieger 1992). Riparian impacts on western lands administered by other federal agencies are widespread and major, while impacts on those in private holdings, such as in California's huge Central Valley, are even more severe. With riparian areas comprising less than 1% of the western United States (Douglas et al. 1992), these conditions are particularly alarming given the critical role that riparian communities play in the maintenance and protection of biodiversity (see the "Affected Environment" chapter).

On a regional scale, most of the large, low-elevation watersheds in the area have had major past riparian impacts. To the southwest the nearby drainages of the Entiat, Chiwawa, and Wenatchee rivers have been extensively impacted by road building, logging, recreational development, and private land developments. These riparian areas are from only 15 miles to 60 miles away. In an ecosystem perspective, this is nearly adjacent to the Stehekin Valley. To the northwest in the Ross Lake National Recreation Area, at least 35 linear miles of riparian zones (and an unknown amount of riparian acreage) has been permanently lost due to the flooding of the Skagit River for hydroelectric development. These riparian areas were about 35 miles away on average. To the northeast, the riparian areas of the Twisp and Methow valleys have been extensively impacted from sources similar to those for the Entiat and Wenatchee systems with the additional impacts of livestock grazing. These riparian areas are from only 10 miles to 40 miles distant. And finally, to the southeast, the natural riparian communities of the Columbia itself have been significantly altered though the formation of reservoirs on nearly all reaches. These affected riparian zones average about 50 miles away.

This comparison to affected riparian areas in other low-elevation watersheds is particularly critical when considering the geography of the lower Stehekin Valley. The valley is a unique geographical, and probably ecological, feature in the greater North Cascades. It is virtually in the center of a huge mountainous region, yet its elevation, at 1,100 feet, is significantly lower than any other valley within at least 30 miles. This not only affects its climate and flora, but from the perspective of conservation biology and the long term protection of viable populations and ecosystems, it makes it a crucial refugium and movement corridor — or link between habitats — for numerous wildlife species over an extremely vast area (Forman and Godron 1986). In any direction from the lower Stehekin Valley, it is 30-50 miles to a comparable low-elevation riparian area. If Stehekin is in the middle of a 35-mile radius circle, it is the lowest elevation riparian area of any size in an area of about 2.5 million acres.

The beneficial impacts from this alternative would have a positive cumulative impact on riparian communities in the region.

IMPACTS ON UPLAND COMMUNITIES

Summary of Regulations and Policies

These policies are the same as those discussed under riparian communities.

Methodologies for Assessing Impacts

See the introduction to the "Environmental Consequences" chapter for a summary of the methodologies used for assessing impacts on upland communities (see complete explanation in appendix D).

Impact Assessment

Measured impacts on upland communities are summarized in table 37.

New construction near the airstrip and at the Landing would disturb the following upland communities:

Community	Acres
Mixed coniferous	5.3
Mixed deciduous/coniferous	0.2
Douglas fir	6.3
Bigleaf maple	08
Total	**12.6**
Already Disturbed Lands	1.3

(No effective change in disturbed condition)

A total of 13 acres new disturbance would result from construction, and 4 acres at the Landing would be restored from the removal of the existing lodge and dorm. Thus, there would be a net loss of 9 acres of upland communities.

A total of 636 acres of upland communities would be affected through the creation and maintenance of the six forest fuel reduction areas (see table 37). Seven upland communities are within these areas, with the most affected being mixed coniferous, Douglas fir, and mixed deciduous/coniferous.

Fuel management techniques would vary in the forest fuel reduction areas (see discussion under riparian communities).

A total of 310 acres of forested upland communities would be manually thinned. Of these, 197 acres would be thinned to 40% canopy closure, while 113 would be thinned in patches. In these patch thins, existing thickets of large diameter trees would be retained, while conifers between the thickets would be thinned to 50-60% canopy closure. A total of 636 acres of upland, including the thinned areas, would be treated with prescribed fire.

Some of these 636 acres of upland communities would be beneficially impacted, while some would be adversely impacted. Generally, if mechanized equipment is used to remove logs from the fuel reduction areas, most activity would be restricted to winter, with at least 2 feet of snow cover on the ground. Skid trails on snow would be visible until the spring snow melt. There should be minimal soil disturbance. Slash would be apparent until it is burned. Flush-cut stumps would be evident on 310 acres for many years. With crown cover reduced to 40%-60%, the more open forest would be noticeable in these areas. During thinning operations, an NPS representative would be present to ensure that special conditions are followed by the contractor.

Overland water flow and subsequent soil erosion may increase for the first year or more during snow melt. Increased grass, forb, and shrub cover is expected to halt overland water flow within three growing seasons. Forest nutrient loss from removing tree boles (logs) would be minimized by cutting during winter (not the growing season), and by slash being left and burned in the areas. The number of blow down trees from wind would likely increase for three to five years.

TABLE 37: MEASURED IMPACTS, UPLAND COMMUNITIES - PROPOSED ACTION

Source of Impact	Impact on Upland Communities
Construct new NPS maintenance and housing near airstrip; relocate lodge at Landing out of geohazard area	9 net acres of upland communities would be lost, (adverse impact)
Manage six forest fuel reduction areas	636 acres of forested upland would be affected, (some adverse and some beneficial impact)
Acquire land or interests in private parcels	137 acres of upland would be protected in the long-term as an unintended result of the protection of other resources, (beneficial impact)
Restore old borrow pits to natural conditions; gravel may be barged in	3 acres of upland would be restored, (beneficial impact); imported gravel may introduce nonnative plant species, (adverse impact)
Convert Riddle Creek cabins site to **a** campground	Small restoration of upland, (beneficial impact)
Firewood: stop woodlot cutting; allow barging of wood	Wood cutting on private lands could affect up to 190 acres; lakeshore lands could be affected by a barged-wood storage site, and this wood could introduce nonnative plant or insect species, (potential adverse impacts)
Nonnative plants: control selected species; restore selected disturbed sites; do not restore the airstrip or lower field	A long-term program of nonnative plant control would be necessary. Although some disturbed sites would be recovered, the 48-acre airstrip, which is dominated by aggressive invader species, would remain a major source of nonnative species in the valley even with a long-term abatement program. The 6-acre lower field would be maintained in nonnative species, **(all** adverse impacts)
Stock grazing in recreation area wilderness based on limits of acceptable change; no firewood gathering in subalpine sites	Backcountry meadows would be protected from overgrazing; downed wood would remain at sensitive subalpine campsites, (beneficial impacts)
Move Weaver Point campground back from edge of lake; in general, restore lake edge	Small loss of upland at Weaver Point, but overall net gain in restored lake edge upland, (beneficial impact)
Study Area Totals:	3 acres upland restored 137 acres upland protected 636 acres upland affected by prescribed fire and thinning 9 acres upland lost

The natural fire return interval is generally from 25 to 100 years. Drier, alluvial fan sites such as Boulder and Rainbow creeks probably burned every 10 to 15 years. Fire prescriptions of every 5 to 15 years would mimic natural conditions in some areas, and be more frequent than natural conditions in other areas. Sun tolerant plants would increase in the areas, providing habitat for a different set of wildlife — small mammals, ground-dwelling birds, and deer.

The general methodology identifies a number of resources of concern, such as high visual sensitivity areas. With the protection of high visual sensitivity areas, some upland community classes would also unintentionally be protected. In these overlapping

areas, 137 acres of upland communities would be protected.

The reclamation of 15 old borrow pits would result in 3 acres of restored upland communities. However, the barging uplake of sand, rock, or gravel would eventually introduce normative plant species, regardless of a good-faith effort to treat for such introductions.

With a possible decrease of available firewood from public lands, at least in the long term, cutting and selling of firewood from private lands is likely to increase to an unknown level. A GIS analysis of forested land cover classes on private lands was completed. It was assumed that cutting firewood on private land for the purpose of selling it would only occur on those parcels of at least 1 acre in size and with at least 1 acre of forested land (either riparian or upland forest classes). It was assumed that only the individual taking of select trees, with minimal consequences, would occur on the smaller parcels. There are a total of 48 private parcels that are at least 1 acre and have at least 1 acre of forest. On these parcels, there is a total of 190 forested acres. Not all of the landowners would elect to cut and sell trees for firewood. Some would not cut for aesthetic reasons, and some might only cut select trees for sale as saw timber, which has a much greater value. Larger-scale, woodlot-type firewood cutting could occur on 26 parcels, each containing over 2 acres of forested land. Seven parcels have over 5 acres of forest land, and three parcels have about 20 acres (19, 21, and 25 acres).

Barging of firewood may be more appealing for some residents. Given the numerous variables of this issue, all that can be concluded is that the long-term impacts from possible firewood cutting on private lands could adversely affect up to 190 acres of either riparian or upland communities. If large volumes of firewood are barged uplake, a transfer and storage location on the lakeshore would have to be created. Since this would be a private enterprise, it is assumed this site would be on private lands. The exact location and the amounts of wood possibly stored there is unknown, but this activity could affect lakeshore vegetation as well as scenic resources. Normative plant or insect species would eventually be introduced into the valley regardless of efforts to minimize such introductions.

Populations of select nonnative plant species would be reduced. These species would include diffuse knapweed, rush skeleton-weed, common mullein, and Japanese knotweed. Even with a long-term program to reduce nonnative species, the airstrip, dominated by knapweed, would likely remain a source of aggressive nonnative species that would spread to other areas of the valley. The raising of hay in the lower field would maintain it in an unnatural and nonnative condition, although it is not particularly a source of nonnative seed.

Conclusion

A total of 140 acres of upland communities would be protected or restored, 9 acres lost, and 636 acres would be affected by prescribed fire and thinning. The 48-acre airstrip, infested with aggressive invader species, would remain a major source of nonnative species for the valley.

Cumulative Impacts

It is estimated that 95 acres of upland communities in the valley floor study area have been disturbed or completely lost in the past (283 total disturbance acres minus 188 disturbed riparian acres). This does not include past logging impacts on 1,650 acres, which have had an unknown affect on species composition in these areas (see the "Affected Environment" chapter). There are currently 1,047 acres of upland communities in the valley floor study area. Combined with past disturbance of 95 acres, a total of 1,142 acres existed at some time in the past. Thus, 8% (95/1,142) of the historic upland area has been lost.

Upland communities have been selected as an impact topic in the EIS because they are affected by action items in the plan. However, they have not been identified as a particular resource of concern in the overall management of the valley, as riparian communities have. This is due to their much greater abundance in the national recreation area and in the larger park unit relative to riparian communities, and to their lesser role in the maintenance and protection of biodiversity on a local and regional level. Particular upland communities are, however, of concern for particular wildlife species, and these are addressed in the threatened, endangered, or rare species impact topic. With the exception of the concern for these wildlife species, regional cumulative impacts on upland community types are not considered as serious a threat on an ecosystem level as are riparian impacts.

From this perspective, upland community types in the region are, on the one hand, well protected in a large core area of national park and wilderness lands. This includes 684,000 acres in the national park complex and 1.4 million wilderness acres between the Canadian border and Snoqualmie Pass. On the other hand, outside of this core, upland communities have been and continue to be affected primarily through extensive logging activities on federal, state and private timber lands. Continuing construction of roads, recreational developments and private residences add to these impacts. This is true for a vast area (5 to 6 million acres) surrounding the protected core. Although a regionwide analysis from the perspective of long-term protection of biodiversity and viable ecosystems has not been completed, the consequences of continued logging activity is currently an issue of national debate, and regional and statewide planning (FEMAT 1993; USFS & BLM 1993).

IMPACTS ON NATIVE FISH

Summary of Regulations and Policies

In accordance with NPS *Management Policies,* "The National Park Service will strive to protect the full range of genetic types (genotypes) native to plant and animal populations in the parks by perpetuating natural evolutionary processes and minimizing human interference with evolving genetic diversity. The introduction of native plants and animals will be accomplished using organisms taken from populations as closely related genetically and ecologically as possible to the park populations ___" (NPS, 1988d, 4:10)

"Fisheries management will seek to preserve or restore natural aquatic habitats and the natural abundance and distribution of native aquatic species, including fish, together with the associated terrestrial habitats and species." (NPS, 1988d, 4:8)

"Waters that are naturally barren of fish will not be stocked with any species. Artificial stocking of native fish in natural zones will be employed in natural zones only to reestablish native species in their historic range; stocking of exotic fish species will not be permitted in natural zones." (NPS, 1988d, 4:8)

A memorandum of understanding and supplemental agreement between the National Park Service and Washington Department of Wildlife (Agreement No. MU-9000-5-0004, August 15, 1985 and 1988 supplement) waives the NPS policy on fish stocking for designated natural lakes in the North Cascades complex. The agreement allows the Department of Wildlife to stock fish and/or provide fish for stocking in 40 lakes within the boundaries of North Cascades National Park, five of which are in the Stehekin Watershed, as part of the department's fish management program.

Methodologies for Assessing Impacts

The focus of this impact assessment is on native salmonid species, westslope cutthroat trout, and bull trout, and their sensitivities to habitat degradation, competition and hybridization with nonnative salmonids, and overharvest. Alternative impacts on salmonid habitat were primarily addressed in the "Impacts on Stehekin River/ Floodplain" section. Impacts related to stocking fish in high mountain lakes and recreational fishing would be assessed further upon completion of ongoing research and as part of the development of a fisheries management plan.

Impact Assessment

The proposed action would provide additional protection for westslope cutthroat trout and bull trout in the Stehekin watershed and help perpetuate important genetic resources. Important salmonid habitat would be protected by acquiring interests in or restoring habitat, limiting instream manipulations, and implementing pollution control measures (see the "Impacts on Stehekin River/Floodplain" and "Impacts on Water Quality" sections).

Fish stocking within the Stehekin drainage would be limited to reestablishing endemic species in their historic range. This would help protect native westslope cutthroat trout and bull trout from further displacement caused by competition and hybridization with stocked nonnative species. An exception to this could, upon completion of current studies, be fish stocking in a few selected high lakes where the impacts to native aquatic species could be shown to be minimal, as provided under the memorandum of understanding with the Washington Department of Wildlife.

Restoring westslope cutthroat trout and bull trout into selected habitat would expand their range to part of their historic habitat in the Stehekin drainage. Reintroduction efforts would be based on research and approved recovery plans. In some cases, competing nonnative fish species present in habitat selected for reintroduction might have to be eliminated to assure survival of the reintroduced trout and protect the genetic integrity of the population. Also, any competing nonnative fish species threatening the survival of an existing native population would be controlled or eliminated where feasible. Existing fish species remaining from past stocking activities could not be eliminated from all other waters. In some cases, natural or artificial fish barriers may be required to prevent the invasion or reinvasion of competing nonnative species.

Both westslope cutthroat trout and bull trout are especially vulnerable to fishing and populations could be affected by overfishing. Currently it is not known what, if any, impacts recreational fishing may be having on the existing populations of native cutthroat and bull trout in the national recreation area. To minimize impacts on native fish, recreational fishing would be monitored and special regulations established, such as catch and release fishing, as necessary.

Conclusion

This alternative would enhance the integrity of existing native fish habitat and populations and would also help restore native cutthroat and bull trout populations in part of their historic habitat within the Stehekin drainage.

Cumulative Impacts

The total cumulative impacts on native fish are composed of past impacts, external impacts, and impacts predicted under this alternative. Both westslope cutthroat trout and bull trout are extremely vulnerable to habitat degradation, competition and hybridization with nonnative salmonids, and overharvest (Behnke 1979; Trotter 1987;

Bader et. al 1993). The stocking of normative species in the past has had a major adverse impact on pure westslope cutthroat trout and bull trout populations in the national recreation area, resulting in major population reductions (see "Affected Environment" chapter). Some nonnative aquatic species are well established in recreation area waters and would continue to have long-term adverse impacts on native fish. Stocking conducted by other agencies adjacent to the recreation area and park could result in nonnative fish entering NPS waters that could adversely affect native species populations. Because of the scarceness of pure populations of westslope cutthroat trout and bull trout on a regional scale (see "Affected Environment" section), any measures to protect native fish species would have an important beneficial cumulative effect on their recovery and preservation.

IMPACTS ON THREATENED, ENDANGERED, OR RARE SPECIES

Summary of Regulations and Policies

The Endangered Species Act requires the National Park Service to determine whether a proposed action would affect federally listed threatened or endangered species. Consultation with the U.S. Fish and Wildlife Service (USFWS) is required if the action affects such a species.

NPS *Management Policies* state that the National Park Service will identify and promote the conservation of all federally listed threatened, endangered, or candidate species within park boundaries (4:11). It further requires the National Park Service to consider all state-listed threatened, endangered, candidate, and sensitive species in its planning activities. The National Park Service will also control access to critical habitats and conduct management programs which perpetuate the natural distribution and abundance of these species and the ecosystems on which they depend. In general, management emphasis is on minimizing human impacts on natural wildlife population dynamics, while protecting native wildlife populations against harvest, removal, destruction, harassment, or harm through human action (4:5).

Additionally, the enabling legislation for the Lake Chelan NRA allows for hunting **of** game species. These activities are subject to state laws and regulations.

Methodologies for Assessing Impacts

All documents relevant to sensitive wildlife species in the region were first reviewed for baseline information. These included National Park Service, U.S. Forest Service, Washington Department of Wildlife, Chelan County PUD, and independent surveys, studies, management plans, and recovery plans (see the sources cited in the "Affected Environment" chapter).

Impact assessments under each alternative were based on a number of factors: the likelihood of each species or its preferred habitat types occurring in areas of known **or** expected development; direct (total) loss of preferred habitat based on acreage known or expected to be impacted; acreage of preferred habitat to be managed for a modified condition (partial loss); and the species' sensitivity to disturbance from human activities that may cause it to abandon currently or possibly occupied habitat.

Impact assessments for federally listed threatened, endangered, or candidate species will be reviewed by the U.S. Fish and Wildlife Service for concurrence, modification, or addition of mitigating measures in the final EIS.

Impact Assessment

Peregrine Falcon. Peregrine falcons are seldom sighted in the North Cascades park

complex. From 1968 to 1985 a total of five peregrine sightings were recorded in subalpine areas (NPS 1985). These occurred from early July to late September. Three days of raptor observation on Easy Pass (just outside the Stehekin drainage) in late September 1985 found no peregrines. Based on this record, no effect would occur on this species under the proposed action or any of the others.

Gray Wolf. The U.S. Fish and Wildlife Service is currently revising the recovery plan for gray wolves in the western U.S. A chapter for the state of Washington would be included in the revised plan. Some field research has been conducted, but little information is available south of the Canadian border in Washington. Wolves appear to be starting to naturally recolonize the northern part of the park complex and the nearby Okanogan National Forest. Although this area is at least 50 miles from the Stehekin Valley, wolves have been documented moving such distances, and farther. The protection of riparian communities in the lower valley would indirectly benefit wolf prey species, primarily mule deer. This alternative would have a beneficial effect on the probable future wolf use of the valley.

Bald Eagle. There are no known, regularly used, winter perch or roost sites in the national recreation area. Eagles have been known periodically, however, to perch in the Weaver Point area. In general, winter perch trees are always near feeding areas, such as salmon runs or waterfowl concentrations, and preferred branches are consistently used (USFWS 1986). Communal night roosts are also near a food source, in uneven-aged forest stands with a remnant of old growth. Isolation is an important feature of wintering habitat. On the Nooksack and Skagit (west side) rivers, eagles consistently use areas with the least human activity.

Fish, waterfowl, and carrion are probably the main food items of eagles wintering on Lake Chelan. Coots and mallards are important prey items on the Columbia River reservoirs and are probably taken here. There have been no occupied nesting territories in the Lake Chelan area between 1970 and 1993. The recovery goal for the area is to have five occupied territories. This would be the second largest subpopulation in the Cascade Mountains zone.

Since wintering eagles consistently use certain trees and areas for perching and roosting, it is unlikely that such behavior would go unnoticed in the national recreation area if regularly occurring. On the other hand, given the human use levels of the lower river and the head of the lake, eagles could be consistently displaced from the area. The recovery of the bald eagle hinges on the future availability of currently unused but suitable habitat (USFWS 1986). It is not known if the Stehekin Valley is suitable nesting habitat. Summer foods would probably be limited to fish, since there are no waterfowl concentrations in the summer, snowshoe hare hunting would be difficult with heavy tree cover, and anadromous fish runs occur in the fall (chinook and kokanee salmon from late August to November).

There would be no effect on existing, limited eagle use of the area under this alternative. Possible effects on long-term recovery goals are unknown. Assuming that the lake and river fishery can support breeding eagles (it does support breeding osprey), the valley could support one or more of the recovery plan's goal of five occupied territories (nest sites). These potential nest sites would be unavailable to eagles due to continued and increased human use in the area under the proposed action. It is also possible, however, that all five of the recovery plan's occupied territories could be supported downlake.

Cumulative impacts on bald eagles include exposure to residual DDT levels. Although the use of DDT in America was banned in 1972, Patmont et al. (1989) found DDT levels in 50% of the fish tissue samples taken from Lake Chelan to exceed the International Joint

Commission's recommendation for the protection of wildlife. These levels are not unusual for the region, and levels in Lake Chelan are expected to decline. The thinning of egg shells due to DDT is now not as great of a concern in the Pacific Northwest as in the past (USFWS 1986). Regardless, nothing in the proposed action or its alternatives would affect DDT levels in the lake ecosystem.

Northern Spotted Owl. A final USFWS spotted owl recovery plan has not been approved. This analysis uses the draft plan as its basis (USDI 1992). The overall goal of the draft recovery plan includes three main components: monitor owl populations and habitat, ensure a stable or increasing population, and implement regulatory mechanisms or land management commitments that provide for long-term protection of habitat. The biological goal for the Eastern Washington Cascades Province is to establish 20 designated conservation areas (DCAs) in the province that would protect a future total of 176 pairs of owls.

The Eastern Washington Cascades Province has characteristics unlike the more well-known western Cascades. In general, habitat in the eastern province is in better condition than that in the western, although there is much less of it and it is discontinuous. The few spotted owls north of Lake Chelan are isolated from larger subpopulations south of the lake. Emphasis for owl conservation in this province is on low-elevation, mixed conifer forests with small clusters of owls. The other major difference is the east side's vulnerability to fire. There is a significant potential for large-scale fire, and a very low probability that any DCA would avoid stand-replacement wildfire over a significant portion of its landscape during the next 100 years. Fire suppression has resulted in an accumulation of ground and understory fuels and an increase in crown closure which increases the probability of a stand-replacement (crown) fire. This could potentially eliminate owl habitat from large-scale landscapes. Fire poses a severe natural threat to population recovery in this province. Ironically, under natural fire regimes, east side forests would have tended to develop more open canopies and less dense understories, and would probably have been less suitable owl habitat today.

The Stehekin Valley DCA (WD-33 in the plan) is 55,176 acres in size, and it is estimated to contain 5,600 acres of nesting, roosting, and foraging (NRF) habitat. Of this, 1,520 NRF acres are on USFS wilderness lands in the Company and Agnes creek drainages, while the rest are within the national recreation area and park. The recovery plan estimates there are six pairs of owls in the DCA, while NPS and USFS surveys have documented seven pairs. The plan projects that 10 pairs could be supported in the DCA if "habitat were recovered."

Management of owls in this province would begin with the establishment of interagency groups that would provide province-specific guidance. In the eastern Cascades, with its risk of fire, such guidance would likely include the attempted maintenance of currently suitable habitat conditions. Then an individual DCA management plan would be completed which includes a history and inventory of owl population and habitat conditions, objectives, consideration of other land uses, risk assessment, criteria for determining appropriate management actions, and monitoring and evaluation components.

In general, the following guidelines would apply to all DCA management plans: construction or development of new facilities that may adversely affect owl habitat or reproductive success would not occur; existing roads would be evaluated and a determination made on need, or if closure and rehabilitation is appropriate due to owl concerns; firewood gathering, if allowed, would be limited to blowdown blocking roads or green trees thinned from overstocked, unsuitable habitat; land exchanges would be considered if they

promote owl recovery; and dispersed recreational uses would generally be compatible, although trails would be located at least one-quarter mile from owl activity areas.

The forest protection guidelines in the draft recovery plan (USDI 1992, appendix F) conclude that there are no viable "forest protection options to maintain owl habitat at its current level in the East Cascades subregion. As noted, the current extensive habitat is likely a result of an historical anomaly: successful fire protection. The structure resulting from this anomaly is inherently unstable, subject to increased fire, wind, disease, and insect damage. Any stand manipulation [even prescribed fire] which would significantly increase resistance to these disturbance factors apparently would result in decreased owl habitat, through reduction of thick understory conditions.

The computer modeling of a no-action/ minimum requirements scenario for a typical east-side forest (which was originated by wildfire about 80 to 100 years ago — like Stehekin) resulted in forest stands with a very dense layer of grand fir and Douglas fir beneath a sparse canopy of ponderosa pine (USDI 1992, appendix G). This is similar to what appears to be occurring on many stands in the Stehekin Valley. In the model, risk of severe fire was high, and diseases and insects killed trees of all species, adding to fuel loading.

Forest stands that currently support active spotted owl nests are on steep side slopes away from past human impacts in the lower valley, but these stands have probably changed in the absence of fire. The lower valley itself may have supported spotted owl habitat at some time in the past, and may support it again in the future under natural or unnatural fire regimes. The recovery plan calls for a goal of 10 pairs of owls in the DCA. Assuming that the available habitat is saturated with owl territories (based on large home range size), the lower valley is the only potential habitat "available" for future nesting sites. As noted in the USFS/BLM spotted owl EIS (1993), if NPS lands are managed for natural conditions, then the amount of owl habitat in them can be expected to vary over time as natural disturbance regimes are allowed to operate.

The forest fuel reduction areas in this alternative would reduce the risk from most fires in the developed lower valley; however, they would not reduce the risk in the upper valley around High Bridge and Bridge Creek, nor along the lakeshore, where the active owl nests are located. In fact, these nest sites, with their steep slopes and heavy forest cover, probably could not be protected from wildfire without extreme vegetative treatments in their vicinities. Even if possible, such management is very unlikely given NPS management policies. It is therefore concluded that these sites, and the majority of the NRF habitat in the recreation area and the Stehekin Valley, would remain, over the long term, at a high risk of loss due to wildfire.

Direct losses of potential owl habitat would occur in the creation of the fuel reduction areas. Forest cover in these areas totals 709 acres, some or most of which currently could be suitable owl habitat. Of these 709 acres, up to 355 acres would be managed for a 40%-60% crown closure and minimal understory. Since owls prefer at least 60% crown closure and multistoried canopies, most of these acres would be lost as possible owl habitat. The fuel reduction areas would, however, reduce the risk to adjacent forest stands, with existing owl habitat, from some wildfires. The existing policy of suppression of all fires in the lower valley further protects these stands. Therefore, the establishment of fuel reduction areas as part of the valley's overall wildfire protection policies would have some adverse and some beneficial effects on spotted owls.

Management of the forest fuel reduction areas is consistent with the U.S. Forest Service and Bureau of Land Management 1994 "Record of Decision and Standards and

Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species within the Range of the Northern Spotted Owl."

Impacts from cutting firewood on private lands could negatively affect up to an additional 190 acres of forest lands. If the number of hikers on the lakeshore trail south of the Landing were to increase, the nest site here could be directly disturbed since it is less than one-quarter mile from the trail.

Positive impacts would occur from the long-term protection of 149 acres of forested riparian and upland communities on private lands, after acquisition or easement protection.

Barred owls occur in the lower valley and have been known to displace spotted owls in some areas. The four key avian predators to spotted owls also occur in the valley — great-horned owl, northern goshawk, red-tailed hawk, and common raven (NPS 1993c). In general, the extent of competition and predation threats to spotted owls is unknown in the eastern Washington Cascades province (USDI 1992).

In summary, this alternative is not likely to adversely affect spotted owls, although impacts would be both adverse and beneficial. Developments and human activity in the lower valley may permanently preclude the use of this potential nesting habitat. Fuel reduction would remove up to 355 acres of owl foraging habitat. The protection of 149 acres of forested riparian and upland would be a benefit to long-term habitat conditions. All activity sites would continue to be at severe risk of loss to wildfire.

Grizzly Bear. It is probable that the riparian zone of the Stehekin River was significant spring habitat before the reduction of the grizzly bear population and before human activities displaced possible grizzly use (see the "Affected Environment" chapter). Given the valley's low elevation and early green up in the spring, it could have been a particularly important area. The suppression of natural fire has probably reduced early successional stages in the riparian zone, lessening the value for grizzlies (IGBC 1987). A spring snow line analysis was conducted that showed the lower valley to be snow-free early in the year and thus potentially available for grizzly bear use (Almack et al. 1993). Early spring, when grizzlies are stressed from just emerging from their dens, is a critical time of the year. The low elevation, Stehekin Valley riparian area is the largest in some 2.5 million acres in the center of the North Cascades grizzly bear ecosystem (see the "Impacts on Riparian Communities, Cumulative Impacts" section).

The protection of 118 acres of lower valley riparian communities would benefit grizzly bears in the long term.

Overall isolation of a grizzly population is a consideration for its long-term viability. Isolation is a function of the type and amount of human activities that influence the effectiveness of required habitats and the security of individual bears (Almack et al. 1993). Human resource uses that affect isolation include population centers, campgrounds, ski areas, airstrips, roading, logging, and grazing. Recreational camping, picnicking, and fishing, as well as increased overnight lodging and other human activities increase the availability of food and garbage. Activity sites are often in prime grizzly use areas such as river bottoms. It is recommended that all frontcountry or backcountry campsites and trails be evaluated for their compatibility with grizzly use and behavior (IGBC 1987). Currently, observations of grizzlies are rare and human/grizzly interactions nonexistent, but this could change if the population returns to more natural levels. For the existing population, its small size and low genetic variability prevent it from increasing to a viable level. Prescribed burning under this alternative could return the riparian communities to earlier successional stages, potentially

benefiting grizzly bears if human activity levels were reduced.

Three components should be considered for cumulative impacts: habitat, displacement, and mortality. Impacts on grizzly habitat, both beneficial and adverse, are discussed above for both the valley and regionally. Displacement of grizzlies from the lower valley and in some backcountry areas may be occurring. Given a reasonable assumption that the lower valley is important habitat, grizzlies are not now using this area. Currently, grizzly bear mortality due to human causes is minimal or non existent. This condition could change if either the grizzly population increases or if human use of grizzly habitat rises.

In summary, this alternative is not likely to adversely affect grizzly bears, although impacts would be both beneficial and adverse. The protection of 118 acres of riparian habitat in the lower valley would benefit bears in the long term. An expected 40% increase in visitation and increased levels of private development would discourage or preclude future bear use of important spring habitat in the lower valley.

Bull Trout. See the "Impacts on Native Fish" section for possible impacts on bull trout.

California Wolverine. Half of the park unit's recent wolverine sightings have been from the Bridge Creek drainage. Although wolverine sightings are now primarily from high mountain areas, it is probable that the lower valley was used by wolverines in the past, particularly in the late fall, winter and early spring, before homesteading and development began there. Human activity in the lower valley would continue to displace wolverines from this potential habitat.

Pacific Western Big-Eared Bat. Since there are no known caves in the lower Stehekin Valley, and this species is closely associated with caves, it is unlikely that these bats would be affected by the proposed action or any of the alternatives. Habitat management recommendations revolve around cave and cave entrance areas (WDOW 1991). It is possible that this species visits the area in the two months after completion of its breeding cycle (end of August) and before beginning its hibernation cycle (beginning of November), but due to Stehekin's mountain isolation this seems unlikely.

Pacific Fisher. Although currently very rare in the state, the valley is considered good fisher habitat, and records indicate that fishers could use valley habitat, particularly the riparian areas. In Idaho, fishers preferred riparian areas in winter as well as in summer (USDI 1992). Habitat management recommendations include the maintenance of contiguous forest canopies in riparian areas, retention of snags and down logs, and the protection of wetlands, and habitat for prey species such as squirrels, birds and hares (WDOW 1991). Protection of lake and river shorelines, adjacent wetlands, and other riparian areas in the lower valley would improve long-term habitat conditions.

North American Lynx. Based on vegetation and elevation, the lower Stehekin Valley is not considered optimal lynx habitat. There are, however, at least 17 records from Chelan County, including one from the lower Stehekin valley (WDOW 1993b). Long-term fire suppression could have reduced the density of snowshoe hares — a major prey species — in the area (Koehler 1989). On a regional scale, lynx populations in the northern Cascades are vulnerable due to low numbers, past and planned habitat alteration, forest maturation, and reduced immigration from core populations in Canada due to habitat alteration in dispersal corridors. These factors may lead to a condition in which the population may not naturally recover (WDOW 1993b). Actions in this alternative would not change these regional conditions.

Cascades and **Spotted** Frogs. In general, the protection of riparian areas in the valley would be beneficial to these species. Although they may occur on the north side

of the river, there are more wetlands on the south side which support habitat needs. Protection of wetland on southside private lands on Battalion Creek and on river overflow channels would be beneficial effects. Restoration of woody debris in the river would also be beneficial. There are no threats to the other known sites southeast of the airstrip.

Northern Goshawk. Within a home range, goshawk habitat can be divided into three components: nest sites, post-fledgling area (PFA), and foraging area (WDOW 1993c). Although home ranges can be large, the defended territory maybe equal to the PFA, which averages 415 acres. Nest sites are usually in mature to old growth stands and generally within 500 to 750 feet of permanent water. Goshawks usually have an active nest as well as one to three additional nest areas used in other years. The PFA is an area of concentrated use by the female and fledglings and provides foraging as well as hiding cover. Within the larger home range, snags and down logs increase prey abundance. Goshawks are opportunistic foragers; in this area likely eating American robin, varied thrush, Steller's jay, northern flicker, mourning dove, grouse, flying, ground and tree squirrels, chipmunk, and snowshoe hare. It is recommended that the following management standards should be provided: protection of at least three nest areas of 30 acres each, and minimized human presence during the early March to late September nesting period; protection of a 415-acre PFA with at least 60% of the area in mature to late-successional forest; and a 5,400-acre foraging area also with at least 60% in mature to late-successional forest (WDOW 1993c).

The active goshawk nest south of the Landing is far enough away from the proposed action's Landing development to not be disturbed by it. It is also approximately 400 feet from the lakeshore trail and no known disturbance from hikers has occurred. This trail is, however, within a hypothetical 30-acre buffer around the nest site. Possible increased use of the lakeshore trail under this alternative could disturb this nesting pair. The secondary protective recommendations of maintaining 60% mature to late-successional forest cover would be met. Although the Landing is within a 415-acre buffer of the site, construction of the new lodge would affect only 2 forest acres, a small portion of the buffer. A second territory and possible nest site is suspected in the lower valley, though if it exists, its location is not known. Impacts on this pair from continued human use in the lower valley are unknown but are probable.

Harlequin Duck. Nesting harlequins are highly sensitive to human disturbance and will not attempt to re-nest if disturbed. Studies on the Stehekin River have shown that harlequins are disturbed more by humans on foot than in floating rafts (NPS 1990). Although harlequins have been observed on all river reaches of the lower valley, two sections have had the most sightings of pairs and broods: between the mouth of Rainbow Creek and Harlequin Bridge, and between McGregor Meadows and the Stehekin Valley ranch. Potential impacts on harlequins include habitat loss, human disturbance, and hunting, since they are still a game species in Washington (NPS 1993c).

The proposed action would protect riparian and wetland areas associated with the river as well as restore river edge disturbances within 200 feet of the water. These would all be beneficial to harlequin ducks. The National Park Service would not manipulate the river edge with riprap, which would also be beneficial. The important river reaches identified above would, however, continue to be affected from visitor use near the Buckner orchard and by the closeness of the valley road along the upper reach. Rafting use is expected to decrease with the retention of woody debris in the river.

Regional impacts on harlequin ducks are reflected in the impacts on riparian

communities topic under cumulative impacts.

Golden Eagle. Although golden eagles sometimes forage in the lower valley, the park's wildlife database has records for only 11 such individuals since 1971 — 8 in the winter, 1 in the spring, and 2 in the summer. In the park complex, these birds nest exclusively in the subalpine and alpine. Neither the proposed action nor any of the alternatives is expected to affect this species.

Flammulated Owl. It is not known if this owl occurs in the valley. If it does, this alternative would not affect any of its known habitat needs.

Common Loon. Loons have only been observed on the surface of Lake Chelan where they dive for small fish. Use of some backcountry lakes may occur but is not documented. Nesting may have occurred at the head of Lake Chelan before it was dammed. However, it is unlikely that successful nesting could now occur due to extreme water fluctuations in the beginning of the nesting cycle and the floating nature of loon nests (NPS 1988c). It is possible that impacts on foraging loons may occur from recreational lake users if such uses increase under this alternative.

Vaux's Swift. This bird nests in snags and forages on the wing for insects, just above the tree tops (Larrison and Sonnenberg 1968). It is believed to breed within the park complex, but breeding has never been documented (NPS 1993d). Management recommendations include the retention of snags and large defective trees, especially those with signs of decay (WDOW 1991). This alternative would not have any effect on snag densities or on this species.

Pileated Woodpecker. Although at least two pairs are thought to nest in the lower valley, their nesting and foraging areas are unknown. They prefer forest stands that are over 70 years old; most valley stands are about 100 years old (Oliver and Larson 1981). Given the mix of Douglas fir, ponderosa pine, and riparian stands in the valley, and the large size of pileated territories, the entire forested valley is probably used by these woodpeckers. Although breeding occurs between mid-March and mid-July, this occupied area would be used throughout the year since territories and pair bonds are maintained year-round (Ehrlich et al. 1988).

Pileateds are dependent on large snags and down trees for nesting and foraging, including those with heartwood rot, insect infestation, and in various stages of decay (WDOW 1991). Preferred nest and roost trees include ponderosa pine, black cottonwood, and Douglas fir. This alternative would protect riparian forest stands — a beneficial impact on this species. The protection of this primary cavity nester would also indirectly enhance populations of secondary cavity nesters which use old pileated nests. These secondary cavity nesters include three other sensitive species: Vaux's swift, flammulated owl, and western gray squirrel.

In general, forested pileated habitat would be affected both negative!}' and positively. A total of 371 acres of forested fuel break would be managed for 30^10% canopy closure; however, snags would be left within these areas. Such snags would probably be used for foraging, but these acres may be lost as possible nesting sites due to pileateds' preference for stands with at least two canopy layers (WDOW 1991). On private lands, up to 190 acres of forest stands could be cut for firewood. Both of these impacts would be adverse. On the beneficial side, 149 acres of forested riparian and upland communities would be protected in the long term through the acquisition of private lands or interests.

Western Gray Squirrel. Management recommendations include the protection of snags, and mast-producing trees — probably bigleaf maple, grand fir and Douglas fir in Stehekin (WDOW 1991). Protection of riparian and upland habitats under this

alternative would be a beneficial impact on gray squirrels. Whether or not this species is native to the Lake Chelan NRA, or if it has naturally or unnaturally colonized the valley, is unknown. This could affect its status under NPS management objectives, which protect native species and control normative species. Regionally, the species is in danger of extinction in most of its range in Washington due to disease, competition with other species, predation, and human disturbance — primarily loss of suitable habitat (WDOW 1993a).

Victoria's Grape-Fern. Two populations are known from the lower valley. Although these are near road segments, the sites would be identified and protected during any construction activity resulting from this alternative and no adverse impacts are expected.

Western Ladies-Tresses. This population, in a disturbed site and near a road segment would also be protected from construction activity. No impacts are expected.

Giant Helleborine. This population is distant from any developed areas of the national recreation area, but it is near a trail. It is possible that increased visitation could increase trail use in the area. As long as the exact location of this species is kept confidential and the site is monitored, no adverse impacts are expected under this or any alternative.

Conclusion

There would be no effect on existing bald eagle use of the area; possible effects on long-term recovery of the local population are unknown. Northern spotted owls and grizzly bears are not likely to be adversely affected, although impacts would be both beneficial and adverse. Gray wolves would be beneficially affected. Peregrine falcons would not be affected. Potential and occupied northern goshawk nesting sites could be affected adversely. Harlequin ducks would be affected beneficially.

IMPACTS ON WATER QUALITY

Summary of Regulations and Policies

In accordance with NPS *Management Policies,* "The National Park Service will seek to perpetuate surface and ground waters as integral components of park aquatic and terrestrial ecosystems. Park waters, either surface waters or groundwaters, will be withdrawn for consumptive use only where such withdrawal is absolutely necessary for the use and management of the park and when studies show that it will not significantly alter natural processes and ecosystems." (NPS, 1988d, 4:15)

"The National Park Service will seek to restore, maintain, or enhance the quality of all surface and ground water within the parks consistent with the Clean Water Act and other applicable federal, state, and local laws and regulations." (NPS, 1988d, 4:15-16)

The primary goal of the Clean Water Act (33 USC section 1251 et seq.) is to "restore and maintain the chemical, physical, and biological integrity of the Nation's water." Under the Clean Water Act, states are required to set and enforce water quality standards that meet EPA minimum guidelines. Section 404 authorizes the U.S. Army Corps of Engineers to prohibit or regulate, through a permit process, discharge of dredged or fill material into the waters of the U.S., including wetlands. Section 401 provisions ensure that federally permitted activities that may result in discharge to state water comply with the federal Clean Water Act, state water quality laws, and any other appropriate state laws. The State of Washington Department of Ecology carries out section 401 requirements.

The "Water Quality Standards for Surface Waters of the State of Washington," Chapter 173-201A WAC, designated surface waters in

the national recreation area as Class AA (extraordinary) for maximum protection.

Also refer to the "Impacts on Stehekin River/Floodplain" and "Impacts on Wetlands" sections.

Methodologies for Assessing Impacts

The focus of this impact assessment is on the chemical and physical components of surface water in the national recreation area. Impacts were evaluated by analyzing the sensitivities of key water quality components to alternative activities.

Impact Assessment

The proposed action would provide additional protection for water resources in the study area. Mitigation described under the alternatives section would reduce the impacts to surface water and groundwater resources potentially caused by water uses, and storage, transport, and use of fuels and other toxic material. Also, the overall reduction in disturbance areas, combined with mitigation to reduce soil erosion, would decrease suspended sediments and turbidity in streams (see "Impacts on Stehekin River/Floodplain" section). Construction activities for the erosion control structures on the upper Company Creek road could cause temporary increases in suspended sediment and turbidity.

Some fuel and other toxic materials would be moved outside the 500-year floodplain. Storage tanks at the maintenance area would be moved outside the regulatory floodplain. Increased demand for electricity would increase the use of the Chelan County PUD diesel generator and consequently increase the amount of diesel transported to and stored near Company Creek. This would increase the risk of an accidental spill. Application of federal and state fuel storage and waste disposal regulations would reduce the potential for contaminating water resources. However, a major flood event could inundate up to four fuel and toxic material storage sites, possibly resulting in water contamination.

Potential increased visitor use would result in greater private boat (including house boats) and floatplane use. The number of scheduled commercial boat trips would **not** be expected to increase. Mitigating measures described under the alternatives section would reduce water quality impacts possibly caused by increased watercraft use in the national recreation area. Increased wave action caused by an increase in boat or floatplane traffic would cause only minimal lakeshore erosion compared to that caused by lake elevation fluctuation and natural wave action.

Impacts on water resources caused by private land uses would depend on the level of cooperation between private landowners and the National Park Service and the willingness of other agencies to apply their water resources protection programs.

Conclusion

The proposed action would provide protection in addition to that afforded by existing laws and regulations for water resources.

Cumulative Impacts

The total cumulative impact on water resources is composed of past impacts, external impacts, and impacts predicted under this alternative. Existing water quality conditions are described under the "Affected Environment" chapter. Although the majority of existing water components in the national recreation area are within state water quality criteria, pollution from past and external sources continues to adversely affect its resources. Some lake bottom sediment and fish tissue sampled from Lake Chelan had metal or total DDT concentrations at levels

that could adversely affect human health or wildlife in the recreation area. Metals and DDT in lake sediments tend to be persistent and would continue to cause long-term adverse impacts on fish and wildlife in the recreation area, especially predatory birds.

Frequent consumption of large quantities of fish from Lake Chelan could also have a long-term adverse effect on human health (Patmont et al. 1989). The annual fluctuations in the surface elevation of Lake Chelan would continue to cause some lake bottom and shoreline erosion at the head of the lake resulting in slightly elevated suspended solids and turbidity levels. Sulfates from western Washington pollution sources would continue to threaten aquatic life in high lakes sensitive to acid input.

There are 26 known fuel and toxic material storage sites within the national recreation area. There are likely other unknown sites that contain old buried dumps that contain toxic material. Ground or surface water contamination levels, if any, at these sites from possible leakage or spillage are generally unknown. Because of past and external adverse impacts on water quality in the national recreation area, the beneficial impacts of each alternative would have a positive cumulative impact on water resources.

IMPACTS ON AIR QUALITY

Summary of Regulations and Policies

The NPS *Management Policies,* state that "The National Park Service will seek to perpetuate the best possible air quality in parks because of its critical importance to visitor enjoyment, human health, scenic vistas, and the preservation of natural systems and cultural resources." (NPS, 1988d, 4:17)

The Clean Air Act, 42 USC 7401 et seq., dictates that the national ambient air quality standards (NAAQS) must be maintained nationwide. The act delegates authority to state and local agencies to enforce the NAAQS and to establish air quality standards and regulations of their own. The adopted state standards and regulations must be at least as restrictive as the federal requirements. The Washington Department of Ecology has the authority to regulate air pollution sources within Washington. Lake Chelan NRA is surrounded by areas designated as class I airshed. Sec. 169 A of the act states that it is a national goal to prevent any further impairment of visibility within mandated class I areas from manmade sources of air pollution. Visibility impairment is defined as (1) a reduction in regional visual range and (2) atmospheric discoloration or plume blight from exhaust effluents.

The act also requires that any NPS development or management activities within parks that could affect air quality to comply with state and local air pollution control laws and regulations (section 118).

Methodologies for Assessing Impacts

Lake Chelan NRA is in attainment for all NAAQS. The relationship of existing sources of pollution to the ambient air quality of the Stehekin Valley has not been sufficiently studied and modeled to assess the impacts to the ambient air of Stehekin Valley. Consequently, this assessment is based on the changes in emissions from energy consumption that would occur under each alternative. Emissions were calculated based on the estimated annual use of different fuel types under each alternative and improved efficiencies of woodburning units (see appendixes E and J). Results were compared to existing conditions as percent change. Assumptions for purposes of analysis were as follows:

- Energy consumption is correlated with a combination of the number of residences, and of NPS and commercial activities.

- All existing stoves and fireplaces would be converted to high-efficiency /low-emission units.

Air quality impacts associated with fugitive dust, wildland fires, and campfires, and construction activities were assessed qualitatively.

Impact Assessment

Compared to existing conditions, the proposed action would increase emissions from energy and consumption within the Stehekin Valley by 6% for the five pollutants evaluated. This alternative would increase particulates by 3%, oxides of nitrogen by 202%, and oxides of sulfur by 186%. Chelan County PUD's diesel electric generator along with the use of other fuel oils would emit 34% of all fuel-related pollutants and produce most of the nitrogen and sulfur oxides. Increases in the total quantity of nitrogen oxide emissions would be the greatest compared to the other four pollutants evaluated. Total carbon monoxide emissions would decrease by 15% and hydrocarbons by 16% as a result of converting to efficient woodburning units. However, burning firewood would continue to be the largest fuel-related pollution source contributing 62% of the total emissions. Therefore, reductions in firewood use and conversion to high-efficiency woodburning stoves or fireplace inserts would cause the greatest reduction in energy-related emissions.

Conservation measures described in the alternatives section and reduced NPS firewood use could reduce annual firewood consumption by over 50% (Northwest Energy Services, Inc. 1993). Measures to conserve energy would also minimize the use of Chelan County PUD's diesel electric generator and reduce emissions. The private sector currently uses 53% of the total energy resource in Stehekin. Therefore, the reduction in fuel-related emissions would very much depend on their use of conservation measures. Increased vehicle use within the national recreation area would increase emissions by 44%. Increased air and boat traffic in and out of the national recreation area would also increase emissions. Emissions from energy-related pollution could noticeably reduce visibility during cold periods when air occasionally stagnates because of temperature inversions and low wind speed.

Limiting vehicular access to the upper Stehekin Valley road would reduce vehicle and dust emissions along an 11-mile corridor between High Bridge and Cottonwood Camp. In addition, paving about 5 miles of road between Harlequin Bridge and 9-Mile would reduce fugitive dust emissions along that road corridor. However, increased vehicle use on other unpaved roads would increase airborne dust reducing visibility and coating adjacent vegetation. Revegetation of some disturbed areas would help protect soils from wind erosion and reduce dust emissions.

Prescribed natural fires to achieve presettlement fuel levels would cause major temporary decreases in air quality and probably be more frequent than under the no-action/minimum requirements alternative. Prescribed natural fires must conform to the *Washington State Smoke Management Plan.* Smoke from campsites would also be a large contributor to Stehekin Valley air pollution. Prohibiting campfires in alpine zones would reduce smoke in wilderness areas of the park.

Short-term emissions would result from construction of proposed facilities and sand, rock, and gravel extraction operations at the Company Creek pit. Machinery emissions and increased airborne dust from these activities would decrease air quality near the project sites. Normal conditions would return when construction or extraction activities were completed. Extraction operations at the Company Creek pit would occur about every 10 years for one month. Reclamation of the Company Creek pit after

completion of extraction operations would decrease wind-caused airborne dust.

Conclusion

Compared to existing conditions, the proposed action would increase the total energy-related air pollutants within the Stehekin Valley by 6%, particularly for oxides of nitrogen if demand for electricity increases. Conversion to high-efficiency woodburning units and other energy conservation measures would help reduce some air pollutant emissions. Increases in dust, vehicle, and prescribed fire emissions would adversely affect the recreation area's air quality.

Cumulative Impacts

The total cumulative impact on air resources is composed of past impacts, external impacts, and impacts predicted under this alternative. At times, air quality would be severely affected by smoke from wildland fires, including prescribed burns, prescribed natural fires, and wildfires that occur in surrounding areas. Air pollutants originating from urban and point sources in western Washington could also adversely affect visibility and precipitation chemistry (see "Affected Environment" chapter). Annual release of water from Lake Chelan Dam would continue to expose large areas of lake bottom within the study area. Drying winds would erode exposed bottom soils and increase dust emissions. Past land disturbances, particularly roads, have also exposed soils to wind erosion that contributes to airborne dust emissions.

IMPACTS ON CULTURAL RESOURCES

Summary of Regulations and Policies

All NPS programs affecting cultural resources are subject to the provisions of the National Historic Preservation Act as amended (16 USC 470 et seq.), the National Environmental Policy Act (42 USC 4371 et seq.), the American Indian Religious Freedom Act (42 USC 1996), the Native American Graves Protection and Repatriation Act (25 USC 3001 et seq.), the Archeological Resources Protection Act (16 USC 470 et seq., the Advisory Council on Historic Preservation's regulations regarding "Protection of Historic Properties" (36 CFR 800), the secretary of the interior's "Standards and Guidelines for Archeology and Historic Preservation" (FR 48:44716-40), and "Federal Agency Responsibilities under Section 110 of the National Historic Preservation Act" (FR 53:4727-46). Other applicable legislation and regulations and specific management procedures governing historic and archeological resource management are detailed in the NPS *Cultural Resource Management Guideline* (NPS-28).

Methodologies for Assessing Impacts

Archeological base maps were compared with the development plan maps. In areas where development was proposed on or near archeological sites, it was assumed that impacts would occur.

Until exact locations are selected and preliminary designs are available for new construction, it is not possible to project direct effects on archeological resources. The National Park Service would conduct more specific surveys in the design stage. Every effort would be made to avoid direct impacts on archeological resources. Should avoiding sites be impossible, mitigating measures, including but not limited to excavation and recording of sites, would be carried out in consultation with the state historic preservation officer and the Advisory Council on Historic Preservation.

Should previously unknown resources be uncovered during construction, work would be stopped in the discovery area, and the National Park Service would consult according to 36 CFR 800.11 and, as

appropriate, provisions of the Native American Graves Protection and Repatriation Act of 1990.

Impact **Assessment**

Identification/evaluation, preservation, and interpretation of the cultural resources under NPS stewardship would ensure their long-term protection for public enjoyment. Historic properties recommended in the 1986 *Historic Resource Study* would be evaluated, a cultural sites inventory would be established and updated, and historic properties would be maintained as recommended in the 1987 *Historic Structure Preservation Guide,* thus providing for a more comprehensive program of cultural resource preservation, protection, and interpretation. Recordation of cultural sites and collection of interpretive artifacts would result in accumulation of data on the history of the park area. Systematic management of the museum collection would benefit curation of individual items and preservation of archeological and historic resources.

The Buckner homestead and orchard would be preserved, and the genetic stock of the orchard would be maintained. A low level of interpretation would be provided and most of the buildings would be closed to the public. All on-site media and devices to interpret the homestead and orchard would be designed and placed to avoid impacts and minimize the visual intrusion on the historic scene.

Items in the Buckner collection would be restored on a priority basis if owned by the Park Service. Significant items in the Buckner collection would be acquired by the Park Service. Some artifacts would be restored and maintained for interpretation. A collection storage/museum/curatorial facility would be constructed outside the Stehekin Valley to store additional items, thus minimizing impact on the historic landscape in the valley area.

The Golden West Lodge would be rehabilitated and used for NPS administrative purposes, a visitor center, an interpretive center, and minimal storage for some items in the Buckner collection. Such adaptive use of the lodge could affect the historical character and interpretive value of the site.

The High Bridge Historic District would be rehabilitated and used for NPS operations. This action could affect the historic character and interpretive value of the site and would ensure the long-term preservation of the site.

An agricultural use permitting system of NPS lands would be developed, guided by a historic landscape report and a comprehensive vegetation management plan, both including consideration of historic crops and uses. This would ensure that continuing agricultural use would operate within the parameters of historic agricultural patterns and thus preserve the historic landscape.

There may be indirect effects to the prehistoric site near Stehekin Landing due to casual collection.

It is possible that improvements to the Stehekin Valley road could directly affect one prehistoric site and the historic Stehekin wagon road segment. Rehabilitation of the High Bridge Historic District has the potential to affect a prehistoric site.

Harlequin Bridge has been determined eligible for listing on the national register. The National Park Service will consult with the state historic preservation officer regarding retention and rehabilitation of the structure.

Conclusion

A systematic and comprehensive program for the preservation, protection, and interpretation of cultural resources in the Lake Chelan NRA would be conducted in conformance with the *Resource Management Plan* and *Interpretive Prospectus* for the park

complex. The program would provide for the preservation of significant cultural resources illustrating the history of the area and for additional efforts directed toward management of the area's cultural resources and historic landscapes. One historic and two prehistoric archeological sites could be affected. Any potentially adverse effects would be mitigated in consultation with the state historic preservation officer and the Advisory Council on Historic Preservation.

Cumulative Impacts

Throughout the state of Washington historic properties, many of which at one time had national register potential, have deteriorated or been removed. These resources include disappearing reminders of the state's settlement patterns, commercial development, recreation and tourism industry, and administration of significant scenic and cultural areas by government agencies. The increased protection provided to cultural resources under the proposed action would prevent some resources from disappearing.

Cumulative impacts on archeological sites are difficult to analyze. It is presumed that the closer large groups of people are to a given site, the more likely it is to suffer slow degradation caused by erosion, casual collection, and deterioration of features.

IMPACTS ON VISUAL/SCENIC RESOURCES

Summary of Regulations and Policies

The NPS organic act states that one of the fundamental purposes of a national park is to conserve the scenic resources of these nationally significant areas. "The Service thus established shall promote and regulate the use of the Federal areas known as national parks, monuments and reservations . . . by such means and measures as conform to the fundamental purpose of said parks, monuments and reservations, which purpose is to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such a manner and by such means as will leave them unimpaired for the enjoyment of future generations" (emphasis added).

The act that established the North Cascades National Park and Ross Lake and Lake Chelan National Recreation Areas in 1968 made specific references to scenic values. Section 202 states, "In order to provide for the public outdoor use and enjoyment of portions of the Stehekin River and Lake Chelan, together with the surrounding lands, and for the conservation of the scenic, scientific, historic, and other values contributing to the public enjoyment. . . ." Section 402 reiterates the importance of visual resources by stating that the area will be administered in a manner to best provide for "conservation of scenic, scientific, historic and other values contributing to the public enjoyment. . . ."

Methodologies for Assessing Impacts

Implementation of the management objectives and their associated actions would affect visual resources in both positive and negative ways. Visual impacts have a physical component (change in the resource) and a viewer component (response to that change). Visual resource changes introduced by implementation of the plan can be analyzed in terms of the existing visual character of the landscape and the degree to which the actions would contrast or be compatible with that character. Viewer response can be analyzed in terms of (1) viewer exposure to visual resource change — whether the action would be visible and if so, from what distance, for what duration and by how many viewers, and (2) perceived viewer sensitivity, which is primarily a function of the extent to which viewer activity is dependent on visual quality. A visual impact implies a significant visual change that conflicts with the existing

visual character and adversely affects viewer groups. Minor visual impact implies little visual change in existing character and minor effects on viewer groups.

The following impact discussion is presented within the context of the landscape units, and starts at the lake and proceeds up the valley.

Impact Assessment

The removal of the Riddle Creek cabins and the conversion to boat-in campsites that would be set back from the sensitive shoreline, restoring the lake shoreline to a more natural condition, which would result in a net benefit to the visual experience, particularly to arriving visitors on private boats and the commercial ferries. Any new docking facility associated with the campsites would be a minor intrusion into the visual character of this area.

The alluvial terrace associated with Purple Creek in the Landing landscape unit is of low sensitivity except at the shoreline. Existing private and NPS development and new facilities (e.g., the lodge) that are planned to be relocated from the shoreline to areas further into the terrace and rehabilitation of old sites would enhance the scenic values of the area. Arriving visitors (viewpoint #1) as well as residents at the head of the lake (viewpoint #3) and campers at Weaver Point (viewpoint #5) would benefit from the improved views to the shoreline at the Landing. An impact on the existing character of the Landing would be associated with the development of a haul-out area and a long-term storage site for boats.

The head of the lake is recognized as a sensitive area because of its visual accessibility to almost all visitors to Lake Chelan NRA. Additional development of private lands for residential use or to meet visitor demand for accommodation in the head of the lake landscape unit would not affect views from arriving visitors (#1), users of Imus Trail (#2), the road along the lake (#3), Purple Point campground (#4), Weaver Point campground (#5), and the Landing (#6) if management objectives and actions are implemented that protect sensitive resources, and land protection and cooperative relationships with other public agencies are established to preserve the shoreline of the lake and remove existing structures that are visible. In addition, to reduce impacts, new buildings would be located out of the shoreline buffer. The relocation of campsites away from the shoreline and expansion of the Weaver Point campground into areas of low visual sensitivity would benefit scenic values and views.

The provision of a public access site on the river near the "castle" and a pedestrian suspension bridge over the river at Boulder Creek would affect the scenic river experience of people floating the river in the Bakery and Boulder Creek landscape units. These facilities would benefit area users by allowing additional views up and down the river, to other adjacent resources and the surrounding valley walls.

In the fairways landscape unit, relocating NPS and concession seasonal housing and the maintenance activities out of the open fairways to an area beside the airstrip and restoring the fairways to natural conditions would reduce the limited amount of open space in the valley and views out to adjacent areas. The new facilities, however, are planned to be located in an area of low visual sensitivity. Clustering of these facilities and maintaining the surrounding existing vegetation as much as possible would reduce their visibility.

Providing a formal river access site at approximately river mile 9, in the Coon Creek landscape unit, would be a benefit to river users as well as provide visual access to the river and surrounding resources. Impacts would be associated with development of the site because of changes to vegetation and the riverbank. Impacts

could be reduced with selective removal of vegetation, enhancement of the road and river vegetative buffer and sensitive design of the area.

Providing a turnaround for vehicles at High Bridge would necessitate removal of vegetation and adding a widened gravel pad. This should be accomplished by disturbing only what is required for the turnaround and placing the turnaround in a location that is not visible from the High Bridge viewpoint (#17).

There are a number of other actions that would have an impact on visual resources and the overall experience of visitors to the area. These are as follows;

New pedestrian and horseback riding trails would have segments located within view of the valley road or river, both of which are of high sensitivity. Minor modifications to vegetation and land form associated with trail development would go unnoticed from the majority of viewpoints. The trails would provide visual access to scenic resources in the surrounding landscape

Burying powerlines, particularly where it parallels the Valley Road (e.g. on the shoreline of the lake) and crosses the river (e.g. Harlequin Campground), would benefit views from several key viewpoints, the river and the road.

Implementing design guidelines and compatibility criteria that are sensitive to the land and resources and that reflect and complement historic attributes of the valley would enhance scenic values and the visual character of development.

Conclusion

Visual resources would be improved, while the opportunity to experience these resources by residents and visitors to the valley would become more confined as views from trails, the valley road, and the river became more enclosed and constricted.

Cumulative Impacts

Over time, the decision not to perform vista clearing and to restore some open spaces (e.g., the "fairways") would result in the loss of views from several key viewpoints (e.g., Imus Creek overlook) and minor views from other locations. As vegetation matured and became taller and more dense in the valley, opportunities for views would become more constrained. Views to resources and surrounding landscapes from trails, the valley road, and the river would become more enclosed and constricted. Generally it can be concluded that visual resources would be improved with the management of shoreline and road buffers, while the opportunity to experience these resources would become more restricted.

IMPACTS ON ACCESS AND TRANSPORTATION

Summary of Regulations and Policies

The NI'S *Management Policies* state that "The National Park Service will seek reasonable access to parks and ensure that the means of circulation within them are adequate to permit public enjoyment of park resources." (IMPS, 198Sd, 9:7)

The policies also direct that activities causing excessive or unnecessary unnatural sounds in and adjacent to the parks, including low-elevation aircraft overflights, be monitored, and actions taken to prevent or minimize unnatural sounds that adversely affect park resources or visitors' enjoyment of them.

Methodologies for Assessing Impacts

Impacts on the transportation system were divided into two groups: visitor impacts and facility impacts. Visitor impacts were evaluated by analyzing the changes in level

of use, traffic safety, and noise. Facility impacts result from either an increase in maintenance activities or the necessity for providing new or improved transportation facilities. Quantified transportation impacts were based on the predicted changes in visitors, vehicular traffic, and population in the year 21107 (appendix K). The air quality impact topic also covered impacts related to vehicular traffic.

Impact Assessment

Getting There. By 2007 there would be a moderate (estimated 40-45%) yearly increase in commercial and private boat passengers over existing conditions assuming the increase in commercial passengers would be mainly accommodated with existing boat capacities and schedules. Passenger numbers may increase more rapidly during shorter seasons. There would be a greater demand for private boat docking facilities.

There may be up to a 40% increase in private wheeled plane passenger loadings and resulting increase in takeoffs and landings at the airstrip over existing conditions. There would be an increase in frequency of noise from takeoffs and landings. The number of floatplane commercial passengers varies considerably annually, but it is expected that passenger loadings and takeoffs and landings would be similar to existing conditions in 1990-92. Takeoffs farther downlake from the Landing would reduce the noise level from takeoffs at the Landing.

Once There. There would be a 40% increase over existing conditions in one-way shuttle bus trips to Cottonwood- There would be increased trips and noise from the Landing to Bridge Creek and reductions above Bridge Creek. Hiking and horseback riding would increase due to visitation increases over existing conditions. Trails would be more susceptible to erosion from increased movements.

Roads and Trails. Average daily traffic on the valley road would increase from 185 vehicles per day in 1992 to approximately 250 vehicles per day at mile 4.0 near Harlequin Bridge due to increases in overnight lodging and seasonal residents in the valley. Additional increases would result from moderate increases in shuttle bus trips and NPS vehicles. Vehicular noise would increase over existing conditions between the Landing and High Bridge. There would be a decrease in noise between High Bridge and Bridge Creek due to limits to private vehicles on (his section of road. The remaining traffic would consist of shuttle buses and NPS vehicles. There would be a small increased potential for more vehicular accidents from the Landing to High Bridge and less potential above High Bridge. Average daily traffic may be about at the same level as 1991 (50 vehicles per day) on Company Creek road. The possibility of erosion of the roadway from flooding would be reduced because of reconstruction of existing structures to withstand frequently recurring floods. Vehicular traffic would be eliminated from some unnecessary low use roads in the valley, allowing those corridors to be free from vehicular noise.

Landing. The increase in commercial boat passengers may be accommodated with the existing capacity of the boats. However, the Landing area would record increased congestion by the increase in visitors and demands for additional parking and vehicular circulation in a confined area. The demand for public parking may increase due to an increase of seasonal population and overnight lodging in the valley. Vehicular circulation would increase due to the picking up and dropping off of increased numbers of valley overnight lodging visitors. Public parking demand may increase by 34% over existing conditions. These potential increases would be mitigated by good site design.

Conclusion

Moderate increases in visitor arrivals (40%—45%) would cause moderate increases in vehicular congestion and noise in the valley. Increased use would require increased maintenance of facilities, roads, and trails. Existing and proposed new facilities would meet the additional demand.

Cumulative Impacts

There would be no significant cumulative impacts on the regional transportation system as a result of the proposed action.

IMPACTS ON VISITOR EXPERIENCES

Summary of Regulations and Policies

The NFS organic act states that its mission is to "provide for the enjoyment of the [parks] in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."

The National Park Service tries to conduct interpretive programs in all parks to instill an understanding and appreciation of the value of parks and their resources; to develop public support for preserving park resources; to provide the information necessary to ensure the successful adaptation of visitors to park environments; and to encourage and facilitate appropriate, safe, minimum-impact use of park resources. (NFS *Management Policies* 7:1) A park's minimum interpretive operation consists of those essential interpretive services without which it could not accomplish these basic purposes. *(Interpretation Guideline,* NPS-6)

The *Management Policies* also address the visitor experience with respect to natural quiet: "The National Park Service will strive to preserve the natural quiet and the natural sounds associated with the physical and biological resources of the parks (for example, the sounds of the wind in the trees or of the waves breaking on the shore, the howl of the wolf, or the call of the loon). Activities causing excessive or unnecessary unnatural sounds in and adjacent to parks, including low-altitude aircraft overflights, will be monitored, and action will be taken to prevent or minimize unnatural sounds that adversely affect park resources or values or visitors' enjoyment of them" (NPS, 1988d, 4:18).

The Wilderness Act does not address issues as detailed as campfires and horse grazing. NPS *Management Policies* state that designated wilderness campsite facilities may include fire rings, but only if determined by the superintendent to be the minimum facility necessary for the health and safety of wilderness users or for the protection of wilderness resources and values (NPS, I988d, 6:6). The policies further state that noncommercial grazing of trail stock may be authorized in accordance with conditions that ensure protection of wilderness resources and character. Superintendents are responsible for monitoring livestock use to the same degree as human use, and may use the same management techniques to manage livestock use that are available for managing other wilderness uses (NFS, 1988d, 6:9).

Methodologies for Assessing Impacts

This assessment is based on surveys *(Visitor Services Project,* NPS 1992b) of past visitor activities and opinions, extrapolations from experience in other parks and from parks and recreation research, personal observations of national recreation area visitors and activities, and interviews with park staff and community members.

Impact Assessment

Activities that cause detrimental impact or are discordant with the overall desired visitor experience would be discouraged or prohibited; these include bungee-jumping, flying ultralights, parasailing, hang gliding.

water skiing, jet skiing, and driving off-road motorized vehicles. Boat and floatplane traffic on the 1ake would be managed to provide a leisurely, peaceful ambience. River rafting would be permitted, but debris clearing would be limited. Interpretive services would be provided by the National Park Service, commercial businesses, and by the community.

Activities would involve muscle power more than fossil fuels. Motorized activities such as shuttles would be kept to slow speeds and would be more energy efficient than private automobiles. A variety of resources and experiences would be accessible to elderly visitors and people with disabilities.

Visitors would continue to have motorized access to developments such as lodgings and to features such as Rainbow Falls. The road corridor would present a relaxed, rural character. Primary use would be concentrated along the paved portion of the road. Farther upvalley, the nature of the road and the time involved to travel to locations such as Cottonwood Camp may discourage some visitors from experiencing backcountry areas. Visitors would find many options for motorized and nonmotorized travel and various social settings.

Lodging options would vary in cost, types of facilities, amount of social interaction, and degree of physical comfort. Overall concession and private sector capacity could show a moderate increase in response to demand. Camping opportunities would be greater in number and more or less primitive in character.

Visitors would find more access to Lake Chelan and the Stehekin River; access to other resources would continue generally at present levels. Overall visitor-related resource impacts would stay constant or decrease.

Visitors would receive orientation information through a variety of media timed to facilitate effective decision making. Visitors would have a variety of opportunities to learn primary interpretive themes, safety concerns and resource issues relating to the Lake Chelan NRA. Enhanced interpretive media and facilities would interest a wider variety of visitors than at present. 1'rograms would respond to interest in prime features and stories and to visitation patterns.

Backcountry travelers using stock would be limited to a maximum party size of 12 pairs of eyes. This could be in any combination, such as five people and seven horses. Parties may also have to follow more strict grazing controls; however, limited grazing in the national recreation area and no grazing in the park would continue to be the situation. Campfires would be restricted in alpine and subalpine areas which would alier the flavor of backcountry camping at these sites. Such restrictions are common, however, in many western national parks and would not be expected to significantly alter visitor use levels.

Conclusion

A wide spectrum of visitors would have diverse means of access to prime natural, cultural, scenic, and recreational resources without significantly affecting park resources or degrading the experiences of other visitors.

Cumulative Impacts

Visitor activities would be sustainable for the most part, in that they could continue without adverse affects on the environment. Exceptions could be the trampling of trailside vegetation, development of social trails, vandalism, and soil compaction in campgrounds, which could accumulate over time- Visitors (especially repeat visitors) would develop a greater awareness and acceptance of limitations on recreational use; they would also develop a greater environmental awareness and willingness to regulate (heir behavior in accordance with

NPS policies and sound practices. Thus the impact per visitor could decline.

IMPACTS ON THE REGIONAL ECONOMY

Summary of Regulations and Policies

There are no regulations or policies that specifically relate to the impacts that the National Park Service might have on regional economies. However, regional socioeconomic issues must be addressed in the analysis of impacts in preparation of EIS as required by the National Environmental Policy Act.

Methodologies for Analyzing Impacts

A two-phased program of analysis was undertaken. A socioeconomic data baseline was established during the first phase. This was documented in the December 1992 final report titled "Lake Chelan National Recreation Area, Baseline Socioeconomic Inventory." The potential regional economic impacts of the CMP alternatives were analyzed during the second phase of the socioeconomic research. This effort was documented in the January 1994 final report titled "Lake Chelan National Recreation Area, Socioeconomic Studies: Environmental Consequences of the NPS-GMP." These reports were completed by Reed Hansen & Associates and form the basis for the analysis of impacts and conclusions for each of (he alternatives considered by the EIS.

The focus of the analysis is on the regional economy, which is defined as the area contained within the boundaries of Chelan County, Washington. The following four topical areas are covered by the analysis.

■ changes to the visitor economy, i.e., increases (or decreases) in the number of visitor arrivals to Lake Chelan NRA; net lodging requirements; and general economic effects including direct and indirect employment, earnings, and output associated with visitor expenditures

seasonal and year-round population changes

public service and fiscal effects in regard to the Stehekin community

potential community changes associated with the CMP alternatives

Impacts on the regional economy are considered in light of the baseline conditions from 1992.

A key variable for evaluating regional economic impacts is the number of visitors arriving at the national recreation area. Total visitor arrivals, according to NPS data, have increased steadily over the years since Lake Chelan NKA was established. In 1969 there were 17,539 visitor arrivals, increasing to 53,663 in the peak year of 1989. Subsequently, total visitor arrivals have declined to 43,550 persons in 1992. After adjustment to remove the data for private boat passengers (which have been found to be subject to error), the 1989 peak figure was 33,295 and the final 1992 figure was 27,234. An analysis of total and adjusted visitor arrivals by month was also done for 1990, 1991, and 1992. Over 40% of adjusted visitor arrivals occur during July and August in **all** years. June and September are also heavy activity months, together accounting for nearly a third of adjusted visitor arrivals for all years.

Visitation baseline figures were developed for the 1992 base year and projections for various implementation periods; i.e., 5-year, 10-year, and 15-year projections. It is assumed that the CMP will cover a 20-year period, with steady-state conditions occurring in the 15th year. Projections for the various GMP alternatives were based on trends from 1982-92 information on visitor arrivals by transportation mode.

The major differences in the alternatives are in terms of transportation access, circulation within, and development of lodging and associated facilities within the national recreation area. The proposed action and (he no-action/minimum requirements alternative, as well as alternative B, art intermediate or less extreme with respect to transportation and residential /commercial development in comparison to the range covered by alternatives A and C.

The alternatives and their socioeconomic impacts are evolved from basic differences in visitation, the visitor experience, and the mix of facilities and services provided by the Park Service and the private business community. Also, the different alternatives have implications for summer residents and housing. These are considered in terms of visitor arrivals, lodging, employment, earnings, output, and population. These differences in economic and demographic factors are translated into public services and fiscal impacts and considered in respect to community structures and relationships. Following is a brief discussion of method? used for projecting visitor arrivals, net lodging requirements (spaces or pillows), direct and indirect regional economic impacts, population change, public service and fiscal effects, and community changes.

Visitor Arrivals. Visitor arrival projections for all of the alternatives, except for alternative A, are based on historical growth rates during the 11-year period 1982-92, which in some instances are factored up to reflect improvements in visitor amenities with increased visitor demand. For the no-action/minimum requirements alternative, the historical growth rate of 1.8% per annum is applied unadjusted. For alternative 15 and the proposed action, a modest increase of 25% over the historical rate of growth (or 2.25% per annum) is applied. Visitor arrival projections for alternative C are based on a rapid (5%) annual rate of growth in visitor arrivals through the first 15 years and at the historical rate thereafter. Major expansion (up to 200 additional spaces) of approved lodging capacity and related visitor services is assumed under this alternative. Visitor arrival projections for the alternative A are based on the assumption that visitor arrivals would fall off as a result of decreases in overnight lodging capacity. Based on historical relationships, it is assumed that a 1.0% decrease in lodging unit capacity would result in a 0.2% decrease in visitor arrivals.

Net Lodging Requirements. Demand for lodging spaces is projected on the basis of overnight visitor shares and lodging space occupancy relationships existing in 1992. For some of the alternatives, specific increases (decreases) in public lodging are assumed. Public lodging is to be phased out entirely under alternative A. It is also assumed that there would be a reduction in private lodging spaces to about one-half of the 1992 base-year level by the end of 15 years under this alternative. Under the no-action/ minimum requirements alternative, publicly provided lodging is to increase by 15 spaces. Additional public and private lodging capacity is assumed for the proposed action and alternative B, although specific amounts are not assumed. Additional lodging up to 200 spaces in combined public and private facilities would be provided under alternative C.

Direct and Indirect Regional Economic Effects. The backbone of the economic analysis is the model of visitor expenditures. Expenditures are categorized as derived from Stehekin Valley day and overnight visitors, and those occurring by these visitors on their way to and from downlake destinations in Chelan. In 1992 the base-year, tourism-related visitors from outside Chelan County are estimated at 25,872 persons. These tourism-related visitors are estimated to generate expenditures for commercial transportation, lodging, food and drink, shopping, entertainment, automobile expenses, and private airplane expenses. Total 1992 visitor expenditures were estimated at $1.8 million at Stehekin and $3.9 million downlake, for a total of $5.7 million.

Tourism-related visitor expenditures as well as NPS are then allocated among IMPLAN (USFS Micro IMPLAN Version 91-08, 1985] industrial sectors (see the "Affected Environment" chapter). The major NPS direct expenditure is for personnel, i.e., NPS employees. Modest amounts are also spent for construction resources and repairs. These NPS purchases add about $1.0 million for a total of about $6.7 million in 1992. TMPLAN is based on an accounting framework called an input/output (I/O) table. I/O multipliers from IMPLAN can be used to estimate the impacts of direct spending by industry on estimates of the additional indirect and induced effects due to re-spending of expenditures and earnings by direct recipients (businesses and households engaged in the visitor/tourism industry). IMPLAN multipliers arc available for 140 industry sectors in Chelan County. After applying the IMPTAN multipliers, total FTE employment of about 286 workers and their earnings of $3.3 million are associated with expenditures of about $10.6 million related to Lake Chelan NRA tourism in Chelan County in 1992.

The impact analysis of GMP alternatives follows the same approach used for the baseline analysis. The economic analysis performed for the various alternatives is for 15 years out from 1992, or 2007. It is anticipated that most NPS lodging and other modifications would be accomplished in this time frame. Adjustments in visitor arrivals would also be substantial. These would of course affect the level of visitor expenditures and overall regional economic activity. In all cases where growth occurs, NPS full-lime workforce increases were based on projections of percent increases in visitor arrivals. Seasonal workforce increases were similarly derived. However, in the case of alternative A, the NPS full-time workforce was adjusted downward based on an assumed reduction in the year-round presence, limited to providing essential maintenance, resource protection, and public safety. Seasonal employment for this alternative, however, is assumed at the 1992 base level.

Population Change. Lake Chelan NKA population figures for 1992 are used as the baseline for all alternatives. for 1992 the total year-round population was estimated between 90 and 106 persons. For this study total year-round population of 100 persons is used. The summer peak population was estimated at approximately 300 persons. The total population figures are inclusive of NPS personnel and household members,

For impact analysis, estimation of population change (either increments or decrements) associated with the GMP alternatives is based on changes in Stehekin overnight lodging requirements, which affect staffing levels, and NPS activity, which in turn affects year-round and seasonal staffing levels. NPS personnel and overnight lodging staff increments or decrements are determined on the basis of visitor growth except for alternative A in which cutbacks are incorporated, at least in terms of changes in NPS activities and closure of North Cascades Stehekin Lodge. Workers of private lodging providers and NPS year-round personnel are assumed to have an average household size of 2.27 persons (this is consistent with 1990 census data on household size in Stehekin). NPS seasonal workers and overnight lodging staff art assumed to be single or unaccompanied.

Projections for total year-round population are based on lodging increments (decrements) at 0.18 year-round resident per lodging increment (decrement) plus NPS year-round workers at 2.27 persons per worker. Incremental changes in lodging are measured in terms of space or pillow requirements, as discussed above. Similarly, projections of total seasonal population are based on visitor growth rates and corresponding changes in North Cascades Stehekin Lodge accommodation requirements and NPS seasonal worker needs. In addition, seasonal housing demand included in the calculation of seasonal population for

each of the GMP alternatives. In the case of the proposed action, no-action/minimum requirements alternative, and alternative B, housing additions are held to current levels—about 2 units per year. For alternative A no new construction is permitted. Alternative C is assumed to allow new construction at the historical high average level of 5 units per year (based on permitting activity between 1969 and *1979).* For new seasonal housing an average household size of 2.0 is assumed.

Public Services and Fiscal Effects. Public services and related financial data for several local government entities with jurisdiction in the Stehekin area are evaluated in the "Impacts on the Regional Economy" section. Detailed fiscal analysis of the impacts of tourism-related activity at Lake Chelan NRA is provided for Chelan County government.

The fiscal analysis uses a marginal cost-revenue approach that allows comparison of incremental public service expenditures against incremental revenues. Base-year (1992) expenditures by function and revenues by source were developed from budget information on the Chelan County general fund and road fund. These were translated into Stehekin base-year flows by making adjustments to overall county per capita figures in most, but not all, cases. For instance, the sales and use tax is based on 50% of per capita for Chelan County plus 90% of visitor expenditures times the adjusted local option tax rate, which is set at about 0.84%.

The genera! property tax revenues are estimated directly from Stehekin assessed valuation and the county general fund levy rate. Stehekin is shown to generate positive fiscal balances in both the general fund and the road fund under baseline conditions. For the general fund the surplus balance is estimated at $10,798; for the road fund the corresponding net fiscal balance is estimated at $3,427. Revenue and expenditure impacts associated with the five alternatives are projected in 1992 constant dollars for the year 2007, based on changes in population and assessed valuation in Stehekin and visitor expenditures in the national recreation area, as the values for these variables differ among them.

Stehekin School District No. 69 impacts are estimated based on enrollment change and per pupil expenditures and revenues. Base-year enrollment averaged 20 pupils (17 in school year 1991-92 and 23 in 1992-93). Enrollment increases are projected based on the average enrollment to population share of 20%. The primary source of funding is state apportionment. The district is in substantial surplus during the base-year.

There is no fiscal impact anticipated for the Chelan-Douglas County Health District because it operates on a self-sustaining fee basis. Activity levels would vary depending on (he alternative considered. Similarly, there is no fiscal impact anticipated for the Chelan County PUD No. 1. The Chelan County PUD operates the Stehekin power system. The Stehekin system is isolated electrically from the Chelan County PUD power grid which serves all other areas in Chelan County. The utility indicates that the Stehekin system is in a chronic deficit situation. Since the Chelan County PUD derives revenues which more-or-less balance costs over time system-wide, the only alternative to rate increases is higher levels of subsidies from the rest of the system service area. The utility can easily adjust the Stehekin system rate structure to more fully capture the full costs of Stehekin operations.

The NPS contribution to public services benefiting Stehekin residents appears to be substantial, albeit difficult to allocate to given users directly. These services would probably vary considerably with different visitor use and development levels associated with the CMP alternatives.

Community Changes. The analysis of impacts is based on information obtained from a review of literature, personal interviews with Stehekin residents, NPS

personnel, and representatives of the North Cascades Conservation Council. The methods used are essentially qualitative, i.e., they are derived from the personal observations of members of various stakeholder groups, comparable experience in other locations, and evidence from social science research studies,

Impact Assessment

Visitors, Lodging, and Economic Impacts- Visitor arrivals are expected to increase to 38,024 in 2007, an increase of about 40%. Visitor arrival projections for the proposed action are based on a modest (25%) increase over the 1980-92 rate of growth in visitor arrivals. Additional lodging is estimated at 30 spaces (pillows) for the National Park Service/North Cascades Stehekin Lodge and 29 spaces (pillows) for the private sector in that year. Total spaces available would raise from 150 spaces (pillows) in the 1992 base year to 209 spaces (pillows) in 2007.

Visitor expenditures are based on tourism-related visitors of 36,123, as modified to remove nonrecreational visits to the area. Visitor expenditures at Stehekin are estimated at $2.4 million and downlake at $5.4 million, for a total of $7.8 million. Total direct expenditures are anticipated to be $9.1 million, including $1.4 million of NPS direct purchases. Direct employment is estimated at 311 full-time equivalents (FTEs) and direct earnings at $3.3 million. NPS employment is projected at 31 FTEs. After ripple effects are included, total employment is estimated at 391 FTE workers, total earnings at $4.4 million, and total output at $14.4 million.

Population Impacts. Year-round population in 1992 was estimated to be 100 persons, while seasonal (summer) peak population was estimated to number 300 persons. For the proposed action, population in 2007 increases to 122 year-round and 399 seasonal residents, following anticipated increases in overnight lodging and NI*S activity requirements. Seasonal housing is expected to increase at current levels of about 2 per year with 2.0 persons per household.

Public Services and Fiscal Impacts. Under the proposed action, the net fiscal impact for the Chelan County general fund is estimated to be a surplus of $17,271 in 2007. For the Chelan County road fund a surplus of $6,432 is estimated in 2007. The main revenue impacts are sales and use tax and property tax revenues. The primary expenditure effects are for general government, then planning and environment; sheriff and judicial are also significant. Stehekin School District No. 69 is projected to receive 24,4 pupils in 2007. The district is estimated to generate a fiscal surplus of $136,346.

The Chelan-Douglas Health District provides monthly inspections of private sector restaurants and as-needed inspections fur new water/sewer permits, but these are done on a self-sustaining fee basis. Thus, there is no fiscal impact.

The Stehekin electric system is a chronic deficit operation even for operations only, not counting utility overhead, debt, or depreciation. While the average sale price of power is quite high at about 8 cents per kwh, the cost of diesel power at 15 cents per kWh, suggests a 7 cent per kWh marginal cost of load growth. Thus, growth load is problematic for the utility as it may result in requirements for further rate increases (following a major hike in 1990) over the term of the GMP.

Services provided by the National Park Service in the proposed action would include sewerage treatment and collection near NPS headquarters, road repair, garbage, communications, and emergency medical service/rescue boat. Other NPS facilities have benefits to the entire community. Current cost levels are substantial, although they are mostly attributable to the NPS mission. These services would continue.

Community Changes. The NPS pursuit of privatization would be likely to persist

under this alternative. This should serve to support the community, although there would likely be no change in either formal or informal organizations in the area. Stehekin school enrollment is unlikely to change dramatically; this is likely to cause little change in the school services provided.

The Park Service would actively pursue land purchases where sellers are willing as funds permit. Compatibility of land uses would be required by the Park Service under this alternative.

Conclusion/Cumulative Impacts

The proposed action would have moderate but positive effects on the regional economy. By 2007 visitor arrivals and lodging spaces would increase by about 40%. Visitor expenditures and total employment would increase by about 37%.

The net fiscal impacts on the Chelan County general and road funds would be positive, resulting in *a* higher surplus in 2007 than in 1992. The school district is expected to have 24 pupils in 2007 and generate a higher net fiscal surplus than the 1992-93 school year,

Chelan County PUD No. 1 supplies power on a chronically deficit basis for the Stehekin system. Power costs are a limiting factor to Stehekin growth. A rate increase may be needed over the next 15 years to cover deficiencies and any new load growth.

NPS-provided activities and their costs would expand in response to growth in visitor use and development levels. These services include sewer and water at the Landing, waste disposal, road maintenance, etc.

The Park Service would require compatibility of uses and would pursue land acquisition as sellers become willing and funds become available.

UNAVOIDABLE ADVERSE IMPACTS, AND THE RELATIONSHIP BETWEEN SHORT-TERM USE OF THE ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Unavoidable adverse impacts resulting from the proposed action are primarily biological. Some upland biotic communities would be adversely affected from the creation of the forest! fuel reduction areas. Additionally, 7 acres of wetlands would be adversely affected.

Lower valley habitat for three federally threatened species — grizzly bear, northern spotted owl, and bald eagle — would remain unavailable for potential use due to continued high human use of the area. For grizzly bears, rare low-elevation riparian areas, which are likely important spring habitat, would continue to be adversely effected through increased visitor use and private developments. The following five other species would also be adversely affected over the long term by continued high human use of the lower valley: gray wolf, California wolverine, Pacific fisher, northern goshawk, and harlequin duck. The short-term human use of the valley would preclude the maintenance and enhancement of long-term productivity for these sensitive species.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Irreversible commitments are defined here as those involving nonrenewable resources, such as mineral resources. The continued use of sand, rock, and gravel from the existing borrow pit would be considered an irreversible commitment of these resources. Except from the view of geological time, these deposits would never be replaced and their movement would be permanent.

Financial resources committed to the proposed action would also be, in a practical sense, irreversible.

Irretrievable commitments are those involving specific commitments of particular renewable resources. Over the long term, such commitments are usually reversible.

Existing facilities and developments, whether public or private, commit the use of hundreds of acres of the valley, precluding other uses such as wildlife habitat for some species. These commitments are reversible given an active restoration program in the future. Vegetation and habitat values would return with time; however, they may be different than those that existed under natural conditions.

IMPACTS OF THE NO-ACTION/MINIMUM REQUIREMENTS ALTERNATIVE

IMPACTS ON STEHEKIN RIVER/FLOOD PLAIN

Impact Assessment

The no-action/mini mum requirements alternative would provide some additional protection for natural river processes. Measured impacts within the 100-year floodplain are summarized in table 38.

TABLE 38: MEASURED IMPACTS, 100-YEAR FLOODPLAIN - NO-ACTION ALTERNATIVE

Source of Impact	Impact on Stehekin River/Floodplain
Within the Study Area:	
Acquire land or interests in private parcels	61 acres in the floodplain, including 4 acres in the high flood influence area would be protected in the long-term, (beneficial impact)
Restore natural character of lake edge 200 feet landward	1 acre of the floodplain would be restored, (beneficial impact)
Harvest 1-acre woodlots for firewood	3(1 acres of the forested floodplain could be subject to repeated cutting and access roads, (adverse impact)
Continue to maintain airstrip at current size	10 acres of vegetated floodplain would be maintained in an unnatural condition, (adverse impact)
Do not expand existing road system	15 acres in the floodplain, including 3 acres in the high flood influence area, would continue to be disturbed, (adverse impact)
Preserve the Buckner homestead and orchard	7 acres of the forested floodplain would be maintained in an unnatural condition, (adverse impact)
Study Area Totals:	62 acres of floodplain beneficially affected f>2 acres of floodplain adversely affected

The National Park Service would actively restore only about 1 acre of floodplain at the mouth of the Stehekin River within 200 feet of the lake edge.

Any removal of instream woody debris in the lower 10 miles of the Stehekin River and control of the river to protect occupants, property, bridges, and roads could change natural river erosion processes and flow patterns. This could result in increased channel erosion and flooding downstream. Removal of woody debris or disturbance of streamside vegetation could reduce important feeding and cover habitat adversely affecting fish and other aquatic organisms.

About 47 acres of vegetated floodplain, including 11 acres in the high flood influence area, would be maintained in an unnatural condition. Areas that would be affected include portions of the airstrip, woodlots, and the Buckner orchard. Any soil disturbance caused by activities at these sites would be mitigated to help prevent erosion from runoff. Erosion of gravel or dirt roads and shoulders would continue to carry

sediments to the Stehekin River and its tributaries adversely affecting natural river processes and aquatic habitat.

Recent small magnitude (10-25 year recurrence interval) floods have caused considerable damage to the upper Company Creek road and Stehekin Valley road at 8-Mile. Emergency repairs would be completed on the river control structure only if roads became impassable. The impacts from repairing roads on natural river processes would depend on the degree of damage to the control structure and type of repairs done. Assuming roads would not be relocated, the impacts could be similar to the proposed action. However, without adequate repairs a large flood could wash away existing structures and cause a major realignment of the river channel.

The no-action/minimum requirements alternative would minimally reduce potentially hazardous conditions associated with flooding and other geological processes. Specific visitor protection measures related to flood and other geological hazards would be developed as required by the NPS *Floodplain Management Guidelines.* All NPS buildings and most facilities including those in the 100-year floodplain and those at the Landing in a debris cone area would not be relocated. Flood damage to roads and bridges would only be repaired on an emergency basis, potentially resulting in unsafe road conditions during periods of disrepair. Fuels and toxic material at the maintenance area would continue to be stored in the regulatory floodplain.

Hazards related to the development and occupancy of the floodplain would be reduced by acquiring interests in 61 acres of private lands located in the 100-year floodplain. Flood hazards on private property would depend on the level of cooperation between private landowners and the National Park Service and the willingness of other agencies to apply their floodplain management programs. Private property could be affected adversely by increased flooding and lateral erosion potentially caused by upstream channel modifications, inadequate repair of existing river control structures, or maintaining floodplain vegetation in an unnatural condition. In addition, the maintenance of the Company Creek and Stehekin Valley roads could indirectly support continued development and occupancy of private property located in the floodplain.

Conclusion

The no-action/minimum requirements alternative would have the least beneficial effects on natural river processes and habitat for fish and other aquatic species. Less than 1 acre of the Stehekin River floodplain would he restored. Acquiring interests in private lands with owner's consent would eventually provide additional long-term protection for another 61 acres of floodplain. The river would continue to erode portions of Company Creek road. Potentially hazardous conditions associated with flooding and other geological hazards would not be substantially reduced. The potential for designation of the Stehekin River as a wild and scenic river would not be compromised by the no-action/minimum requirements alternative.

IMPACTS ON WETLANDS

Impact Assessment

The no-action/minimum requirements alternative would restore and provide additional protection for some wetlands in the Stehekin watershed benefiting a variety of dependent lifeforms and processes. Actions that would have beneficial impacts on wetlands include restoring damaged wetlands along the lakeshore, acquiring some additional wetlands, limiting grazing in wilderness areas near water, cooperative management with private landowners and other agencies, and carrying out pollution control measures. Actions that could

potentially have adverse impacts include maintaining the airstrip, controlling river erosion, and removing instream woody debris. Impacts on wetlands are also discussed in the "Impacts on Stehekin River/Flood plain" and "Impacts on Water Qualify" sections. Measured impacts on wetlands are summarized in table 39.

TABLE 39: MEASURED IMPACTS, WETLANDS - NO-ACTION ALTERNATIVE

Source of Impact	Impact on Wetlands
Within the Study Area:	
Acquire land or interests in private parcels	10.5 acres of the wetlands would be protected in the long-term, (beneficial impact)
Restore natural character within 2U0 ICL'1 of lake edge	10 acres of currently disturbed habitat in or near wetlands would be restored, (beneficial impacts)
Harvest 1-acre woodlots for firewood	5 acres of forested wetlands would be subject to cutting, (adverse impact)
Continue to maintain the airstrip at current size	5.5 acres of wetlands would he maintained in an unnatural condition, (adverse impact)
Do not expand present road system	1.2 acres would continue to be lust, (adverse impact)
Study Area Totals:	20.5 acres of habitat in or near wetlands beneficially affected 11.7 acres of wetlands adversely affected

The National Park Service would actively restore about 10 acres of damaged habitat in or near wetlands within 200 feel of the lakeshore to more natural conditions. Complete restoration could take a long time depending on the availability of funds and specific techniques employed. Outside the study area, an unknown amount of disturbed subalpine and backcountry wetland areas would be revegetated. Also, wetlands within 200 feet of open water would be protected by prohibiting pack animal grazing within that area.

Any removal of instream woody debris in the lower 10 miles of the Stehekin River and control of the river to protect life, health, and property, bridges and roads could change natural river erosion processes and flow patterns. This could alter water regimes that result in loss of wetlands along the river corridor or reduced potential for new natural wetland development. The degree of impact would be difficult to predict because of the dynamic nature of the river.

Emergency repairs would be completed on river control structures that protect the Company Creek road and Stehekin Valley road at 8-Mile only if the roads became impassable. The impacts of repairing the two roads on wetlands would depend on the degree of damage to the river control structure and type of repairs done. Assuming the road would not be relocated, the impacts could be similar to the proposed action. It is also very likely that without adequate repairs on the Company Creek road a large flood could wash away the existing structure and cause a major realignment of the river channel possibly resulting in the creation of new wetland areas.

Other roads would be maintained and repaired as needed. Erosion and runoff from roads and road shoulders could continue to carry sediments and possibly vehicle-related deleterious materials to adjacent wetlands. Increased sediment in palustrine wetlands can decrease depth and area of open water area, decrease area annually flooded, and increase susceptibility to drought resulting in habitat loss.

Cutting trees for firewood in designated woodlots could directly affect up to 5 acres of forested wetlands. Maintaining 5.5 acres of wetland vegetation at the lower end of the airstrip near Blackberry Creek would cause a long-term adverse impact. Any soil disturbance caused by vegetation management activities near wetlands would be mitigated to prevent runoff carrying sediment from disturbed areas to wetlands. Cutting wetland vegetation could cause the loss of food, cover, and nesting sites. Dependent wildlife that may occur in these areas, such as migratory waterfowl, songbirds, beaver, or amphibians, may be affected adversely.

Conclusion

The no-action/minimum requirements alternative would have the least beneficial impact on wetlands. Only 10 acres of habitat in or near wetlands would be restored where possible and another 10.5 acres protected by acquisition. Road disturbance and vegetation management activities would affect adversely 11.7 acres of wetlands. River manipulation and erosion and runoff from roads also could affect an unknown amount of wetlands adversely.

IMPACTS ON RIPARIAN COMMUNITIES

Impact Assessment

Measured impacts on riparian communities are summarized in table 40.

Conclusion

A total of 25 acres of riparian communities would be protected, and up to 130 acres would be lost. This would result in a net adverse change of 105 acres of riparian communities — a major adverse impact on riparian communities in the valley. The community-level biodiversity of the park complex would be adversely affected through impacts from this alternative.

TABLE 40: MEASURED IMPACTS, RIPARIAN COMMUNITIES - NO-ACTION ALTERNATIVE-

Source of Impact	Impact on Riparian Communities
Maintain NPS maintenance and housing area in riparian	8 acres of riparian communities would continue to be affected, (adverse impact)
Treat public lands with prescribed fire to reduce fire hazard; some mechanical removal of fuels	An unknown amount of riparian would be periodically affected by fire and thinning; would simulate natural conditions better than total suppression, (beneficial impact)
Acquire land or interests in private parcels	25 acres of riparian would be inadvertently protected through acquisition of private parcels identified in the LPF (beneficial impact); 94 acres riparian potentially lost on other, unacquired private lands (adverse impact)
Firewood: harvest 1-acre woodlots on 80-year rotation; some riparian fairways planted for wood production	36 acres of riparian affected over the long term; wood cutting on private riparian lands would be minimized, (adverse and beneficial impacts)
Maintain road to Cottonwood Camp; reclaim unnecessary side roads	Some riparian continued to be affected in upper valley; unknown riparian acreage restored on side roads in lower valley, (adverse and beneficial impacts)
Study Area Totals:	25 acres riparian protected 36 acres riparian lost 94 acres riparian potentially lost

IMPACTS ON UPLAND COMMUNITIES

Impact Assessment

Measured impacts on upland communities are summarized in table 41.

TABLE 41: MEASURED IMPACTS, UPLAND COMMUNITIES - NO-ACTION ALTERNATIVE

Source of Impact	Impact on Upland Communities
Treat public lands with prescribed fire to reduce fire hazard; some mechanical removal of fuels	An unknown amount of upland would be periodically affected by fire and thinning; would simulate natural conditions better than total suppression, (beneficial impact)
Acquire land or private interests in private parcels	62 acres of upland would be inadvertently protected (beneficial impact).
Add 15 new units to lodge at Landing	There would be less than 1 acre loss of upland, (adverse impact)
Maintain road to Cottonwood Camp; reclaim unnecessary side roads	Some upland would continue to be affected in upper valley; unknown upland acreage restored on side roads in lower valley, (adverse and beneficial impacts)
Riddle Creek cabin sites permits renewed	There would continue to be small upland impact, (adverse impact)
Firewood: harvest 1-acre woodlots on 80-year rotation	38 acres of upland would be affected over the long term; wood culling on private uplands would be minimized, (adverse and beneficial impacts)
Nonnative plants: control selected species; limit revegetation efforts to subalpine backcountry sites; do not restore the airstrip or lower field	Although backcountry sites would be recovered, the 48-acre airstrip. dominated by aggressive invader species, would remain a major source of nonnative species in the valley; airstrip approach clearings would be maintained and periodically clear-cut; 6-acre lower field would be maintained in nonnative species, (adverse and beneficial impacts)
Stock grazing allowed in Lake Chelan NUA wilderness; backcountry camp-fires allowed in campsites with grates	Backcountry meadows would continue to be affected through limited monitoring efforts; backcountry campsites continue to be affected by firewood collection, (adverse impacts)
Maintain Weaver Point campground; restore 2(X)-fool lake edge buffer from Landing to head of lake	Unknown amount of restored upland lake edge (beneficial impact)
Study Area Totals:	62 acres upland protected 38 acres upland lost

The consent decree questions the appropriateness of providing green timber from public lands for private firewood use. The enabling legislation for Lake Chelan NRA (Public Law 90-544 as amended by P.L. 100-668) states that "management, utilization, and disposal of renewable natural resources . . . are authorized," provided that they are compatible with the purposes of the unit. This section authorizes the secretary of the interior to allow use of renewable resources, but does not require it. Trees, whether living or dead, are traditionally considered renewable resources. Therefore, the utilization, per se, of green frees from public lands for private firewood is authorized, but such uses includes environmental impacts.

These impacts are discussed in this document,

The consent decree also questions the applicability of the existing compatibility standards to the woodlot program. The standards state that the "cutting of timber by any means other than selective harvesting" is incompatible with the purposes of the unit. The woodlot program involves the sequential, but complete removal of trees in 74 1-acre lots over an 80-year period. Whether or not these are considered clear cuts, patch cuts, shelter cuts, or selective cuts is an argument of silvicultural nomenclature. Nevertheless, the cutting of these 1-acre woodlots appears to be in violation of the current compatibility standards.

Conclusion

A total of 62 acres of upland communities would be protected, and 38 acres would be lost. This would result in a net beneficial change of 24 acres of upland communities -a minor gain of relatively abundant upland communities.

IMPACTS ON NATIVE FISH

Impact Assessment

The no-action/minimum requirements alternative would provide little additional protection for westslope cutthroat trout and bull trout in the- Stehekin drainage. Some important salmonid habitat would be protected by acquiring interests in some habitat, and implementing pollution control measures.

No actions would be taken to stock or reestablish endemic fish within the Stehekin drainage. fish stocking in a few selected high lakes would be allowed under the memorandum of understanding with the Washington Department of Wildlife. Any nonnative fish that escaped into streams draining from these lakes could adversely affect native fish populations that might be present downstream.

Based on research and approved recovery plans, competing nonnative fish species would be controlled or eliminated where they threatened the survival and genetic integrity of existing native fish populations. However, existing fish species remaining from past stocking activities would not be eliminated from all other waters.

Both westslope cutthroat trout and bull trout tire especially vulnerable to fishing and populations could be affected by overfishing (Behnke 1979; Trotter 1987; Bader et al 1993). Currently it is not known what, if any, impacts recreational fishing may be having on the existing populations of native cutthroat and bull trout in the national recreation area, Therefore, angler harvest would be monitored and adverse effects mitigated by using special fishing regulations or other measures.

Conclusion

This alternative would provide only limited additional protection for existing native cutthroat and bull trout populations and would not reestablish native fish populations in the Stehekin drainage.

IMPACTS ON THREATENED, ENDANGERED, OR RARE SPECIES

Impact Assessment

Peregrine Falcon. No impacts are expected; see the discussion under the proposed action.

Gray Wolf. The continued maintenance of the upper valley road would reduce the suitability of this area as potential wolf habitat. The loss of riparian communities in the lower valley would indirectly affect wolf prey species, while general development

levels there would probably preclude the use of this area by wolves in the future.

Bald Eagle. These impacts would be the same as those under the proposed action.

Northern Spotted Owl. The upper valley road would continue to provide easy human access to the vicinity of four nearby nest sites; one of the sites is less than one-quarter mile from the road. If these sites are disturbed by people, the reproductive success of these birds could be reduced. Hikers on the Pacific Crest Trail between High Bridge and Bridge Creek could continue to affect two nest sites that are within one-quarter mile of the trail. Owl habitat in the lowc-r valley would be adversely affected from a variety of sources. Firewood cutting in the woodlots would remove 70 forested acres of habitat. The prescribed fire program would reduce the suitability of forest stands as owl foraging habitat. The loss of other forested stands and riparian communities, from sources such as private land development, combined with the expected increase in human activity under this alternative, would also continue to impact suitable owl habitat. A total of 283 acres of currently disturbed lands would not be restored and would remain unavailable for owl use. These conditions combined may preclude the general use of the lower valley by owls — at the least, preclude its use for future nesting.

Grizzly Bear. The continued maintenance of the upper valley road would reduce the habitat suitability of this area as well as provide easier human access to grizzly summer ranges in the backcountry. The loss of riparian communities in the lower valley would directly affect probable early spring habitat, while general development levels there would continue to preclude the use of this area by grizzlies.

Bull Trout. See the impacts on fisheries for possible impacts on bull trout.

California Wolverine. The continued maintenance of the upper valley road would reduce the habitat suitability and use of this area, as well as allow easier human access to the Bridge Creek drainage where wolverine sightings have occurred.

Pacific Western Big-Eared Bat. No impacts are expected; see the discussion under the proposed action.

Pacific Fisher. The possible use of the valley by fishers would be adversely affected by at least two actions under this alternative: the continued maintenance of the upper valley road, and the probable loss of riparian communities on private lands from increased development.

North American Lynx. Impacts would be very minimal; see the discussion under the proposed action.

Cascades and Spotted Frogs. These species may be affected by riparian land development, particularly on the south side i)f the river along the Company Creek road. Some unnecessary side roads would be closed and reclaimed which may benefit wetland areas.

Northern Goshawk. These impacts would be the same as those under the proposed action.

Harlequin Duck. Harlequins using the upper valley would still be affected from vehicular travel and easy human access to these river stretches. In the lower valley, the expected loss of riparian communities on private lands and the continued construction of river control structures would adversely affect harlequin habitat. The closing and reclaiming of unnecessary side roads may reduce human impacts on nesting or foraging ducks.

Golden Eagle. No impacts are expected; see the discussion under the proposed action.

Flammulated Owl. These owls may be affected by two actions: the loss of 70

forested acres of suitable habitat in the woodlots, and the loss of forested stands and snags on private lands from expected future developments.

Common Loon. These impacts would be the same as those under the proposed action.

Vaux's Swift. The only expected impact would be from the loss of snags, and thus potential nesting habitat, on private properties. In general; however, snag densities in the lower valley would be expected to return to more natural conditions.

Pileated Woodpecker. Pileateds would be primarily affected through the loss of forest stands from private properly developments. This would include the loss of snags a^ nesting habitat, but snag density would generally increase in the valley due to provisions in the firewood management plan.

Western Gray Squirrel. Gray squirrels would be adversely affected from the loss of forested stands due lo development on private lands.

Victoria's Grape-Fern. These impacts would be the same, as those under the proposed action.

Western Ladies-Tresses. These impacts would be the same as those under the proposed action.

Giant Helleborine. No impacts are expected; see the discussion under the proposed action.

Conclusion

Gray wolves and grizzly bears would continue to be adversely affected from the upper valley road, the loss of riparian areas, and general high levels of human activity in the lower valley. Existing bald eagle use would not be affected. Northern spotted owls would be adversely affected from multiple sources. These would combine to possibly preclude the potential nesting use of the lower valley by owls. Peregrine falcons would not be affected. Potential and occupied northern goshawk nesting sites could be adversely affected from human activities. The harlequin duck would be affected adversely from the loss of riparian areas and continued construction of river control structures. The species-level biological diversity of the park complex would be affected adversely through impacts from this alternative.

IMPACTS ON WATER QUALITY

Impact Assessment

The no-action/minimum requirements alternative would provide some additional protection for water resources in the study area. Mitigation described under the alternatives section would reduce the impacts on surface water and groundwater resources potentially caused by water uses, and storage, transport, and use of fuels and other toxic material.

Nonpoint erosion from disturbed areas, particularly roads, would continue to elevate suspended sediments and turbidity in streams (see "Impacts on Stehekin River/Floodplain" section). Emergency repairs of the erosion control structure on the upper Company Creek road could also cause temporary increases in suspended sediment and turbidity.

Fuel and other toxic materials would continue to be stored within the 100-year floodplain and near the lake at the Landing. Increased demand for electricity would increase the use of Chelan County PUD's diese1 generator and consequently increase the amount of diesel transported lo and stored near Company Creek. This would increase the risk of an accidental spill. Application of federal and state fuel storage and waste disposal regulations would reduce

the potential for contaminating water resources. However, a major flood event could inundate up to five fuel and toxic material storage sites, possibly resulting in water contamination.

Potential increased visitor use under this alternative would result in greater private boat (including house boats) and floatplane use- The number of scheduled commercial boat trips would not be expected to increase. Mitigating measures described under the alternatives section would reduce water quality impacts possibly caused by increased watercraft use in the national recreation area. Increased wave action caused by an increase in boat or floatplane traffic would cause only minimal lakeshore erosion compared to that caused by lake elevation fluctuation and natural wave action.

Impacts on water resources caused by private land uses would depend on the level of cooperation between private landowners and the National Park Service and the willingness of other agencies to apply their water resources protection programs.

Conclusion

This alternative provides some protection of water resources in addition to (hat afforded by existing laws and regulations.

IMPACTS ON AIR QUALITY

Impact Assessment

Compared to existing conditions, the no-action/minimum requirements alternative would increase emissions from energy consumption within (he Stehekin Valley by 18% for the five pollutants evaluated. This alternative would increase particulates by 11%, oxides of nitrogen by 282%, and oxides of sulfur by 259%. Chelan County PUD's diesel electric generator along with the use of other fuel oils would emit 39% of all fuel-related pollutants and produce most of the nitrogen and sulfur oxides. Increases in total quantity of nitrogen oxide emissions would be the greatest compared to the other four pollutants. Total carbon monoxide emissions would decrease by 11% and hydrocarbons by 11% as a result of converting to efficient woodburning units. However, burning firewood would continue to be the largest fuel-related pollution source contributing 57% of the emissions. Therefore, any reductions in firewood use and conversion to high-efficiency woodburning stoves or fireplace inserts would cause the greatest reduction in energy-related emissions. The private sector currently uses 53% of the total energy resource in Stehekin. Therefore, the reduction in fuel-related emissions would very much depend on their use of conser-vation measures. Increased vehicle use within Lake Chelan NRA would increase emissions by 49%. Increased air and boat (traffic in and out of the national recreation area would also increase emissions. Emissions from energy-related pollution could noticeably reduce visibility during cold periods when air occasionally stagnates because of temperature inversions and low wind speed.

Increased vehicle use would increase dust emissions along unpaved valley roads including a 11.3-mile corridor of unpaved road between High Bridge and Cottonwood campground. Increased airborne dust would reduce visibility and coat adjacent vegetation. Prescribed natural fires would cause major temporary decreases in air quality, but the frequency of prescribed fires would probably be less than the proposed action. Smoke from campsites would also be a large contributor to Stehekin Valley air pollution and wilderness areas.

Conclusion

Compared Lo existing conditions, the no-action/minimum requirements alternative would increase the total energy-related air pollutant emissions within the Stehekin Valley by 18%, particularly for oxides of

nitrogen if demand for electricity increases. Conversion to high-efficiency woodburning units and other energy conservation measures would help reduce some air pollutant emissions. Prescribed fire emissions and increases in dust and vehicle emissions would adversely affect the recreation area's air quality.

IMPACTS ON CULTURAL RESOURCES

Impact Assessment

Inventories of the cultural properties in the Stehekin area would continue to be updated on a regular cycle, and the existing national register nomination would be amended to incorporate any additional eligible properties.

The Buckner homestead and orchard would be preserved but not interpreted, and the genetic stock of the Buckner orchard would not be maintained. A limited amount of artifacts in the Buckner collection would be acquired for interpretive purposes, and a small collection storage facility would be established in the Golden West Lodge or other existing NI'S structure for temporary storage of collection items, thus minimizing impacts on the historic landscape of the Stehekin Valley. Some significant elements of the collection could be lost, while the overall interpretive value of the entire collection would be diminished.

The National Park Service would cooperate with residents and property owners to facilitate the continued existence and rural character of the Stehekin community, and current levels of grazing and haying in the lower Stehekin Valley would be permitted to continue. However, an agricultural use permitting system would not b<? established, and a historic landscape report would not be prepared to ensure that historic agricultural uses were followed.

The Golden West Lodge and the High Bridge ranger station would be rehabilitated and used as a year-round visitor center/district office facility and for NPS administrative purposes, respectively. While the ambiance of the two sites would be preserved, their historic character and interpretive value could be affected by such actions. All other historic properties listed in the national register would be maintained as recommended in the 1987 *Historic Structure Preservation Guide.*

There may be indirect effects to on the prehistoric site near Stehekin Landing due to casual collection.

It is possible that maintenance on the Stehekin Valley road could directly affect one prehistoric site and the historic Stehekin Wagon Road segment. Every effort would be made to avoid direct impacts on archeological resources.

Conclusion

Cultural resource management actions would be more limited than under the proposed action, resulting in the possible deterioration or loss of some cultural resources and elements of the historic landscape and the lack of an interpretive program. Any potentially adverse effects would be mitigated in consultation with the state historic preservation officer and the Advisory Council on Historic Preservation.

IMPACTS ON VISUAL/SCENIC RESOURCES

Impact Assessment

The lake provides the backdrop for many of the experiences available to visitors and residents. As such, the lake is the framework for many of the key viewpoints (#s 1-7, and #20) on arrival and in the valley. The potential for visitor facilities or residences to be built on private parcels on the lake (downlake from the Landing) and the maintenance of the cabins at Riddle Creek

would affect resources by modifying vegetation and land form and adding structures and docking facilities to the shoreline. In addition, having no lake use restrictions, without regard for activity, noise or numbers, would affect the scenic values and natural surroundings of the area.

The alluvial terrace associated with Purple Creek in the Landing landscape unit is of low visual sensitivity except at the shoreline. The Landing would continue to be the hub of activity and commercial center. Public and private development, such as the expansion of boat moorage, expanded lodging and other services, and retaining staff housing in the current location on the shoreline would affect the quality of the shoreline experience on arrival {#1), from the Landing (#6 and #20), Imus Trail overlook (#2), the head of the lake (#3), Purple Creek campground (#4), and Weaver Point (#5).

The bluff and head of the lake landscape units contain private lands on the lake shoreline, which arc currently developed and visible from surrounding viewpoints and the valley road. The head of the lake is recognized as a sensitive area because of its visual accessibility to almost all visitors to Lake Chelan NRA and is of high visual sensitivity. Additional development of these private lands for residential use or to meet visitor demand for accommodation would not affect visual resources as long as management objectives and actions are implemented that protect sensitive resources and restore (he natural character of the lake edge. If such actions are not implemented, impacts would be expected with the additional development. Campsites and the dock a(Weaver point would remain visible on the shoreline of the lake.

In addition to the bluff and head of lake landscape units, there are other units that contain significant private lands that could be developed. These are the Bakery, Boulder Creek, Rainbow Mountain and McGregor units. Many of these parcels are located on the shoreline of the Stehekin River and front on the Valley Road, both visually sensitive corridors. With the development of these parcels the potential for change to resources is high, as is the visibility of those changes.

The development of an 11-mile-long trail from the Landing to High Bridge, parallel to the valley road, would clear and disturb approximately 13 acres of land. This trail would have segments located within areas of high sensitivity, such as within view of the road or on the shoreline of the lake or river. Minor modifications to vegetation and land form would generally go unnoticed from the majority of viewpoints. The trail would provide visual and physical access to resources in the valley and lo surrounding mountains.

There are a number of other valleywide actions associated with this alternative that would affect visual resources and the overall experience of visitors to the area. These are as follows:

- The continued use of shoreline control structures in the river would degrade the natural river processes and values and the wild and scenic river experience of river users.

- Additional NPS and private development would require additional overhead powerlines, affecting resources. These would have to cross the river and could be visible from public facilities such as the road and trails

- The development of a vista and view clearing component to the vegetation management plan would positively affect visual resources by preserving existing views and providing opportunities to open additional views to scenic features.

- Continued use of woodlots for firewood fat a rate of 1-acre/year) would create minor clearings of the tree canopy. This change would take place in an area of low visual sensitivity and would not affect key viewpoints.

Conclusion

The incremental development of public facilities as well as an expanding private residential presence associated with the no-action /minimum requirements alternative would affect visual resources. The shoreline of the lake and private parcels of land located on the river or along the Stehekin Valley road would be developed to service visitors or for private residences. Demands by both residents and visitors for additional services and facilities would create changes to the resources in the valley. These changes would affect visually sensitive areas and key viewpoints.

IMPACTS ON ACCESS AND TRANSPORTATION

Impact Assessment

Getting There. There would be an estimated 30% increase in commercial and private boat passengers over existing conditions. The impacts would be estimated somewhat lower than those in the proposed action.

With a 3(J% estimated increase in private plane passenger landings at the airstrip over existing conditions, an increase in frequency of noise from takeoffs and landings would occur. These increases would be less than in the proposed action. The floatplane landings/takeoffs and patterns would remain at the same level as existing conditions, and resultant noise levels would not change unless different airplanes are used for commercial service.

Once There. With an estimated 30% increase in one-way shuttle trips to Cottonwood Camp, there would be increased trips and noise from the Landing to Cottonwood Camp over existing conditions. Because of fewer trips than estimated in the proposed action, there would be slightly less noise impacts from the Landing to Bridge Creek but greater impacts above Bridge Creek, Impacts on trails would also be slightly decreased over that in the proposed action. Snowmobile use would be less than under baseline conditions.

Roads and Trails. Vehicular traffic volumes on the Valley Road would be lower than in the proposed action but higher than under existing conditions. Since private vehicles would be permitted to use the Valley Road to Cottonwood Camp, noise would increase in those roadway segments above High Bridge. Maintenance activities would increase due to increased traffic particularly above High Bridge. There would be the potential for increased vehicular accidents from the Landing to Cottonwood Camp. The impacts of using Company Creek road would be similar to those as under existing conditions.

Landing. Vehicular and pedestrian congestion would continue to increase at the Landing area due to increases in visitors in a confined area. Congestion would be higher than under existing conditions.

Conclusion

Moderate increases in visitor arrivals (30%) would cause moderate increases in vehicular congestion, noise, and potential accidents in the national recreation area compared to existing conditions. Increased use would require increased maintenance of facilities, roads, and trails, Existing facilities would meet the additional demand.

IMPACTS ON VISITOR EXPERIENCES

Impact Assessment

Activities would involve a variety of mechanized, motorized and muscle-powered options. Motorized activities such as shuttles would be kept to slow speeds and would be more energy efficient than private automobiles. A variety of resources and experiences would be accessible to elderly

visitors, and some would be accessible to people with disabilities.

Visitors would continue to have motorized access to developments such as lodgings and to features such as Rainbow Falls. The road corridor would present a relaxed, rural character. Primary use would be concentrated along the paved portion of the road. Farther upvalley, the time involved to travel to locations such as Cottonwood Camp would keep use at low levels, but would also enhance opportunities for visitors to experience backcountry areas. Visitors would find many options for nonmotorized travel and varying degrees of solitude,

Lodging options would vary in cost, types of facilities, amount of social interaction, and degree of physical comfort. Camping opportunities would be more or less primitive in character. Visitors would be able to stay a sufficient length of time to experience Lake Chelan NRA.

Access to features would continue generally at present levels. Overall visitor-related resource impacts would stay constant or increase slightly.

Visitors would receive orientation information through a limited number and quality of media, and timed to facilitate effective decision making. Visitors would have a limited variety of opportunities to learn primary interpretive themes, safety concerns and resource issues relating to Lake Chelan NRA. Programs would respond to interest in prime features and stories and to visitation patterns.

There would be no change from existing wilderness experiences. Stock party size would vary from 6 to 30 pairs of eyes, stock grazing would be allowed in the national recreation area but not in the park, and campfires would be allowed in designated sites with fire grates (see the "Affected Environment" chapter).

Conclusion

Visitors would have diverse means of access to prime natural, cultural, scenic, and recreational resources without significantly affecting park resources or degrading the experiences of other visitors.

IMPACTS ON THE REGIONAL ECONOMY

Impact Assessment

Visitors, Lodging, and Economic Impacts. Visitor arrival projections for the no-action/minimum requirements alternative are based on the average annual rate of growth (AARG) for total visitor arrivals during the 12-year period 1980-92, or 1.8% per annum. Total visitor arrivals arc expected to increase to 35,590 in 2007. This is about 30% above 1992 levels (27,234 visitors). Additional lodging of 30 person-spaces (pillows) by the National Park Service (concessioner) and 16 spaces by the private market total 46 spaces for an overall total of 196 spaces, compared to 150 spaces in 1992.

Visitor expenditures are based on year 2007 expenditures by recreational visitors (33,811) after deleting estimated nonrecreational visitors. Visitor expenditures total $7.3 million of which $2.2 million are estimated to be spent at Stehekin and the balance downlake at Chelan and surrounding areas in Chelan County. In addition, NPS purchases arc estimated to be $1.3 million, About 225 FTE workers arc directly related to these expenditures, of which 29 are NPS employees and the balance private workers. Direct earnings arc estimated at $3.0 million. Total FTE employment (after allowing for indirect and induced effects) is estimated at 368 workers with $4.2 million in earnings. Total output is estimated at $13.6 million. For comparison, the base-year (1992) totals were 2S6 workers, $3.3 million in earnings, and $10.6 million of total output.

Population. Population is estimated to grow to 114 year-round and 389 seasonal by 20(17 following anticipated increases in overnight lodging and NFS activity requirements. Visitor arrival projections provided part of the basis for these needs. Seasonal housing additions are expected to follow current levels of about 2 added units per year with average household size of 2.0.

Public Services and Fiscal Impacts. For the no-action/minimum requirements alternative, as others, the main revenue impacts are sales and use tax and property tax revenues. The primary expenditure effects arc for general government, though planning and environment, sheriff, and judicial arc also significant. The not general fund fiscal impact estimated for the no-action/minimum requirements alternative is a projected annual surplus for 2007 of $15,863. For the Chelan County road fund, the major revenues are the property tax and motor vehicle/fuel tax sources, while expenditures are mostly for construction and maintenance. The road fund is estimated to generate a surplus from the Stehekin community in 2007 of $5,974. Enrollment in 2007 for the school district is estimated to be 27.8. As in the case of the baseline, the no-action/minimum requirements alternative generates a substantial surplus, $127,405 in 2007, due to a general state apportionment and modest instruction and support expenditures.

The Chelan-Douglas Health District provides monthly inspections of private sector restaurants and as-needed inspections for new water/sewer permits, but these arc done on a self-sustaining fee basis. Thus, there is no fiscal impact.

While the average sale price of electric power is quite high at about 8 cents per kWh, the cost of diesel power at 15 cents per kWh, suggests a 7 cent per kWh marginal cost of load growth. Thus, growth load is problematic for the utility, as it may result in requirements for further rate increases over the term of the GMP.

Services provided by the National Park Service in the case of the no-action/ minimum requirements alternative include sewerage treatment and collection near the NPS headquarters, road repair, garbage, communications, and emergency medical service/rescue boat. Other NPS facilities have benefits to the entire community. Current cost levels are substantial, although they are mostly attributable to the NI*S mission. They would be continued in the case of the no-action/minimum requirements alternative.

Community Changes. Regarding community structures and relationships it appears that the Park Service is pursuing a policy of more privatization, which would continue through the planning horizon of the no-action/ minimum requirements alternative. This should serve to support residents and improve their sense of belonging in the community. It is not anticipated that formal or informal community organizations would undergo significant change. Stehekin school enrollment is projected to increase by a few pupils above current levels by 2007. Hence, there would be no dramatic change in the education program under this alternative.

Compliance with land use regulation would be fostered. The Park Service would actively pursue priority land purchases where there is a willing seller, subject to the availability of appropriated funds. Compatibility of land uses would also continue to be required by the Park Service under this alternative.

Conclusion

The no-action/mini mum requirements alternative would have modest positive impacts on the regional economy, By 2007 visitor arrivals and lodging spaces would increase by about by about 30%. Visitor expenditures are projected to increase accordingly. When all direct, indirect, and induced effects are counted, total FTE employment, earnings, and output are

projected to increase substantially above 1992 levels.

The net fiscal impacts on the Chelan County general and road funds would have a higher surplus in 2007 than 1992. The school district is expected to have 27.8 pupils in 2007, with a net fiscal surplus slightly lower than 1992-93 school year.

The Chelan County PUD No. 1 operates the Stehekin system at a deficit. This would continue under this alternative.

Services provided by the Park Service and their costs would expand for the full-implementation year, 2007.

Community impacts would be favorable due to gradually increased commercialization of visitor services. The Park Service would purchase land as sellers became willing and funds became available.

UNAVOIDABLE ADVERSE IMPACTS, AND THE RELATIONSHIP BETWEEN SHORT-TERM USE OF THE ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Unavoidable adverse impacts are primarily biological. Up to]05 net acres of riparian communities would be adversely affected, resulting from the potential development of unprotected private lands and the cutting of trees in the woodlots. This would be an adverse impact on the community-level biodiversity of the park complex. Additionally, 12 acres of wetlands would be adversely affected.

Unavoidable adverse impacts on sensitive wildlife species would be similar to the proposed action. Three federally threatened species — grizzly bear, northern spotted owl, and bald eagle — would be adversely affected from a variety of impact sources. Five additional species — gray wolf, California wolverine, Pacific fisher, northern goshawk, and harlequin duck — would also be adversely affected over the long term by continued and increased human use of the lower valley.

Adverse impacts or loss of some cultural resources and elements of the historic landscape may also occur.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Irreversible commitments are similar to the proposed action. The continued use of sand, rock and gravel from the existing borrow pit would be considered an irreversible commitment of these resources. Financial resources committed to this alternative are the least of any of the alternatives, but these commitments would also be irreversible.

Irretrievable commitments are the same as those for the proposed action.

IMPACTS ON STEHEKIN RIVER/FLOODPLAIN

Impact Assessment

Alternative A would have the greatest beneficial impact on natural river processes and habitat conditions for fish and other aquatic species. The overall reduction of disturbed areas in the floodplain would result in decreased erosion and sediment loading, increased riparian vegetation, and increased instream cover. Measured impacts within the 1flO-yenr floodplain are summarized in table 42.

TABLE 42: MEASURED IMPACTS, 100-YEAR FLOODFLAIN - ALTERNATIVE A

Source of Impact	Impact on Stehekin River/Flood plain
Within the Study Area:	
Acquire private parcels	167 acres of the floodplain would be protected in the long-term, (beneficial impact)
Remove nil nonessential development from public lands and restore habitat In natural conditions	47 acres of the floodplain would be restored, (beneficial impact)
Close all roads and restore or convert to trails in the study area	15 acres in the floodplain would be restored, (beneficial impact)
Restore old borrow pits to natural conditions	11 acres of the floodplain would be restored, (beneficial impact)
Close airstrip and revegetate to natural conditions	1(1 acres of the floodplain would be restored, (beneficial impact)
Allow natural processes to reclaim the Buckner homestead and orchard	7 acres of the floodplain would eventually recover lo more natural conditions (beneficial impact)
Study Area Totals:	256 acres of floodplain beneficially affected 0 acres of floodplain adversely affected
Outside the Study Area:	
Close all roads and restore or convert to trails outside the study area	d acres within 200 feet of the Stehekin River would be restored or converted to a trail; an unknown amount (if area affected by river processes would eventually recover to more natural conditions, (beneficial impart)

The National Park Service would eventually restore about 76 acres of disturbed floodplain, including 20 acres in the high flood influence area, to more natural conditions. Complete restoration would take a long time depending on the availability of funds and willingness of landowners to sell. Disturbed floodplain habitat now owned by tho National Park Service would be restored the soonest. These areas include the maintenance area, the "fairways," old borrow pits, and the airstrip. Floodplain habitat damaged by roads would be restored or converted to trail when no longer needed after property was acquired.

Instream woody debris would not bo manipulated and all NPS-owned river control structures along the 4,600 feet of riverbank would be removed and natural

conditions restored. Natural accumulations of woody debris would benefit fish by providing important cover habitat. Removal of control structures could temporarily increase streambank erosion and flooding at the site and downstream.

Until privately owned lands were acquired, the floodplain would be protected by prohibiting new construction and new commercial or industrial uses. The effectiveness of this protection would depend on cooperation between private landowners and the NPS and the willingness of other agencies to apply their river and floodplain management programs.

The proposed action would substantially reduce potentially hazardous conditions associated with flooding and oilier geological processes. Under this alternative all NPS buildings, facilities, and roads within the 100-year floodplain and other geohazard areas would be removed. Specific visitor protection measures related to flood and other geological hazards would be developed as required by the NTS *Floodplain Management Guidelines*. Fuels and toxic materials currently stored at the five sites would eventually be removed from the regulatory floodplain.

Until all private property was acquired, flood hazards would depend on the level of cooperation between private landowners and the National Park Service and the willingness of other agencies to apply their floodplain management programs. Private property could be affected adversely by increased flooding and lateral erosion potentially caused by the removal of existing river control structures and not allowing additional instream river erosion control. The National Park Service would not support continued development and occupancy of private property located in the 100-year floodplain.

Conclusion

Alternative A would have the greatest long-term beneficial impact on natural river processes and habitat for fish and other aquatic species, including restoration of 90 acres of the Stehekin River floodplain and removal of instream modifications. Acquiring private lands with owner's consent would eventually provide additional long-term protection for another 167 acres of floodplain. Potentially hazardous conditions associated with flooding would be substantially reduced by removing NI*S buildings, facilities, and roads, and acquiring private land now located in floodplain or other geohazard areas.

IMPACTS ON WETLANDS

Impact Assessment

Alternative A would have the greatest beneficial impact on wetlands and dependent lifeforms compared to the other alternatives because most wetlands would be restored. Measured impacts on wetlands are summarized in table 43.

The National Park Service would eventually restore about 11 acres of disturbed wetlands to natural conditions. Another 55 acres of disturbed habitat near or in wetlands within 200 feet of the river or lake edge would also be restored. Restoration of wetlands would also include removal of 10 buildings. Complete restoration would take a long time depending on the availability of funds, specific techniques employed, and the willingness of landowners to sell. Wetland areas now owned by the National Park Service would be restored the soonest. These areas include the maintenance area, old borrow pits, and airstrip, and portions of the river and lake edge. Wetlands damaged by roads would be restored when on longer needed after property was acquired.

TABLE 43; Measured IMPACTS, WETLANDS - ALTERNATIVE A

Source of Impact	Impact on Wetlands
Within the Study Area:	
Acquire private parcels	62.9 acres of the wetlands would be protected in the long-term, (beneficial impact)
Remove all nonessential development from public lands and restore habitat to natural conditions	About 1.3 acres of damaged wetlands would be restored, another 55 acres of disturbed habitat in or near wetlands within 2(H) feet of the lake and river edge would potentially be restored, (beneficial impact)
Close airstrip and revegetate to natural conditions	1.1 acres of vegetated wetlands would potentially be restored to more natural conditions, (beneficial impact)
Restore old borrow pits lo natural conditions	6.9 acres of the wetlands would potentially be restored, (beneficial impact)
Close all roads and restore or convert lo a trail	About 1.2 acres of wetlands would potentially be restored, (beneficial impact)
Study Area Totals:	128.4 acres of habitat in or near wetlands beneficially affected 0 acres of wetlands adversely affected
Outside the Study Area:	
Close valley road above Bridge Creek and convert to a trail	19.1 acres of roadway would be converted to a trail; an unknown amount of wetlands within or near the road corridor could eventually recover lo more natural conditions (beneficial impacts)

Erosion control structures affecting about 4,600 feet of river bank would eventually be removed and natural conditions restored. This could result in the natural development of additional wetland areas near the river. Outside the study area, disturbed wetlands in wilderness areas would be revegetated and protected by prohibiting pack animal grazing.

Until privately owned wetlands were acquired, wetlands would be protected by prohibiting new construction and new commercial or industrial uses. The effectiveness of this protection would depend on cooperation between private landowners and the National Park Service and the willingness of other agencies to apply their wetland protection programs.

Conclusion

Alternative A would have the greatest long-term beneficial impact compared to the other alternatives, restoring 66 acres of habitat in or near wetlands where possible and protecting another 63 acres by acquisition.

IMPACTS ON RIPARIAN COMMUNITIES

Impact Assessment

Measured impacts on riparian communities are summarized in table 44.

Conclusion

A total of 315 acres of riparian communities would be protected or restored. This would be a major beneficial impact on riparian communities and on community-level biodiversity in the valley.

TABLE 44: MEASURED IMPACTS, RIPARIAN COMMUNITIES - ALTERNATIVE A

Source of Impact	Impact on Riparian Communities
Restore N1"S maintenance and housing area, and restore	*18* acres of riparian communities would be restored, (beneficial impact)
Acquire land or interests in private parcels	118 acres of riparian would be protected in the long-term; 54 private structures would he removed from riparian areas, (beneficial impart)
Restore old borrow pits to natural conditions	10 acres of riparian would be restored, (beneficial impart)
Close a11 roads as property is acquired	About 81 acres of roadway would be restored; an assumed one-third of this is in riparian, (beneficial impact)
Restore all other disturbed riparian	142 additional acres riparian restored, (beneficial impact)
Seek designation of the river under the Wild and Scenic Rivers Act	Over the long term, the river system, including its riparian corridor, would be managed for more natural conditions, (beneficial impact)
Study Area Totals:	197 acres riparian restored UN acres riparian protected

IMPACTS ON UPLAND COMMUNITIES

Impact Assessment

Measured impacts on upland communities are summarized in table 45.

Conclusion

A total of 247 acres of upland communities would be protected or restored. This would be ;i major beneficial impact on upland communities.

TABLE 45: MEASURED IMPACTS, UPLAND COMMUNITIES - ALTERNATIVE A

Source of Impact	Impact on Upland Communities
Restore most of the developed area at the Landing	5 net acres of upland communities would be restored, (beneficial impact)
Acquire land or interests in private parcels	136 acres of upland would be protected in the long-term (beneficial impact), (beneficial impact)
Restore old borrow pits to natural conditions	3 acres of upland would be restored (beneficial impact); imported gravel may introduce normative plant species, (adverse impact)
Close a11 valley roads as property is acquired	About 81 acres of roadway would be restored; an assumed two-thirds of this is in upland, (beneficial impact)
Restore Riddle Creek cabin sites	There would be small restoration of upland, (beneficial impact)
Firewood: stop all firewood cutting on public lands; allow barging of wood	Wood cutting on private lands could affect up to 190 acres; lakeshore lands could be affected by .: barged-wood storage site, and this wood could introduce ruminative plant or insect species. (adverse and beneficial impacts)

Remove ni1 populations possible of normative plants; restore all other disturbed sites	A long-term program of nonnative plant control would be required; 50 acres of upland would be restored, (beneficial impact)
Stock grazing in recreation area wilderness prohibited; prohibit all backcountry camp fires	Backcountry meadows would bf protected from grazing; downed wood would remain at all backcountry campsites, (beneficial impart)
Study Area Totals:	111 acres upland restored 136 acres upland protected

IMPACTS ON NATIVE FISH

Impact Assessment

Alternative A would provide the greatest protection for westslope cutthroat trout and bull trout in the Stehekin Watershed and help perpetuate important genetic resources. Important salmonid habitat would be protected by acquiring lands, restoring habitat, stopping instream manipulation, and implementing pollution control measures (see. the "Impacts on Stehekin River/Floodplain" and "Impacts on Water Quality" sections).

Fish stocking within the Stehekin drainage on NPS land would be limited to only reestablishing endemic species in their historic range. This would help protect native westslope cutthroat trout and bull trout from further displacement caused by competition and hybridization with nonnative species. All other stocking would be stopped.

Restoring westslope cutthroat trout and bull trout into historic habitat would expand their range throughout the Stehekin drainage on NPS lands. Reintroduction efforts would be based on research and approved recovery plans. Where feasible, any competing nonnative fish species present in habitat selected for reintroduction or that threatens existing native populations would be. eliminated to assure survival of the reintroduced trout and protect the genetic integrity of the population. However, existing fish species remaining from past stocking activities would not be eliminated from all other waters. In some cases, natural or artificial fish barriers may be required to prevent the invasion or reinvasion of competing nonnative species.

Both westslope cutthroat trout and bull trout are especially vulnerable to fishing and populations could be affected by overfishing. Currently it is not known what, if any, impacts recreational fishing may be having on the existing populations of native cutthroat and bull trout in the national recreation area. To minimize impacts, recreational fishing would be monitored and special regulations established, such as catch and release fishing, as necessary.

Conclusion

Alternative A would have the greatest beneficial impact compared to the other alternatives, enhancing the integrity of existing native fish populations and habitat and reestablishing native cutthroat and bull trout populations in most of their historic habitat within the Stehekin drainage on NPS lands.

IMPACTS ON THREATENED, ENDANGERED, OK RARE SPECIES

Impact Assessment

Peregrine Falcon. It is not known if peregrines have historically nested in the Stehekin Valley. Recovery of this species is occurring in Washington, and active management, except for monitoring, would

not be pursued. Falcon populations would not be affected.

Gray Wolf. Both the upper and lower valley would be permanently protected and available as wolf habitat. This could be particularly important given the valley's unique geographic and ecologic position in the surrounding ecosystem. Under this alternative, the Park Service would also pursue the restoration of this native species into suitable habitats of the park complex.

Bald Eagle. This alternative would permanently protect the lower valley and would allow for the possibility of eagle nesting in the lower valley. Anadromous fish runs into the lower valley would also be more available to eagles with lower human use of the area. Other possible nesting sites, downlake but within the national recreation area, could be occupied, however, continued boat traffic on the lake may limit this possibility. This alternative would contribute to the recovery's goal of five occupied territories in the area of Lake Chelan.

Northern Spotted Owl. Upper valley nesting siles would be protected from easy human access and the possible disturbance by closing the valley road. New nest sites could be colonized in the lower valley. Given the distances between the upper valley nests, possibly up to four additional nesting territories could be established in the lower valley. If this were to occur, a total of 11 breeding pairs could nest in the valley, meeting the goal of 10 pairs established in the draft recovery plan for this DCA (USD1 1992). Wildlife, however, would still be a long term threat to all owl habitat in the DCA.

Grizzly Bear. Both the upper and lower valley would be permanently protected and available as grizzly habitat. This could be particularly important given the valley's unique geographic and ecologic position in the surrounding ecosystem. Under (his alternative, the Park Service would also pursue the augmentation of the grizzly bear population in the park complex in order to restore this native species to a more natural abundance.

Bull Trout. Refer to the "Impacts on Native Fish" section for discussion for potential impacts on bull trout.

California Wolverine. Habitat in both the upper and lower valley would be permanently protected and available. The population of this native species in the park complex may be in need of augmentation in order to achieve a more natural population level. The National Park Service may pursue such augmentation under this alternative.

Pacific Western Big-Eared Bat. No impacts are expected; see the discussion under the proposed action.

Pacific Fisher. Riparian habitat in both the upper and lower valley would be permanently protected and available. The population of this native species in the park complex is probably in need of augmentation in order to achieve a more natural population level. The Park Service would likely pursue such augmentation under this alternative.

North American Lynx. It is possible that this species may not recover to natural abundance without human assistance (WDOW 1993). If this is the case, the Park Service would attempt to augment the existing population in the park complex, or attempt to alleviate whatever the identified limiting factors may be.

Cascades and Spotted Frogs. All riparian and wetland areas would be permanently protected. This would be a beneficial impact on all populations of these frogs.

Northern Goshawk. The removal of development in the lower valley would allow the recolonization of this habitat by nesting goshawks. A crude estimate of the number of possible new nesting sites would be six, since the valley floor is about 2,500

acres and defended goshawk territories are believed to be about 4011 acres. It is possible, however, that the natural prey base in the valley would not support this many foraging pairs. The limitation on the number of recreation area visitors would also provide more protection to the existing downlake nest sites, as well as to potential future nests.

Harlequin Duck. Approximately 20 linear miles of river would be maintained under natural conditions, providing harlequins with undisturbed breeding habitat. The removal of river control structures and the leaving of large woody debris in the channel would provide harlequins with more naturally diverse and more productive habitat conditions. The limitation on the number of recreation area visitors would also provide more protection to nest sites.

Golden Eagle. No impacts are expected; see the discussion under the proposed action.

Flammulated Owl. These impacts would be the same as those in the proposed action.

Common Loon. Although loons would continue to be disturbed by boat use at the head of Lake Chelan, this alternative would limit the number of visitors and the amount of small boat moorage provided. These actions would decrease human impacts to foraging loons.

Vaux's Swift These impacts would be the same as those in the proposed action.

Pileated Woodpecker. Pileated woodpeckers would be beneficially impacted through the protection of forested stands in the valley

Western Gray Squirrel. Gray squirrels would be beneficially affected through the protection of forested stands in the valley.

Victoria's Grape-Fern. The two known populations would be permanently protected from construction activity.

Western Ladies-Tresses. This population would be permanently protected from construction activity.

Giant Helleborine. No impacts are expected;
see the discussion under the proposed action.

Conclusion

Both the upper and lower valley would be permanently protected and available as habitat for all species. For gray wolves, grizzly bears, Pacific fishers and possibly California wolverines — all wide-ranging predators — this is particularly important given the valley's unique geographic and ecologic position in the surrounding ecosystem. Potential nesting habitat for northern spotted owls, bald eagles, and northern goshawks would be available for re colonization, assisting in meeting the goals of recovery plans for the first two species. Peregrine falcons would not be affected. Harlequin ducks would not be displaced from important breeding habitat. Forest habitat for flammulated owls, Vaux's swift, pileated woodpeckers, and western gray squirrels would be protected permanently.

IMPACTS ON WATER QUALITY

Impact Assessment

Alternative A would have the greatest beneficial impact on water resources in the study area. Potential water resources impacts would be substantially reduced by restoring most land disturbance (see "Impacts on Stehekin River/Floodplain" section) and minimizing use of fuels and other toxic materials. Most fuel and toxic material storage facilities would be removed from the national recreation area.

Potential decreased visitor use under this alternative would result in decreased private boat (including houseboats) and floatplanes use. The number of scheduled commercial

boat trips would not be expected to decrease. Mitigating measures described under the alternatives section would minimize water quality impacts possibly caused by watercraft use in the national recreation area. Wave action caused by boat or floatplane traffic would cause only minimal lake-shore erosion compared to that caused by lake elevation fluctuation and natural wave action.

Until private lands were acquired, impacts on water resources caused by private land uses would depend on the level of cooperation between private landowners and the National Park Service and the willingness of other agencies to apply their water resources protection programs.

Conclusion

Alternative A would have the greatest beneficial impacts on water resources compared to the other alternatives.

IMPACTS ON AIR QUALITY

Impact Assessment

Alternative A would result in the greatest decrease in emissions from energy consumption within the Stehekin Valley compared to the other alternatives. Assuming all lands identified for acquisition were acquired with the owner's consent, there would be substantial reductions in energy use. The eventual elimination of fuel oil and firewood use would decrease total energy-related emissions by 99%. Fuel-related emissions would gradually diminish over a long period of time. Until lands were acquired, impacts from energy consumption would be similar to the proposed action.

Vehicle use would diminish and roads would be closed when no longer needed, resulting in gradual reductions in vehicle and road dust emissions. Eventual revegetation of most disturbed areas would protect soils from wind erosion and reduce dust emissions.

Naturally ignited forest fires would cause major temporary decreases in air quality and probably be more frequent and affect larger areas than the no-action/minimum requirements alternative. Prohibiting campfires in wilderness areas would reduce smoke in the park and national recreation area.

Conclusion

Alternative A would have the greatest long-term beneficial impact. Compared to existing conditions, alternative A would eventually decrease (he total energy-related air pollutant emissions within the Stehekin Valley by 99%. Diminishing vehicle use and revegetation of disturbed areas would also gradually improve air quality. Natural wildland fires would adversely affect the recreation area's air quality on a periodic basis.

IMPACTS ON CULTURAL RESOURCES

Impact Assessment

Emphasis would be placed on natural processes, while preserving selected national register properties. Additional historic sites would be investigated, but emphasis would be placed on recordation, research, and photographic documentation rather than preservation treatment and interpretation. The Golden West Lodge and the High Bridge ranger station would be preserved, and the Litter would be used as a backcountry ranger station. This use of the property could affect positively the integrity and interpretive value of the site. Historic landscapes and structures at the Buckner homestead would be documented, but natural processes would be allowed to reclaim the site as well as all other national register properties, resulting in the deterioration and/or possible loss of significant

cultural resources. All agricultural activities would be discontinued unless related to maintenance of a documented cultural landscape, thus resulting in the loss of some elements of the historic landscape in the lower Stehekin Valley. A minimum number of artifacts in the Buckner collection would be acquired by the Park Service for interpretive purposes at the Buckner homestead, while the remainder of the artifacts would be returned to the Buckner family. Some significant components of the collection could be lost, while the overall interpretive value of the entire collection would be diminished. There would be no impacts on any known archeological sites under this alternative.

Conclusion

Cultural resource management actions would be limited, resulting in the deterioration or loss of significant historic landscapes and historic properties and the lack of an interpretive program. There would be no impacts on any known archeological sites.

IMPACTS ON VISUAL/SCENIC RESOURCES

Impact Assessment

The elimination of camping and cabins at Flick Creek and Riddle Creek would restore a "wilderness" approach to the visual experience, particularly for arriving visitors on private boats and the commercial ferries.

The alluvial terrace associated with Purple Creek in the Landing landscape unit is of low visual sensitivity except at the shoreline. The minimal development associated with alternative A would be relocated away from the shoreline, except for the marine facilities, and rehabilitation of old sites and shoreline uses would enhance the scenic values in this unit. Arriving visitors (#1), as well as road/trail users (#3) and campers at Weaver Point (#5), would benefit by the improved views to the shoreline (table 10).

The head of the lake landscape unit would experience an improvement to visual resources with the removal of structures at the river estuary and lake shoreline and rehabilitation of this area to natural conditions. Views to resources would improve from many of the surrounding key viewpoints, at the Landing, from along the road/trail, Weaver Point, and arriving boats.

The provision of a trail to the river near the "castle" and a pedestrian suspension bridge over the river at Boulder Creek would impact the wild and scenic river experience in the Bakery and Boulder Creek landscape units. These facilities would provide area users with opportunities to access and view the river and experience other resources and the surrounding valley walls.

The removal and rehabilitation to natural conditions of facilities such as the airstrip, housing and maintenance activities on the fairways, field cropping and pasture at the lower field and Valley Ranch would eliminate most of the open spaces currently in the valley. These actions would affect views to surrounding resources from these locations as well as viewpoints #8, #9, #14, and #16.

There are a number of other valleywide actions that would affect visual resources and the overall experience of visitors to the area. These are as follows:

- The abandonment of the valley road and its rehabilitation and conversion to a multiple-use trail would constrict and enclose views to surrounding resources.

- Burying of powerlines would benefit views from several viewpoints and the road /trail

- Not permitting manipulated clearing or vista clearing would reduce the number

of opportunities to see and experience scenic and natural resources.

Conclusion

Visual resources would be enhanced. The potential to experience these resources by visitors to the area would be limited because of the reduction in viewing opportunities due to the elimination of culturally manipulated open spaces and restricted views from the shoreline and Valley Road/trail.

IMPACTS ON ACCESS AND TRANSPORTATION

Impact Assessment

Getting There. The number of visitor arrivals would be at 1992 levels or slightly lower. The impacts of arrivals by commercial and private boat passengers would be similar to those as under 1992 conditions.

The airstrip would be closed resulting in the removal of facilities and activities related to an airstrip operation. Aircraft noise would be removed and vehicular traffic related to airstrip operations. Commercial and private floatplane operations would have similar impacts as under existing conditions.

Once There. No shuttle service would be provided resulting in the elimination of noise caused by these vehicles and support facilities and activities required by this system. Alternatively, horseback riding and hiking would increase on major portions of the Stehekin Valley road system and trail systems. Trail systems would be more susceptible to erosion than in the proposed action. There would be the possibility for new social trails being formed due to increased movements. All of the noise of snowmobiles would be removed due to the prohibition of the use of these vehicles.

Roads and Trails. Ultimately all valley roads would be removed north of the Landing; consequently, eliminating all noise from all motorized vehicles. All maintenance equipment and activities to support motorized vehicles on the roadway systems would be eliminated. Vehicular travel would continue on Company Creek road and the Stehekin Valley road to Harlequin Bridge or farther into the valley until all private property was acquired. Traffic volumes and resultant noise would gradually decrease in moving toward ultimately closing all of the valley roads. The potential of vehicular traffic accidents would also decrease as use of the roads decrease.

Landing. Congestion at the Landing would be reduced over that of existing conditions due to the gradual acquisition of private property in the valley and the absence of overnight lodging. Parking demand and the conflict between vehicular and pedestrian movements would be greatly reduced. Wilh the reduction of vehicular movements and good site planning and development more oriented to pedestrians, a pleasant pedestrian environment would be achieved.

Conclusion

Slight decreases in visitor arrivals and closing the airstrip and roads would eventually eliminate most vehicular congestion, noise, and potential accidents in the national recreation area. All maintenance equipment and activities to support motorized vehicles on the roadway system would eventually be eliminated. Landing facilities would be modified to meet pedestrian needs.

IMPACTS ON VISITOR EXPERIENCES

Impact Assessment

Visitors interested in more primitive experiences would have access to prime natural, cultural, scenic, and recreational

resources without significantly affecting park resources or degrading the experiences of other visitors. Other visitors would find fewer opportunities than at present. Activities would involve muscle power more than fossil fuels. Motorized activities would be phased out. Only features and experiences close to the Landing would be accessible to many elderly visitors and people with disabilities.

Visitors would have nonmotorized access to developments such as campgrounds and to features such as Rainbow Falls. The Sack of motorized transportation would discourage many visitors and keep use at low levels, but would also enhance opportunities for visitors to experience backcountry areas. Visitors would find many options to experience a sense of solitude.

Lodging options would be mostly limited to camping, with minimal physical comforts. Overall overnight lodging capacity would decrease gradually to zero. Camping opportunities would be more or less primitive in character. Only camping visitors would be able to stay a sufficient length of time to experience the area in depth.

Access to features such as Lake Chelan and the Stehekin River would emphasize personal means of transportation and relative solitude. Overall visitor-related resource impacts would decrease.

Visitors would receive orientation information through a variety of media timed to facilitate effective decision making. Visitors would have limited opportunities to learn primary interpretive themes, safety concerns and resource issues relating to Lake Chelan NRA. Minimal interpretive media, facilities and programs would interest a smaller variety of visitors than at present.

Visitor experiences in the wilderness for those currently using stock would be adversely affected. New restrictions would limit stock party size to a maximum of six pairs of eyes within the park or national recreation area, and would prohibit grazing in the national recreation area as well as the park. The backcountry experience of traveling with a larger stock party would no longer be available on NPS-administered lands. In addition, all backcountry campfires would be prohibited. This would change the flavor of backcountry camping, however, such restrictions are common in many western national parks and visitor use levels would not be expected to change.

Conclusion

Visitors would have more opportunities for nonmotorized activities and fewer opportunities for motorized activities. Elderly, sedentary and disabled visitors would have few opportunities to experience recreation area resources and values.

IMPACTS ON THE REGIONAL ECONOMY

Impact Assessment

Visitors, Lodging, and Economic Impacts. Visitor arrival projections are based on the assumption that visitor arrivals would fall off as a result of decreases in overnight lodging capacity. It is assumed that the North Cascades Stehekin Lodge would close during the initial five-year plan implementation period. It is also assumed that there would be a reduction in private lodging spaces to about one-half of the 1992 base-year level by the end of 15 years, due to .1 narrowing of the market for overnight lodging as well as the imposition of licensing requirements and land use controls on local businesses.

It is reasonable to assume that the absence of lodging would deter many of the visitors, who desire to stay in overnight lodging, from coming to Lake Chelan NRA on day trips or for extended camping trips. However, the attractiveness of the national recreation area may increase for other

potential visitors because of the recent emphasis on ecotourism and inherent desirability of natural wilderness areas. Thus, visitor arrivals from this group may increase. For purposes of this analysis, visitor arrivals decline as the number of lodging spaces are reduced, but not on a strictly proportional basis. In 2007 visitor arrivals are estimated to be 25,237 persons, a 7% decline from the 1992 figures (27,234 visitors). Lodging spaces are expected to decline by 110, all 70 of the NPS/North Cascades Lodge spaces and 40 of the private spaces. With total spaces in the base year at 150, this would leave only 40 private spaces in Stehekin Valley

Total visitors arc translated into tourism-related visitors and these, estimated to be 23,975 in 2007, should generate direct Stehekin Valley expenditures of $0.8 million and additional downlake (other Chelan County) expenditures of $3.7 million for a total of $4.4 million. Direct employment and earnings are anticipated to total 170 workers and $1.9 million, respectively. NPS employees are estimated to total 16 FTEs. Gross employment, earnings, and output (including ripple effects) are estimated at 215 workers, $2.5 million in earnings, and $8.3 million in output, all in 2007.

Population. Population declines to 70 year-round and 252 summer residents in 2007. In this case, the Park Service phases out the lodging concessioner during the initial five-year period. Seasonal housing is expected to be held to current levels.

Public Service and Fiscal Impacts. The Chelan County general fund is estimated to generate a net fiscal surplus for 2007 of $3,147, the lowest of the alternatives. For the Chelan County road fund, the net fiscal surplus (also lowest case) is estimated at $1,803 for 2007. Stehekin School District No. 69 is projected to have 14 pupils enrolled in 2007 under this scenario, compared to an average of 20 in the base year. The substantial net fiscal surplus generated by the district, which is estimated at $78,231, *is* again the lowest case, due to declines in demographics. The Chelan-Douglas Health District would have lower requirements for private sector restaurant inspections, and presumably, no new water/sewer permits. Chelan County PUD No. 1 would have a lower operating deficit, perhaps even a break-even operation due lo load decline in the high-cost diesel-generated load component. NPS-provided services would decline under this alternative; in fact, the Park Service would withdraw from providing any food/lodging.

Community Changes. The Park Service pursuit of compatibility of resource uses would intensify. Land purchase would probably be at a high rate, assuming willing sellers and availability of funding from Congress. By the year 2007, the local residents would have the business from the NPS/North Cascades Stehekin Lodge withdrawal from food and lodging service provision. However, it would be more difficult for the private sector lo induce overnight visits without NPS support. If overnight visits were to decline sufficiently, business would slow down and associated community relationships would deteriorate. Some people would leave. Economic survival would be more difficult. The perception that the Park Service was responsible for the decline, in effect by abandoning the local community, could materialize.

Conclusion

Alternative A would have modest negative effects on the regional economy. By 2007 visitor arrivals would decline about 7% from 1992. Lodging spaces would decline substantially to about 27% of the 1992 level. Visitor expenditures would decline lo a level somewhat below that in 1992. Total direct, indirect, and induced effects generate employment, earnings, and output below those for 1992.

The net fiscal effects for the Chelan County general and road funds would be the lowest of the alternatives. The school district is projected to have 14 pupils and the lowest net fiscal balance (revenues in excess of expenditures) of the five alternatives.

Chelan County PUD No. 1 would have a lower operating deficit and might break even on operations. NPS-provided public services would decline especially in view of the withdrawal of concession-provided food and lodging.

Impacts on the community by the year 2(107 would be slightly negative. The NPS pursuit of land purchase and compatibility of uses would be more stringent than in 1992. Business might switch to some extent to the private sector after NPS withdrawal from food/lodging provision. However, overnight visits would likely decline sharply without NPS support. Economic survival for non-NFS local residents would be more difficult.

UNAVOIDABLE ADVERSE IMPACTS, AND THE RELATIONSHIP BETWEEN SHORT-TERM USE OF THE ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Unavoidable adverse impacts are primarily social and cultural. Over the long term, all private properly in the recreation area would be acquired, and the community of Stehekin would be unavoidably lost. Adverse impacts or loss of historic landscapes and historic properties would also occur. There would be no adverse impacts on riparian or upland communities, wetlands, or sensitive species.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

There would be no irreversible commitments of sand, rock, and gravel. Financial resources committed to this alternative would be irreversible. There would be no irretrievable commitments of resources.

IMPACTS OF ALTERNATIVE B

IMPACTS ON STEHEKIN RIVER/FLOODPLAIN

Impact Assessment

Alternative B would generally provide additions! protection for natural river processes and improve habitat conditions for fish and other aquatic species. The overall reduction of disturbed areas in the floodplain would result in decreased erosion and sediment loading, increased riparian vegetation, and increased instream cover. Measured impacts within the 100-year floodplain arc summarized in table 46.

TABLE 46: MEASURED IMPACTS, 100-YEAR FLOODPLAIN - ALTERNATIVE B

Source of Impact	Impact on Stehekin River/Floodplain
Within the Study Area:	
Acquire land or interests in private parcels	153 acres of floodplain, including 70 acres in high flood influence area would be protected in the long-term, (beneficial impact}
Restore old borrow pits to natural conditions	11 acres of floodplain would be restored, (beneficial impact)
Close airstrip and restore sensitive arena	10 acres of floodplain would be restored, (beneficial impact)
Relocate maintenance area and restore to natural conditions	4 acres of floodplain would be restored, (beneficial impact)
Relocate the Stehekin Valley road at 8-Mile outside the floodplain and restore to more natural conditions	1 acre of floodplain would be restored.
Restore the natural character within 200 feet of lake edge	1 acre of currently disturbed floodplain would lie restored, (beneficial impact)
Manage six forest fuel reduction areas	131 acres of forested floodplain would be modified, (adverse and beneficial impact)
Maintain present road system, except at upper Company Creek road and Stehekin Valley road at 8-Mile	14 acres of floodplain, including 2 acres in the high flood influence area, would continue to be disturbed, (adverse impact)
Rehabilitate the Buckner homestead and orchard	7 acres of vegetated floodplain would be maintained in an unnatural condition, (adverse impact)
Relocate upper Company Creek Road	1 acre in floodplain would be disturbed, (long-term adverse impact)
Study Area Totals:	179 acres of floodplain beneficially affected 131 acres of floodplain habitat adversely affected 22 acres of floodplain adversely affected
Outside the Study Area:	
Close valley road above High Bridge and convert hi a trail	6 acres of roadway within 20(1 feet of the Stehekin River would be converted to a trail; JI\ unknown amount of area affected by river processes would eventually recover to more natural conditions. (beneficial impact)

The National Park Service would actively restore about 26 acres of floodplain, including 7 acres in the high flood influence area to more natural conditions. Areas that would be restored include the NTS maintenance area, old borrow pits, and floodplain near the mouth of the Stehekin River.

Approximately 22 acres of vegetated floodplain, including 6 acres in the high flood influence area, would be maintained in an unnatural condition. Areas that would be affected include areas the Buckner orchard and roads. Burying powerlines might also cause short-term disturbance on an unknown amount of floodplain. Impacts from the forest fuel reduction program would be the same as for the proposed action.

Erosion of gravel or dirt roads and shoulders would continue to carry sediments to the Stehekin River and its tributaries adversely affecting natural river processes and aquatic habitat. Mitigating measures to conserve sand, rock, and gravel eroded from roads, would help reduce these impacts.

Instream manipulation would be limited to removing hazardous woody debris and low-impact protection of eroding banks that threaten existing improvements. Existing river control structures for protecting roads and bridges would continue to be maintained, except for the upper Company Creek road and Stehekin Valley road at 8-Mile. Any removal of instream woody debris and control of the river to protect existing improvements could change natural river erosion processes and flow patterns. This could result in increased channel erosion and flooding downstream. Removal of woody debris or disturbance of streamside vegetation could reduce important feeding and cover habitat adversely affecting fish and other aquatic organisms.

Approximately 200 yards of the existing Company Creek roadway would be removed and area rehabilitated, although it is very likely that the old roadbed would erode away during the first significant flood resulting in a new river alignment. The river channel is meandering to the west and would likely reoccupy an old channel to the west of the road. A new road would be constructed along approximately 0.9 mile of the floodplain west of the existing road adversely affecting 1 acre of floodplain vegetation. Another 1 mile of the Stehekin Valley road at 8-Mile would be relocated outside the 100-year floodplain. Natural river processes in about 1 acre of floodplain would be restored within the old roadway.

The river management planning process would address additional strategies for protecting and restoring the river and its tributaries and associated floodplain. The plan would also examine alternative methods and designs for protecting streambanks and controlling erosion. The National Park Service would study the suitability of the Stehekin River for wild and scenic designation. The potential for designation would not be compromised by this alternative.

Hazards associated with flooding and other geological processes would be the same as the proposed action, except the upper Company Creek road and Stehekin Valley road at 8-Mile would be relocated from the active river erosion zone.

Conclusion

This alternative- would generally have beneficial effects on natural river processes and habitat for fish and other aquatic species, including restoration of 26 acres of the Stehekin River floodplain. Instream modifications could adversely affect natural river processes and aquatic habitat. Acquiring interests in private lands with owner's consent would eventually provide additional long-term protection for another 153 acres of floodplain. Potentially hazardous conditions associated with flooding would be substantially reduced by relocating most NPS buildings and facilities

now located in floodplain or geohazard areas and acquiring land interests.

IMPACTS ON WETLANDS

Impact Assessment

Alternative B would restore and provide additional protection for wetlands in the Stehekin watershed benefiting a variety of dependent lifeforms. Actions that would have beneficial impacts on wetlands include restoring damaged wetlands, closing some roads, acquiring interests in wetlands, cooperative management with private landowners and other agencies, and carrying out pollution control measures. Proposed actions that could have adverse impacts include rerouting the Company Creek road and allowing some instream manipulation. Impacts related to wetlands are also discussed in the "Impacts on Stehekin River/Floodplain" and "Impacts on Water Quality" sections. Measured impacts on wetlands are summarized in table 47.

TABLE 47: MEASURED> IMPACTS, WETLANDS - ALTERNATIVE B

Source of Impact	Impact on Wetlands
Within the Study Area:	
Acquire land or interests in private parcels	62.9 acres of wetlands would be protected in the long-term. (beneficial impact]
Restore natural character of lake edge 200 feet landward	10.0 acres of currently disturbed habitat within or near wetlands would be restored (beneficial impact)
Restore old borrow pits to natural conditions	6.9 acres of wetlands would be restored, (beneficial impact)
Close airstrip and restore sensitive areas	1.1 acres of wetlands would restored, (beneficial impact)
Relocate maintenance area and restore to natural conditions	11.3 acre of wetlands would *bi:* restored, (beneficial impact)
Do not expand present road system; close unnecessary roads and restore areas	1.2 acres of wetlands would continue to be lost, (adverse impact)
Study Area totals:	81.2 acres of wetlands beneficially affected 1.2 acres of wetlands adversely affected
Outside the Study Area:	
Close valley road above High Creek and convert lo a trail	19.] acres of roadway would converted to a trail; an unknown amount of wetlands within or near the road corridor could eventually recover lo more natural conditions (beneficial impacts)

Under this alternative (he National Park Service would restore about 18 acres of damaged habitat in or near wetlands to more natural conditions in (he study area. Areas that would be restored include the NPS maintenance area, the airstrip, old borrow pits, and some habitat within 200 feet of the lake edge. Complete restoration could take a long time depending on the availability of funds and specific techniques employed. The two NPS-owned nonhistoric buildings would be removed from within wetlands and damaged habitat restored.

The roads near wetlands that were not identified for closure would continue to be maintained. Runoff from gravel or dirt roads and road shoulders would continue to carry sediments to some wetlands. Increased sediment in palustrine wetlands can decrease depth and area of open water, decrease area annually flooded, and increase susceptibility to drought resulting in habitat loss. Reducing road widths and rehabilitating excessive road shoulders and other mitigating measures to conserve sand, rock, and gravel eroded from roads, would reduce these impacts.

Instream manipulation would be limited to removal of hazardous woody debris and low impact protection of eroding banks that threaten existing improvements. Existing river control structures for protecting roads and bridges would continue to be maintained except the upper Company Creek road and Stehekin Valley road at 8-Mile. Instream manipulations and river control structures could change natural river erosion processes and flow patterns resulting in decreased area annually flooded, decreased channel movement, or increased sediment deposition along the river corridor. This could indirectly reduce wetland area or reduce potential for natural wetland development along the river corridor. The degree of impact would be difficult to predict because of the dynamic nature of the river.

Approximately 200 yards of the existing Company Creek roadway would be removed and the area rehabilitated, although it is very likely that the old roadbed would erode away during the first significant flood resulting in a new river alignment. The river channel is meandering to the west and would likely reoccupy an old channel to the west of the road. This could result in development of new wetland areas. A new road would be constructed along approximately 0.9 mile of the floodplain west of the existing road. Preliminary surveys of the route have been completed and the new road would cross wetlands and Battalion Creek at two locations. The amount of wetlands that would be disturbed by the new road is unknown.

Conclusion

Alternative B would have generally beneficial effects on wetlands. Approximately 18 acres of habitat in or near wetlands would be restored where possible, and another (S3 acres would be protected by acquiring interests. Existing road disturbance would continue to adversely affect about 1.2 acres of wetlands.

IMPACTS ON RIPARIAN

COMMUNITIES Impact Assessment

Impacts on riparian communities are similar to those for the proposed action except for two differences: the upper valley road would be dosed at High Bridge, restoring additional riparian; the "fairways" would not be restored to their natural riparian conditions. Measured impacts on riparian communities are summarized in table 48.

About 0.9 mile of the Company Creek road would be realigned. A total of 2.4 acres would be newly affected, 1.3 acres being riparian communities. These acres are bigleaf maple, cottonwood, or mixed deciduous and coniferous riparian classes.

Conclusion

A total of 144 acres of riparian communities would be protected or restored, and up to 74 acres would be affected by prescribed fire. Overall, there would be a major beneficial impact on community-level biodiversity in the valley.

TABLE. 48: MEASURED IMPACTS, RIPARIAN COMMUNITIES - ALTERNATIVE B

Source of Impact	Impact on Riparian Communities
Move existing NPS maintenance and housing area out of riparian	8 acres of riparian communities would be restored, (beneficial impact)
Manage six forest fuel reduction areas	Up to 74 acres of forested riparian would be affected, (beneficial impact)
Acquire land or interests in private parcels	118 acres of riparian would be protected in the long-term, (beneficial impact)
Realign Company Creek road with a new 0.9-milc segment	1 acre of riparian would be lost, (adverse impact)
Restore old borrow pits to natural conditions	10 acres of riparian would be restored, (beneficial impact)
Close valley road above High Bridge and convert to a trail	About 25 acres of roadway would be restored; an assumed one-third of this is in riparian (beneficial impact)
Restore the natural character within 200 feet of river edge	An unknown amount of currently disturbed riparian acreage would be restored (beneficial impact)
Study Area Totals:	26 acres riparian restored 118 acres riparian protected Up to 74 acres riparian affected by fuel management 1 acre riparian lost

IMPACTS ON UPLAND COMMUNITIES

Impact Assessment

Impacts on upland communities are similar to those for the proposed action except for three differences: the new NPS maintenance and housing area would be constructed mostly on the airstrip instead of next to it, thus reducing the amount of disturbance to upland communities near the airstrip; the rest of the airstrip would be restored to its natural upland conditions; and backcountry subalpine areas would be affected by increased stock grazing and campfire impacts. Measured impacts on upland communities are summarized in table 49.

New construction on and near the airstrip and at the Landing would disturb the following upland communities:

Community	Acres
Mixed coniferous	2.6
Mixed deciduous/coniferous	0.1
Douglas fir	()
Bigleaf maple	
Total	**3.0**
Already Disturbed Lands	6.0

(No effective change in disturbed condition)

A total of 3 acres new disturbance would occur from construction. *Jr* addition, 3.5 acres at the Landing would be restored from (he removal of the existing lodge and dorm. Thus, 3 minus 4 results in a net gain of 1 acre of upland communities.

The Company Creek road realignment would affect 1 acre of ponderosa pine, mixed coniferous, mixed deciduous and coniferous, or slope/talus drainage upland classes. About 1 mile of the Stehekin Valley road at 8-Mile would be realigned. A total of 6 acres would be newly affected, all in upland communities. These acres are primarily mixed coniferous, bigleaf maple, and Douglas fir classes.

TABLE 49: MEASURED IMPACTS, UPLAND COMMUNITIES - ALTERNATIVE B

Source of Impact	Impact on Upland Communities
Construct new NI'S maintenance and housing on and near airstrip; relocate lodge at Landing out of geohazard area	1 net acre of upland communities would be restored, (beneficial impact)
Manage six forest fuel reduction areas	636 acres of forested upland would be affected. (some adverse and some beneficial impact)
Acquire land or interests in private parcels	60 acres of upland would be protected in the long term as an unintended result of the protection of other resources, (beneficial impact), (beneficial impact)
Realign Company Creek road with a new 0.9-mile segment	1 acre of upland would be lost, (adverse impact)
Realign Stehekin Valley mad at 8-Mile	6 acres of upland would be lost, (adverse impact)
Restore old borrow pits to natural conditions; gravel may be barged in	3 acres of upland would be restored (beneficial impact); imported gravel may introduce nonnative plant species, (adverse impact)
Close valley road above High Bridge and convert to a trail	About 25 acres of roadway would be restored; an assumed two-thirds of this is in upland, (beneficial impact)
Convert Riddle Creek cabins site to a campground	This would result in small restoration of upland, (beneficial impact)
Firewood: slop woodlot cutting; allow barging of wood	Wood cutting on private lands could affect up to 190 acres; lakeshore lands could be affected by a barged-wood storage site; and Ibis wood could introduce nonnative plant or insect species (adverse and beneficial impacts)
Nonnative plants: control selected species; restore selected disturbed sites including the airstrip; lower field not restored	A long term program of nonnative plant control would be necessary; the 48-acre airstrip would no longer be a major source of nonnative species in the valley; the 6-acre lower field would be maintained in nonnative species, (beneficial and adverse impacts)
Stock grazing and numbers of stock in recreation area wilderness based on less strict standards; firewood gathering in subalpine backcountry sites allowed	Backcountry meadows may be affected from grazing; sensitive subalpine campsites would be affected from wood burning, (adverse impacts)
Move Weaver Point campground back from edge of lake; in general, restore lake edge	Small loss of upland at Weaver Point, but overall net gain in restored lake edge upland, (beneficial impact)
Study Area Totals:	21 acres upland restored 50 acres upland protected 636 acres upland affected by prescribed fire and thinning 1 acre upland lost

Conclusion

A total of SI acres of upland communities would be protected or restored, and 636 acres would be affected by prescribed fire and thinning.

IMPACTS ON NATIVE FISH

Impact Assessment

Alternative B would provide additional protection for westslope cutthroat trout and bull trout in the Stehekin watershed and help perpetuate important genetic resources. Important salmonid habitat would be protected by acquiring interests in or restoring habitat, limiting instream manipulations, and implementing pollution control measures (see the "Impacts on Stehekin River/Floodplain" and "Impacts on Water Quality" sections).

Fish stocking within the Stehekin drainage on NPS land would be limited to reestablishing endemic species in their historic range. This would help protect native westslope cutthroat trout and bull trout from further displacement caused by competition and hybridization with stocked nonnative species. All other stocking would be stopped.

Restoring westslope cutthroat trout and bull trout into selected habitat would expand their range to part of their historic habitat in the Stehekin drainage. Reintroduction efforts would be based on research and approved recovery plans. In some cases, competing nonnative fish species present in habitat selected for reintroduction might have to be eliminated to assure survival of the reintroduced trout and protect the genetic integrity of the population. Also, any competing nonnative fish species threatening the survival of an existing native population would be controlled or eliminated where feasible. Existing fish species remaining from past stocking activities would not be eliminated from all other waters. In some cases, natural or artificial fish barriers may be required to prevent the invasion or reinvasion of competing nonnative species.

Both westslope cutthroat trout and bull trout are especially vulnerable to fishing and populations could be affected by overfishing. At the present time it is not known what, if any, impacts recreational fishing may be having on the existing populations of native cutthroat and bull trout in the national recreation area. Therefore, angler harvest would be monitored and adverse effects mitigated by using special fishing regulations or other measures.

Conclusion

Alternative B would enhance the integrity of existing native fish populations and habitat and would also reestablish native cutthroat and bull trout populations in part of their historic habitat within the Stehekin drainage.

IMPACTS ON THREATENED, ENDANGERED, OR RAKE SPECIES

Impact Assessment

Peregrine Falcon. No impacts are expected; see the discussion under the proposed action.

Gray Wolf. The closing of the upper valley road at High Bridge and conversion of the road to a trail would change human use of this area. What is now a one-day hike over Cascade Pass would become an overnight trip. It is assumed that the existing campgrounds would become backcountry camp sites and no additional sites would be designated. At first, this would reduce the number of hikers, but increase the amount of residence time in the trail corridor. Later, when the expected 40% increase in overall visitor use is realized, numbers of back-packers would increase. Finally, existing recreation associated with vehicles in this section, would cease entirely. Given this mix

of changes, the closing of the road itself would likely have no effect on potential wolf use of the area.

Bald Eagle. Impacts would be the same as those under the proposed action.

Northern Spotted Owl. These impacts arc largely the same as those for the proposed action except for two differences: the Stehekin Valley road would be closed to all traffic at High Bridge, thus improving the protection of the three nest sites from human activity associated with all vehicles; and the realignment of the Company Creek and Stehekin Valley roads would cause the loss of 8 acres of forested land which is currently owl habitat. Additionally, the Pacific Crest Trail between High Bridge and Bridge Creek could be abandoned and the reclaimed road could be used as the trail. This would prevent the possible disturbance to two of the nest sites which are within one-quarter mile of the Pacific Crest Trail.

Grizzly Bear. Closing the upper valley road at High Bridge would change human use of the upper valley riparian /one, as well as reduce overall human access into grizzly bear summer range in the backcountry. Even if a road itself does not directly affect habitat, it allows easy human access to grizzly use areas (IGBC 1987)- The Stehekin Valley road and the road from Lake Chelan to Holden are the only two roads in a large area between highways 2 and 20. These are the only two roads in an otherwise roadless area of about 800,000 acres. Closing part of the Stehekin Valley road may therefore be beneficial to the long-term viability of the North Cascades grizzly bear population.

Bull Trout. Refer to the "Impacts on Native Fish" section for potential impacts on bull trout.

California Wolverine. Impacts would be largely the same as those under the proposed action, except that 11 miles of road would be closed in the upper valley between High Bridge and Cottonwood Camp,

Pacific Western Big-Eared Bat. No impacts are expected; see the discussion under the proposed action.

Pacific Fisher, impacts would be largely the same as those under the proposed action, except that 11 miles of road would be closed in the upper valley between High Bridge and Cottonwood Camp.

North American Lynx. Impacts would be minimal; see the discussion under the proposed action.

Cascades and Spotted Frogs. The realignment of the Company Creek road could disturb areas near Battalion Creek, which may be inhabited by these frogs.

Northern Goshawk. Impacts would be the same as those under the proposed action.

Harlequin Duck. Impacts would be largely the same as those under the proposed action except for two items: 11 miles of road would be closed in the upper valley between High Bridge and Cottonwood Camp. This may decrease disturbance to birds using these river reaches. And the National Park Service could increase the amount of riverbank manipulation compared to the proposed action. This could adversely affect harlequin habitat.

Golden Eagle. No impacts are expected; see the discussion under the proposed action.

Flammulated Owl. Impacts would be the same as those under the proposed action.

Common Loon. Impacts would be the same as those under the proposed action.

Vaux's Swift. Impacts would be the same as those under the proposed action.

Pileated Woodpecker. An estimated 8 acres of forested stands would be lost from the realignment of the Company Creek and Stehekin Valley roads. This would be a

minor adverse impact on existing pileated habitat.

Western Cray Squirrel. Impacts would be the same as those under the proposed action.

Victoria's Grape-Fern. Impacts would be the same as those under the proposed action.

Western Ladies-Tresses. Impacts would be the same as those under the proposed action.

Giant Helleborine. No impacts are expected; see discussion under the proposed action.

Conclusion

These impacts are largely the same as those for the proposed action with the following exceptions. Three spotted owl nest sites would be better protected by the closure of the road between High Bridge and Cottonwood. The closure of upper valley road may benefit gray wolves, grizzly bears, Pacific fishers, and harlequin ducks.

IMPACTS ON WATER QUALITY

Impact Assessment

Impacts would be the same as those described for the proposed action.

Conclusion

Alternative 13 would reduce impacts on water resources compared to existing conditions.

IMPACTS ON AIR QUALITY

Impact Assessment

Impacts would be the similar to those described for the proposed action, except that closing the upper Stehekin Valley road would reduce vehicle and dust emissions along an 1l-milc-long corridor between High Bridge and Cottonwood Camp outside the study area. Also, in the study area no additional roads would be paved resulting in greater dust emissions than the proposed action.

Conclusion

Impacts would be the same as for the proposed action, except above High Bridge where vehicle-caused pollution would be less.

IMPACTS ON CULTURAL RESOURCES

Impact Assessment

While (he impacts of this alternative would be the same as the proposed action for **the** Golden West Lodge and the High Bridge ranger station, (hey would differ for the Buckner homestead and orchard. This national register property would be rehabilitated and enhanced for visitor use, such as picnicking, lodging, and festivals, and the genetic stock of the orchard would not be maintained. These actions could affect the integrity and interpretive value of the site. Natural processes would be allowed to occur at all other national register properties, resulting in their deterioration and/or possible loss. An agricultural use permitting system would be developed and community gardens would be permitted, but these activities would not be guided by the preparation of a historic landscape report. Such activities could affect the integrity of historic landscapes. Construction of a collection storage/museum /curatorial facility in (he Stehekin Valley could affect the historic character and rural ambiance of the valley.

There may be indirect effects to the prehistoric site near Stehekin Landing due to casual collection; however, no direct impacts would occur.

It is possible that improvements to the Stehekin Road could directly affect one prehistoric site and the historic Stehekin Wagon Road segment. Every effort would *be* made to avoid direct impacts on archeological resources.

Harlequin Bridge has been determined eligible for listing on the national register. The National Park Service will consult with the state historic preservation officer regarding retention and rehabilitation of the structure.

Conclusion

Cultural resource management actions would be limited, resulting in the deterioration or loss of significant historic landscapes and historic properties and the lack of an interpretive program.

There is a possibility that one historic and two prehistoric archeological sites would be affected. No significant adverse effects arc anticipated. Any potentially adverse effects would be mitigated in consultation with the state historic preservation officer and the Advisory Council on Historic Preservation.

IMPACTS ON VISUAL/SCENIC RESOURCES

Impact Assessment

The removal of the Riddle Creek cabins and construction of boat-in campsites that are set back from the shoreline of the lake at 4-mile and Riddle Creek would result in a net benefit to the visual experience, particularly for arriving visitors and residents on private boats and commercial ferries. New docking facilities associated with the campsites would be a minor intrusion into the natural appearing shoreline.

The alluvial terrace associated with Purple Creek in the Landing landscape unit is of low sensitivity except at the shoreline. The Landing would continue to be the hub of activity and the commercial center; however, NPS facilities would be relocated from the shoreline to areas inland on the terrace. In addition, new construction would meet architectural guidelines and compatibility standards for development contributing to the rural woodland gateway style concept of this alternative. Rehabilitation of the shoreline would enhance the scenic values of the area. Arriving visitors (#1), the Imus Trail overlook (#2), residents at the head of the lake (#3), and campers at Weaver Point (#5) would benefit from the improved views to the Landing.

The head of the lake is recognized as a sensitive area because of its visual accessibility to almost all visitors to Lake Chelan NRA. Additional development of private lands for residential use or to meet visitor demands for accommodation in the head of the lake landscape unit would not impact views from arriving visitors (#1), Imus Trail overlook *($2),* the road along the lake shore (#3), Purple Creek campground (#4), Weaver Point campground (#5), the Landing (#6), and Buehler's Bluff (#7) if management objectives and actions are implemented that protect sensitive lands and shorelines by locating development out of the shoreline buffer. The relocation of camp sites away from the shoreline and expansion of Weaver Point campground into areas of low visual sensitivity would benefit scenic values and views (table 10).

The provision of a public access site on the river near the "castle" and a pedestrian suspension bridge over the river at Boulder Creek would affect the river experience of rafters by adding structures to the shoreline in the Boulder Creek and Bakery landscape units. These facilities would benefit trail users by allowing opportunities to experience dynamic river processes and provide views up and down the river to adjacent resources and the valley walls.

In the fairways landscape unit, relocating NPS and concession seasonal housing and

maintenance activities from the fairways to the airstrip and allowing the fairways to naturalize would reduce the limited amount of open space in the valley and views out to adjacent areas. The new facilities at the airstrip would be located in an open, highly visible area. Clustering these facilities and feathering edges of the landscaping in a way that makes the openings appear natural would reduce visibility and the degree of change associated with the development.

Relocation of a segment of Company Creek road away from the river and removal of the control .structure, which is currently in the river, would benefit scenic values along tin: river in the McGregor landscape unit. The new alignment would be in an area of low or moderate visual sensitivity depending on its final location.

Providing a formal river access site in the Coon Creek landscape unit at river mile *9* would benefit river users and provide visual access to the river and surrounding resources. Impacts would be associated with development of the site because of changes to vegetation and the river bank. Impacts could be minimized through sensitive design, selective removal of vegetation, and enhancement of vegetation in the road and river buffers.

Providing a turnaround and trailhead at High Bridge would require removal of vegetation and the addition of a widened gravel pad. This could be accomplished with minimal impact on visual resources by selectively disturbing only the limited area required for facilities and by placing them in a location that is not visible from the High Bridge viewpoint (#17).

There are a number of other valleywide actions associated with this alternative that would impact visual resources and the overall experience of visitors to the area. These are as follows:

New pedestrian and horseback riding trails would have segments located in areas of high sensitivity such as within view of the Valley Road or the river. Minor modifications to vegetation and land form associated with trail development would generally go unnoticed from a majority of the viewpoints. The trails would be a benefit to hikers by providing visual access to resources in the valley.

Burying of powerlines, particularly where it parallels the valley road and crosses the river would benefit views from several viewpoints (road at the shoreline (#3) and Harlequin Campground (#13)) and the road.

Developing a view and vista clearing component to the vegetation management plan would preserve existing views and viewpoints and provide opportunities for additional viewpoints.

Implementing design guidelines and compatibility standards that are sensitive to the land and resources and that reflect and complement historic attributes in the valley would enhance the character of development in the valley and protect visual resources.

Conclusion

Visual resources would be improved. The opportunity to experience these resources by residents and visitors to the valley would increase because of the development of a vista and view clearing component of the vegetation management plan.

IMPACTS ON ACCESS AND TRANSPORTATION

Impact Assessment

Getting There. The impacts of commercial and private boat passengers would be

similar to those in the proposed action because of similar passenger loading levels.

The impacts of commercial floatplane activity would be similar to those in the proposed action. The noise levels of commercial floatplane takeoffs would be similar to those under existing conditions. The closure of the airstrip would remove the noise from aircraft use and vehicular traffic related to airstrip operations.

Once There. The impacts of the shuttle system would be similar to those in the proposed action. Additionally trip noise would be eliminated between High Bridge and Bridge Creek due to termination of service at High Bridge. The proposed action provided service to Bridge Creek. Impacts on trails would somewhat be greater than in the proposed action due to the emphasis in walking, bicycling, and horseback riding (e.g., additional erosion). The impacts from use of private snowmobiles would be similar to those in the proposed action.

Roads and Trails. The average daily traffic and impacts from vehicular use would be similar to those in the proposed action. The roadway at mile 8.0 on the Stehekin Valley road and a new 1.4-mile section of Company Creek road would be constructed away from river erosion (replacing shorter existing sections). This would enable these roadway sections to be open during high water and reduce maintenance for roadway restoration after flooding.

Landing. Impacts would be similar to those in the proposed action other than there would be less demand for private boat dock usage due to moorage for day use only.

Conclusion

Impacts would be similar to those for the proposed action.

IMPACTS ON VISITOR EXPERIENCES

Impact Assessment

The impacts of alternative B would be the same as those, of the proposed action, with the following exceptions. Visitors would have increased opportunities to enjoy rafting on the Stehekin River. Visitors would have a limited variety of opportunities to learn primary interpretive themes, safety concerns and resource issues relating to Lake Chelan NRA. Enhanced interpretive media and facilities would interest a wider variety of visitors than at present. Minimum level programs would be available.

Backcountry experiences, with or without stock, would be similar to those in the adjacent Chelan-Saw tooth Wilderness, and parties traveling between the two areas would not have to follow different requirements. Maximum stock party size would be 24 pairs of eyes — less than the current situation in some areas of the Stehekin drainage, but more than in other areas.

Conclusion

Impacts would be the same as those of the proposed action, with greater access to river rafting and more limited access to interpretive activities.

IMPACTS ON THE REGIONAL ECONOMY

Impact Assessment

Visitors, Lodging, and Economic Impacts. In 2007 visitor arrivals are expected to total 38,024 persons, a 40% increase over 1992 (27,234 visitors). Lodging capacity is estimated to increase by 59 spaces of which 30 spaces are National Park Service/North Cascades Stehekin Lodge and 29 spaces are private for a total of 209 spaces, compared to 150 spaces in the base-year (1992).

Visitors are reduced by nonrecreational visitors to obtain tourism-related visitors of 36,123 persons in 2007. These are estimated to directly spend $2.4 million in Stehekin and $5.4 million downlake for a total of $7.8 million. Total direct expenditures are anticipated to be $9.1 million, including $1.4 million of NPS direct purchases. Direct employment and earnings associated with these expenditures are estimated at 311 FTEs and $33 million, respectively. Total economic impacts in 2007 (after ripple effects are added) are estimated at 391 FTEs, $4.4 million earnings, and $14.4 million output

Population. Population in 2007 increases to 122 year-round and 399 seasonal residents. Seasonal housing is expected to increase at current levels of about 2 per year with 2.G persons per household.

Public Services and Fiscal Impacts. The net fiscal impact for the Chelan County general fund is estimated to be a surplus of $17,271 in 2007, similar to the no-action/minimum requirements alternative. For the Chelan County road fund a surplus of $6,432 is estimated in 2007, just above the no-action/ minimum requirements alternative, again. Stehekin School District No. 69 is projected to receive 24.4 pupils in 2007 under this alternative. The district is estimated (o generate a fiscal surplus of $136,346, exceeding that for the no-action/minimum requirements alternative by a small margin. Services provided by the Chelan-Douglas Health District, the Chelan County PUD, and the National Park Service would be similar to the no-action/minimum requirements alternative, also with similar fiscal consequences.

Community Changes. The NPS pursuit of privatization would be likely to persist under this alternative. This should serve to support the community, although there would likely be no change in either formal or informal organizations in the area. Stehekin school enrollment is unlikely to change dramatically; this is likely to cause little change in the school services provided.

The National Park Service would actively pursue land purchases where sellers are willing as funds permit. Compatibility in the use of resources would be required by the Park Service.

Conclusion

Similar to the proposed action, alternative B would have moderate but positive effects on the regional economy. By 2007, visitor arrivals and lodging spaces would increase by 40%. Visitor expenditures and total employment would increase by about 37%.

The net fiscal impacts on the Chelan County general and road funds would have a higher surplus in 2007 than in 1992. The school district is expected to have 24 pupils in 2007 and would generate a higher net fiscal surplus than in the 1992-93 school year.

Chelan County PUD No. 1 supplies power on a chronically deficit basis for the Stehekin system. Power costs are a limiting factor to Stehekin growth. A rate increase may be necessary over the next 15 years to cover existing deficiencies and any new load growth.

IMPS-provided activities and their costs would expand somewhat in response to growth in visitor use and development levels.

Impacts on the community would be generally favorable. The National Park Service would require compatibility and would pursue land acquisition as sellers became willing and funds became available.

UNAVOIDABLE ADVERSE IMPACTS, AND THE RELATIONSHIP BETWEEN SHORT-TERM USE OF THE ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Unavoidable adverse impacts are primarily biological. Some upland biotic communities would be adversely affected. Additionally, 1 acre of wetland would be adversely affected.

Unavoidable adverse impacts to sensitive wildlife species would be similar to the proposed action except that 11 additional miles of upper valley road would be closed. Grizzly bear, northern spotted owl, bald eagle, gray wolf, California wolverine, Pacific fisher, northern goshawk, and harlequin duck would sustain impacts on habitat in the lower valley.

Adverse impacts or loss of historic landscapes and historic properties would also occur.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

There would be no irreversible commitments of sand, rock, and gravel. Financial resources committed to this alternative would be irreversible.

Irretrievable commitments are the same as those for the proposed action.

IMPACTS OF ALTERNATIVE C

IMPACTS ON STEHEKIN RIVER/FLOODPLAIN

Impact Assessment

Alternative C would generally provide additional protection for natural river processes and improve habitat conditions for fish and other aquatic species. The overall reduction of disturbed areas in the floodplain would result in decreased erosion and sediment loading and improve riparian vegetation conditions. Measured impacts within the 100-year floodplain are summarized in table 50.

TABLE 50: MEASURED IMPACTS, 100-YEAR Floodplain - Alternative C

Source of Impact	Impact on Stehekin River/Floodplain
Within the Study Area:	
Acquire land or interests in private parcels	118 acres of floodplain, including 7(1 acres in high flood influence area, would be protected in the long-term, (beneficial impact)
Restore old borrow pits to natural conditions	11 acres of floodplain would be restored, (beneficial impact)
Relocate maintenance area and restore to natural condition?	4 acres of floodplain would be restored, (beneficial impact)
Restore the natural character within 200 feet of the lake edge	1 dire of currently disturbed floodplain would be restored. (beneficial impact)
Manage six forest fuel reduction areas	Up to 131 acres of forested floodplain would be modified, (adverse and beneficial impact)
Provide an additional supply of firewood from a designated area near Company Creek road	73 acres of forested floodplain would he subject to firewood cutting, (adverse impart)
Maintain present road system except at upper Company Creek road	15 acres in the floodplain, including 3 acres in the high flood influence area would continue to be disturbed, (adverse impact)
Continue to maintain airstrip at current size	10 acres of the floodplain would be maintained in an unnatural condition, (adverse impact)
Rehabilitate the Buckner homestead and orchard	7 acres of the forested floodplain would be maintained in an unnatural condition, (adverse impact)
Relocate upper Company Creek road	D.5 acre in the floodplain would be disturbed, (adverse impact)
Study Area Totals:	134 acres of floodplain beneficially affected Up to 131 acres of floodplain modified 116 acres of floodplain adversely affected

Under the proposed action the National Park Service would actively restore about 16 acres of floodplain, including 7 acres in the high flood influence area to more natural conditions. Areas that would be restored include the NPS maintenance area, old borrow pits, and floodplain near the mouth of the Stehekin River.

Approximately 116 acres of vegetated floodplain, including 15 acres in the high flood influence area, would be maintained in an unnatural condition. Areas that would be affected include portions of the airstrip, the Buckner orchard, firewood cutting areas, and roads. Burying powerlines might also cause short-term disturbance on an unknown amount of floodplain. Any soil disturbance caused by management activities would be mitigated to help prevent erosion. Impacts from the forest fuel reduction program would be the same as for the proposed action.

The 15 acres of roads in the floodplain would continue to be maintained. Erosion of gravel or dirt roads and shoulders would continue to carry sediments to the Stehekin River and its tributaries adversely affecting natural river processes and aquatic habitat. Hardening the Stehekin Valley road surface between Harlequin Bridge and High Bridge and other mitigating measures to conserve sand, rock, and gravel eroded from roads, would reduce these impacts.

Instream manipulation, including removal of hazardous woody debris and protection of eroding banks that threaten existing public and private improvements, could occur. River control structures for protecting roads and bridges would continue to be maintained, except for the upper Company Creek road. instream modifications could change natural river erosion processes and flow patterns. This could result in increased channel erosion and flooding downstream. Removal of woody debris or disturbance of streamside vegetation could reduce important feeding and cover habitat adversely affecting fish and other aquatic organisms.

Approximately 300 yards of the existing Company Creek roadway would be removed and area rehabilitated, although it is very likely that the old roadbed would erode away during the first significant flood resulting in a new river alignment. The river channel is meandering to the west and would likely reoccupy an old channel to the west of the road. A new road would be constructed along approximately 1.1 miles of the floodplain west of the existing road adversely affecting 0.5 acre of floodplain vegetation.

A new road protection structure would be built on the Stehekin Valley road affecting about 400 feet of riverbank. The system would use riprap extending from the bottom uf the channel to the 50-year flood elevation [about 16 feet vertically). Willows would also be planted along the shore to help stabilize the bank. At the project site, riprap would raise the water surface elevation 0.5 foot and increase river velocity by 0.5 foot per second. However, no measurable changes in these parameters would be expected downstream. Construction activities would cause temporary increases in river suspended sediment and turbidity. Rock and vegetation used to protect the site would improve fish habitat by providing cover and macro-invertebrate habitat. However, a combination of increased stream velocity and bank armoring would reduce gravel recruitment to fish spawning areas.

The river management planning process would address additional strategies for protecting and restoring the river and its tributaries and associated floodplain. Alternative methods and designs for protecting streambanks and controlling erosion would also be examined. The National Park Service would study the suitability of the Stehekin River for Wild and Scenic designation. The potential for designation would not be compromised by the proposed action.

Hazards associated with flooding and other geological processes would be the same as the proposed action, except the upper Company Creek road would be relocated from the active river erosion zone. Also, less private land would be acquired within the 100-year floodplain because riparian areas would not be designated as high priority for protection.

Conclusion

This alternative generally would have beneficial effects on natural river processes and habitat for fish and other aquatic species, including restoration of 16 acres of the Stehekin River floodplain. Instream modifications could affect natural river processes and aquatic habitat adversely. Acquiring interests in private lands with owner's consent would eventually provide additional long-term protection for another 118 acres of floodplain. Potentially hazardous conditions associated with flooding would be reduced substantially by relocating most NFS buildings and facilities now located in floodplain or geohazard areas and acquiring land interests.

IMPACTS ON WETLANDS

Impact Assessment

Alternative C would restore and provide additional protection for wetlands in the Stehekin watershed benefiting a variety of dependent lifeforms and physical processes. Actions that would have beneficial impacts on wetlands include restoring damaged wetlands, acquiring interests in wetlands, cooperative management with private landowners and other agencies, and carrying out pollution control measures. Proposed actions that could have adverse impacts, include managing vegetation for airstrip maintenance, maintaining roads near wetlands, relocating Company Creek road, and allowing instream manipulation. Impacts related to wetlands are also discussed in the "Impacts on Stehekin River/Floodplain" and "Impacts on Water Quality" sections. Measured impacts on wetlands are summarized in table 51.

TABLE 51: MEASURED IMPACTS, WETLANDS - ALTERNATIVE C

Source of Impact	Impact on Wetlands
Within the Study Area:	
Acquire land or interests in private parcels	62.9 acres of wetlands would be protected in the long-term, (beneficial impact)
Restore natural character within 200 feet of lake edge	10.0 acres of currently disturbed wetlands would potentially lx^{L} restored, (beneficial impacts)
Restore old borrow pits to natural conditions	6.9 acres of wetlands would potentially be restored, {beneficial impact)
Relocate maintenance area and restore to natural conditions	0.3 acre of wetlands would potentially be restored. (beneficial impact)
Continue to maintain airstrip at current size	5.5 acres of wetlands would be maintained in an unnatural condition, (adverse impart)
Maintain existing road system and expand as needed	1.2 acres would continue to be lost, (adverse impact)
Study Area Totals:	80.1 acres of habitat in or near wetlands beneficially affected 6.7 acres of wetlands adversely affected

Under this alternative the National ['ark Service would actively restore about 17 acres of damaged habitat in or near wetlands to more natural conditions in the study area. Areas (hat would be restored include the MPS maintenance area, old borrow pits, and wetlands within 200 feet of the lake edge. Complete restoration could take a long time depending on the availability of funds. The two NPS-owned nonhistoric buildings now located in wetlands would be removed and damaged habitat restored.

Maintenance of the emergency airstrip would require the occasional cutting of tall vegetation within a wetland area covering 5.5 acres. This would not reduce the size of the wetland, but would adversely affect wetland functions. Cutting of wetland vegetation would cause losses of food, cover, and nesting sites used by dependent wildlife. More area of open water could be exposed to direct sunlight causing increased ultraviolet light exposure and evaporation and slightly increased temperatures. Reduced survival of early life stages of amphibians may be correlated to increased exposure to ultraviolet light. Water temperatures would probably not exceed optimal ranges. Wildlife would likely avoid the area during vegetation-cutting activities. The majority of the tall vegetation, including red alder and bigleaf maple, would be expected to grow back quickly after being cut.

All roads near wetlands including between High Bridge and Cottonwood Camp would continue to be maintained. Runoff from gravel or dirt roads and road shoulders would continue to carry sediments to some wetlands. Increased sediment in palustrine wetlands can decrease depth and area of open water, decrease area annually flooded, and increase susceptibility to drought resulting in habitat loss. Hardening the road surface between Harlequin Bridge and High Bridge and other mitigating measures to conserve sand, rock, and gravel eroded from roads would reduce these impacts.

Instream manipulation, including removal of hazardous woody debris and protection of eroding banks that threaten existing public and private improvements would be allowed. Existing river control structures for protecting roads, including the Stehekin Valley road at 8-Mile, and bridges would continue to be maintained except the upper Company Creek road. Instream manipulations and river control structures could change natural river erosion processes and flow patterns resulting in decreased area annually flooded, decreased channel movement, or increased sediment deposition along the river corridor. This could indirectly reduce wetland area or reduce potential for natural wetland development along the river corridor. The degree of impact would be difficult to predict because of the dynamic nature of the river.

Approximately 300 yards of the existing upper Company Creek road would be removed and the area restored. It is very likely that the old roadbed would erode away during (he first significant flood event resulting in a new river alignment. The river channel is meandering to the west and would likely reoccupy an old channel to the west of the road. This could result in development of new wetland areas. A new road would be constructed along approximately 1.1 miles of the floodplain west of the existing road. Preliminary surveys of the route have been completed, and the new road would cross some small streams.

Conclusion

Alternative C generally would have beneficial effects on wetlands. Approximately 17 acres of wetlands would be restored where possible and another 63 acres protected by acquiring interests. Existing road disturbance and vegetation management activities to maintain the airstrip would adversely affect about 6.7 acres of vegetated wetlands.

IMPACTS ON RIPARIAN COMMUNITIES

Impact Assessment

Measured impacts on riparian communities arc summarized in table 52.

Conclusion

A total of 70 acres of riparian communities would be protected or restored, and up **to** 74 acres would be affected by prescribed fire.

TABLE 52: MEASURED IMPACTS, RIPARIAN COMMUNITIES - ALTERNATIVE C

Source of Impact	Impact on Riparian Communities
Move existing IMPS maintenance and housing area out of riparian	8 acres of riparian communities would be restored, (beneficial impart)
Manage six forest fuel reduction areas	Up lo 74 acres of forested riparian would be affected, (beneficial impact)
Acquire land or interests in private parcels	62 acres of riparian would be inadvertently protected in the long-term by the protection of other resources (beneficial impact); (he remaining 56 acres of riparian on private land would not be protected and could be lost, (adverse impact)
Realign Company Creek road with a new 1.1-mile segment	2 acres of riparian would be lost, (adverse impact)
Realign some segments of Stehekin Valley road in lower valley	Realignments would disturb an unknown amount of natural riparian vegetation, (adverse impact)
Convert road between High Bridge and Bridge Creek from tow lanes (14 ft.) to one lane (12 ft.) with pullouts	There would be minimal recovery of road-edge riparian, [beneficial impact)
Study Area Totals:	8 acres riparian restored 62 acres riparian protected Up to 74 acres riparian affected by prescribed fire 2 acres riparian lost

IMPACTS ON UPLAND COMMUNITIES

Impact Assessment

Measured impacts on upland communities are summarized in table 53.

TABLE 53: MEASURED IMPACTS, UPLAND COMMUNITIES - ALTERNATIVE C

Source of Impact	Impact on Upland Communities
Construct new NPS maintenance and housing area near airstrip; relocate lodge at Landing out of geohazard area and construct new parking and stables; construct new Rainbow Lodge accommodations	16 net acres of upland communities would be lost, (adverse impact)
Manage six forest fuel reduction areas	636 acres of forested upland would be affected, (some adverse and some beneficial impact)

Acquire land or interests in private parcels	53 acres of upland would be protected in the long term as an unintended result of the protection of other resources (beneficial impact), (beneficial impact)
Realign Company Creek road with a new 1.4-mile segment	1 acre of upland would be lost, (adverse impact)
Visitor lodging would expand on private lands to meet demand	There would be unknown loss of upland communities, (adverse impact)
Firewood would be supplied from administrative sources, fuel hazard areas, and selective cutting in the Company Creek road designated firewood area	Up to 201 acres in the designated firewood area could be affected; wood on private lands could affect up to 190 acres if residents choose not to u firewood area, (adverse impacts)
Control of nonnative plants not a priority; the airstrip and lower field would be maintained in current conditions	Nonnative plants would continue to spread and displace native fauna and habitat for native wildlife species; the 48-acre airstrip, dominated by aggressive invader species, would remain a major source of nonnative species in the valley; the 6-acre lower field would be maintained in nonnative species, (adverse impacts)
Stock grazing and numbers of stock in recreation area wilderness, based on less strict standards, firewood gathering in subalpine backcountry sites allowed	backcountry meadows may he affected from grazing; sensitive subalpine campsites would be affected from wood burning, (adverse impact)
Study Area Totals:	53 acres upland protected Up to 837 acres upland affected by prescribed lire, thinning, and firewood cutting 17 acres upland lost

New construction near the airstrip, al the Landing, and at Rainbow Halls would disturb the following upland communities:

Community	Acres
Mixed coniferous	12.1
Mixed deciduous/coniferous	0.1
Douglas-fir	6.3
Bigleaf maple	0.7
Xeric uplands	.2
Total	**19.4**
Already Disturbed Lands	0.7

(No effective change in disturbed condition)

A total of 19 acres new disturbance would occur from construction. In addition, 4 acres at the Landing would be restored from the removal of the existing campground, lodge, and dorm. So 19 minus 4 results in a net loss of 15 acres of upland communities.

The Company Creek road designated firewood area would include the Company Creek road from Harlequin Bridge to its end, and all existing side roads from it. Individual trees would be marked for culling within 250 feet of any of these roads using a special selective cutting technique. Trees would be marked by the Park Service, but cutting would be done by residents. This technique would be designed to maintain (he genetic stock of dominant trees of a species, to maintain all existing canopy layers, and to maintain a11 other structural components and ecological processes of the stands including snags and down logs. Within this 250-foot buffer, the following lands would not be included in the cutting area: private parcels, wetlands, nonforested stands, and a 200-foot buffer along the river edge.

A total of 200 acres would be available in this firewood cutting area. The amount of acreage actually affected and the number of trees removed would be dependent in any given year on how many cords of firewood

came from the first two priority firewood sources — administrative wood and wood from the fuel hazard reduction program. When less than 120 cords are supplied from these first two sources, then the balance would come from the Company Creek firewood area. The impacts on upland and riparian communities associated with this selective cutting technique are expected to be significantly less than other cutting techniques. Since the idea of this technique is to mimic the natural system as much as possible, all natural components and processes of these communities would be identified and protected to a high degree. The removal of organic matter (firewood) from these communities would of course be unavoidable, and this material would not be reincorporated into the soil system.

Conclusion

A total of 53 acres of upland communities would be protected, and up to 837 acre? would be affected by prescribed burning, thinning, and firewood cutting; 17 acres would be lost. This would result in a major adverse impact

IMPACTS ON NATIVE FISH

Impact Assessment

Alternative C would provide additional protection for westslope cutthroat trout and bull trout in the Stehekin watershed and help perpetuate important genetic resources. Important salmonid habitat would be protected by acquiring interests in or restoring habitat, limiting instream manipulations, and implementing pollution control measures (see the Stehekin River/floodplain and water quality impacts).

Fish stocking within the Stehekin drainage on NPS land would be limited to endemic species. This would help protect native westslope cutthroat trout and bull trout from further displacement caused by competition and hybridization with stocked nonnative species. Supplemental stocking of native fish to offset the effects of angler harvest and to enhance fishing opportunities would also be allowed if impacts are minimal. Measures would be taken to ensure that fish stocked in park waters were the purest strains available that retained their wild traits. Stocking could also expand the range of native cutthroat trout and bull trout in the Stehekin drainage.

Any competing nonnative fish species threatening the survival of an existing native population would be controlled or eliminated according to approved recovery plans. Existing fish species remaining from past stocking activities would not be eliminated from all other waters.

Both westslope cutthroat trout and bull trout are especially vulnerable to fishing and populations could be affected by overfishing. Currently it is not known what, if any, impacts recreational fishing may be having on the existing populations of native cutthroat and bull trout in the national recreation area. Therefore, angler harvest would be monitored and adverse effects mitigated by allowing supplemental native fish stocking or using special fishing regulations.

Conclusion

Alternative C would provide additional protection for existing native cutthroat and bull trout populations. Native fish populations may become reestablished in portions of the Stehekin drainage because of supplemental stocking and control of nonnative species.

IMPACTS ON THREATENED, ENDANGERED, OR RARE SPECIES

Impact Assessment

Peregrine Falcon. No impacts are expected; see the discussion under the proposed action.

Gray Wolf. The greatest long-term impact to wolves would be from the significantly increased levels of development and human activity in the lower valley expected under this alternative. These conditions would represent a permanent loss of this wolf habitat. The continued maintenance of the upper valley road would also reduce the suitability of this area as wolf habitat.

Bald Eagle. Potential nesting habitat al the lower end of the valley would probably never be colonized by breeding eagles due to increased human activity and development. Potential down lake sites could possibly be used if a strong management program, minimizing human disturbance were established. The recovery plan's goal of five occupied territories in the Lake Chelan area would be more difficult to attain.

Northern Spotted Owl. The upper valley road would continue to provide easy human access to the vicinity of four nearby nest sites — one of the sites is less than one-quarter mile from the road. If these sites are disturbed by people, the reproductive success of these birds could be reduced. Hikers on the Pacific Crest Trail between High Bridge and Bridge Creek could continue to impact two nest sites which are within one-quarter mile of the trail. Owl habitat in the lower valley would be adversely affected from a variety of sources Direct losses of 406 forested acres would occur from creation of the fuel reduction areas. An additional 3 forested acres would be lost from the realignment of Company Creek road. The loss of other forested stands and riparian communities, from sources such as private land development and firewood cutting, combined with the expected increase in human activity under this alternative, would also continue to affect suitable owl habitat. These conditions combined may preclude the general use of the lower valley by owls — at the least, preclude its use for future nesting. If the number of hikers on the lakeshore trail south of the Landing were to increase, the nest site here could be directly disturbed since it is less than one-quarter mile from the trail. These impacts may prevent the attainment of the recovery plan's goal of 10 nesting pairs within the DCA. Wildfire would remain a long term threat to all owl habitat in the DCA.

Grizzly Bear. Under this alternative, the greatest long-term impact on grizzlies would be from the significantly increased levels of development and human activity in the lower valley. At least 56 acres of riparian habitat, not protected under this alternative, could also be affected. These conditions would represent a permanent loss of the lower valley as grizzly habitat. Continued maintenance of the upper valley road would also reduce the suitability of this area as habitat, and would increase the number of backcountry hikers in bears' summer range.

Bull Trout. See the impacts on fisheries for potential impacts on the bull trout.

California Wolverine. The continued maintenance of the upper valley road would reduce the suitability of this area as habitat, and would increase the number of backcountry hikers in the Bridge Creek drainage — an area of expected wolverine use.

Pacific Western Big-Eared Bat. No impacts are expected; see the discussion under the proposed action.

Pacific Fisher. The greatest long-term impact would be from the significantly increased levels of development and human activity in the lower valley expected under this alternative. At least 56 acres of riparian habitat, not protected under this alternative, could also be affected. These conditions would probably represent a permanent loss of the lower valley as fisher habitat. The continued maintenance of the upper valley road would also reduce the suitability of this area as habitat.

North American Lynx. Impacts would be minimal; see the discussion under the proposed action.

Cascades and Spotted Frogs. The realignment of the Company Creek road would disturb areas on Battalion Creek which are known to be inhabited by Cascades frogs. Given the nature of (he Battalion Creek drainage in this area, road construction and drainage concerns could affect surface water movement, and thus frog habitat, in a large area around the creek. A total of 56 acres of riparian acres on private lands, some of which contain frog habitat, could be affected due to private land developments.

Northern Goshawk. The greatest potential impact would be from increased levels of development and human activity in the lower valley. These impacts could be great enough to permanently prevent goshawks from using the lower valley for nesting or even foraging. If the number of hikers on the lakeshore trail south of the Landing increases, the nest site here could be directly disturbed since it is only 400 feet from the trail.

Harlequin Duck. Harlequins are known to be sensitive to human disturbance, and such disturbance is probably a factor in the abandonment of other western rivers. The protection of nesting and brood-rearing habitat is believed to be crucial to the continued use of the Stehekin River by harlequins (NPS 1993a). In this alternative, it is expected that there would be increases in development and human use of the lower valley, including increased river rafting and fishing along the river's banks. Additional river protection structures would affect riverbanks, and the maintenance and use of the upper valley road could affect habitat use in this area. From these impacts it is probable that the reproductive success of harlequins would decrease, and possible that some river reaches would be abandoned.

Golden Eagle. No impacts are expected; see the discussion under the proposed action.

Flammulated Owl. These owls may be affected by the loss of forest stands and snags on private: lands from expected future developments.

Common Loon. It is probable that impacts may occur to foraging loons from recreational lake users since such uses are expected to increase under this alternative.

Vaux's Swift. Swifts may be affected by the loss of snags on private lands from expected future developments.

Pileated Woodpecker. These woodpeckers would be affected by at least two actions: the loss of riparian and upland forest stands, and snags, on private lands due to expected developments; and the loss of 3 acres of forested stands from the realignment of the Company Creek road. Pileateds would be expected to continue to inhabit the valley, since they tolerate human activities fairly well.

Western Gray Squirrel. These impacts would be the same as those for pileated woodpeckers.

Victoria's Grape-Fern. These impacts would be the same as those for (he proposed action.

Western Ladies-Tresses. These impacts would be the same as those for the proposed action.

Giant Helleborine. No impacts are expected; see the discussion under the proposed action.

Conclusion

This alternative would have the greatest impacts on sensitive wildlife species. Expected levels of development and human activity in the lower valley would represent a permanent loss of this area as usable habitat for the following species: gray wolf, bald eagle (nesting), grizzly bear, northern spotted owl (nesting), Pacific fisher, northern goshawk (nesting), and possibly harlequin duck. The species-level biological diversity of

the park complex would be adversely affected under this alternative.

IMPACTS ON WATER QUALITY

Impact Assessment

Impacts would be the same as those described for the proposed action.

Conclusion

Alternative C would reduce impacts on water resources compared to existing conditions.

IMPACTS ON AIR QUALITY

Impact Assessment

Alternative C would increase emissions from energy consumption within the Stehekin Valley by 34% for the five pollutants evaluated. This alternative would increase particulates by *22'%,* oxides of nitrogen by 392%, and oxides of sulfur by 360%. Chelan County PUI3's diesel electric generator along with the use of other fuel oils would emit 44% of all fuel-related pollutants and produce most of the nitrogen and sulfur oxides. Increases in the total quantity of nitrogen oxide emissions would be the greatest compared to the other four pollutants evaluated. Total carbon monoxide emissions would decrease by 4% and hydrocarbons by 5% as a result of converting to efficient woodburning units. However, burning firewood would continue to be the largest fuel-related pollution source contributing *52%* of the emissions. Therefore, any reductions in firewood use and conversion to high-efficiency woodburning stoves or fireplace inserts would cause the greatest reduction in energy-related emissions. Conservation measures and reduced NPS use could reduce annual firewood consumption by over 50% (Northwest Energy Services, Inc. 1993).

Measures to conserve energy would also help reduce the use of Chelan County PUD's diesel electric generator and reduce emissions. The private sector currently uses 53% of the total energy resource in Stehekin. Therefore, the reduction in fuel-related emissions would very much depend on their use of conservation measures. Increased vehicle use in the national recreation area would increase emissions by 30%. Increased air and boat traffic in and out of the recreation area would also increase emissions. Emissions from energy-related pollution could noticeably reduce visibility during cold periods when air occasionally stagnates because of temperature inversions and low wind speed.

Paving the Stehekin Valley road between Harlequin Bridge and High Bridge would substantially reduce fugitive dust emissions along a 6.4-mile corridor. However, increased vehicle use on other unpaved roads, including the upper Stehekin Valley road to Cottonwood Camp, would increase airborne dust reducing visibility and coating adjacent vegetation. Revegetation of some disturbed areas would help protect soils from wind erosion and reduce dust emissions.

Prescribed natural fires to achieve presettlement fuel levels would cause major temporary decreases in air quality and probably be more frequent than under the no-action/minimum requirements alternative. Smoke from campsites would also be a large contributor to Stehekin Valley air pollution and wilderness areas.

Short-term emissions would result from construction of proposed facilities within the national recreation area. Machinery emissions and increased airborne dust from construction activities would decrease air quality near the project sites. Normal conditions would return when construction was completed.

Conclusion

Compared to existing conditions, alternative C would increase the total energy-related air pollutant emissions within the Stehekin Valley by 34%, particularly for oxides of nitrogen if demand for electricity increases. Conversion to high-efficiency woodburning units and other energy conservation measures would help reduce some air pollutant emissions. Increases in dust, vehicle, and prescribed fire emissions would adversely affect the national recreation area's air quality.

IMPACTS ON CULTURAL RESOURCES

Impact Assessment

There may be indirect impacts on the prehistoric site near Stehekin Landing due to casual collection; however, no direct impacts would occur. It is possible that improvements to the Stehekin Road could directly affect one prehistoric site and the historic Stehekin Wagon Road segment. Every effort would be made to avoid direct impacts on archeological resources. Harlequin Bridge has been determined eligible for listing on the national register. The National Park Service will consul) with the slate historic preservation officer regarding retention and rehabilitation of the structure.

Conclusion

Cultural resource management actions and their impacts would be the same as those under alternative B.

IMPACTS ON VISUAL/SCENIC RESOURCES

Impact Assessment

The lake provides the backdrop for many of the experiences available to visitors and residents. As such, the lake is the framework for many of the key viewpoints (#s 1-7, and #20) on arrival at the Landing and in the valley. Allowing al! recreational water uses on the lake, without regard for the activity, noise or numbers would affect the scenic values and natural setting of the area.

The Landing landscape unit remains the focal and dispersal point for all activities. NPS facilities would be relocated away from the shoreline and the shoreline rehabilitated where necessary. The lake would be made more accessible to visitors which would improve opportunities for views out to surrounding resources. The increased demand for overnight moorage by small and large boats would be met with more facilities on the lake edge. These facilities would impact the shoreline and would be apparent from the Valley Road on the shoreline of the lake and from viewpoints; on arrival (#1), at the head of the lake (#3), (he Landing (#6 and #20), Weaver Point (#5) and Purple Point (#4). Meeting the demand by more visitors for more services would require an expanded shuttle service. Additional buses, would require larger loading and unloading areas and short term storage lanes, which would affect shoreline conditions and would be visible from surrounding viewpoints.

The head of the lake is recognized as a sensitive area because of its visual accessibility to almost all of the visitors to Lake Chelan NRA. Additional development of private lands for residential use or to meet visitor demand for accommodation would not affect surrounding viewpoints as long as management objectives and actions arc implemented that protect sensitive resources and land protection and cooperative understandings with other public agencies provide for the preservation of the shoreline and the removal of existing structures in the shoreline buffer. The relocation of campsites away from the shoreline and expansion of camping at Weaver Point into areas of low sensitivity would benefit visual resources in the head of the lake unit.

The provision of public access to the river at the "castle" and a pedestrian bridge(s) over the river would impact the wild and scenic river experience of people floating the river Or fishing. These facilities would benefit area users by providing additional views to the river and surrounding resources.

Another activity node would be located near Rainbow Falls where lodging, a restaurant and support facilities would be developed by the National Park Service. New development would be set back from the road 200 feet, located in an area of low sensitivity and would be designed to reflect the historic context of the area. The view to the top of the falls from viewpoint #12 would no) be affected. Additional day use activities would be accommodated at Buckner orchard. Increased day use activities at the orchard would affect the numbers of people at viewpoint #10 and the visitor experience in this historic landscape.

In the fairways landscape unit, relocating NPS and concession seasonal housing and maintenance activities out of the fairways to an area beside the airstrip and allowing the fairways to return to a natural condition would limit views out to surrounding areas. These views should be assessed to determine if they become part of a vista clearing component of the vegetation management plan. The new facilities are planned to be located in an area of low visual sensitivity. Clustering of these facilities and maintaining existing vegetation as much as possible would reduce their visibility.

Relocation of a segment of Company Creek road away from the river and rehabilitation of the old section would benefit scenic values along this portion of the river in the McGregor landscape unit. The new alignment would be in an area of low or moderate visual sensitivity depending on the final location.

Providing a formal river access site in the Coon Creek landscape unit at river mile *9* would benefit river users and provide visual access to surrounding resources. Impacts would be associated with development of the site because of changes to vegetation and the river bank. Impacts could be minimized through sensitive design, selective removal of vegetation and enhancement of vegetation in the river and road buffers.

The Stehekin Valley ranch is designated as another dispersed activity node. Further development of private visitor facilities could impact the pastoral setting and views from viewpoint #16. Development which occurred within the tree line and out of the open pastures would not he visible to users of the valley road.

Development of a turnaround and trailhead at High Bridge would require removal of vegetation and the addition of a widened gravel pad. Impacts of this development would be minimized by selectively disturbing only the area required for the facilities and placing the development out of sight of the High Bridge viewpoint (#17).

There are a number of other actions associated with this alternative that would affect visual resources and the overall experience of visitors to the area. These are as follows:

- New trails would have segments located in areas of high sensitivity such as within view of the Valley Road or the river. Minor modifications to vegetation and land form associated with trail development would generally go unnoticed from a majority of the viewpoints. The trails would provide visual access lo resources in the valley and surrounding mountains.

- Increased NPS and private development would require additional overhead powerlines resulting in an impact on resources. The lines would have to cross the river and would be visible from public facilities (e.g., trails, the road).

Development of a vista and view clearing component to the vegetation management plan would preserve existing views and provide opportunities to open up additional views to important resources from the road, trails, river, and shoreline.

Agricultural uses and community gardens are permitted in this alternative and would open views to pastoral scenes and surrounding resources.

Shoreline protection devices allowed in this alternative would degrade natural river processes and values and the wild and scenic experience of river users.

Conclusion

Overall, the increased emphasis on commercial activities and the new development required to meet all future demands would place stress on the visual resources in the Stehekin Valley. In the short term, there are sufficient areas of low sensitivity, where visual resource constraints are minimal, to accommodate this demand. As the demand increases and development follows that demand, the possibility of development affecting visual resources also increases. In addition, more and more people would be encountered on the road, on trails, at viewpoints, and at historic sites, thus affecting the visual experience.

IMPACTS ON ACCESS AND TRANSPORTATION

Impact Assessment

Getting There. There would be an estimated 105-110% or major increase in visitor arrivals and 120-125% increase in commercial and private boat passengers over existing conditions. This increase could not be accommodated by existing boat capacities and schedules during high use times. There would be a higher frequency of dockings at the Landing. An overnight berthing of one of the commercial boats would produce additional noise and need for visitor support facilities during the evening and nighttime. The higher use of private boats and perhaps larger boats would produce a docking demand greater than the existing number of docks. Larger private boats may require larger docks at the Landing area.

The impacts of commercial floatplane activity would produce substantially higher noise frequency events related to the increasing number of takeoffs and landings. The closure of the airstrip would remove the noise from aircraft use and vehicular traffic related to airstrip operations.

Once There. The shuttle system operation would be similar to that under existing conditions and the no-action/minimum requirements alternative, with service between the Landing and Cottonwood Camp. However, system ridership would more than double over that of existing conditions. Consequently, there would be more noise produced by the operation of the system from the Landing to Cottonwood Camp. Due to the increase in frequency of trips, higher levels of shuttle and roadway maintenance may be required over that of existing condition. Trail erosion, the development of new social trails, and widening of the footpaths of existing trails would occur from the major increase in movements. The operation and noise from private snowmobiles would substantially increase over that under existing conditions until the considerably high frequency of the numbers of trips in the valley to Cottonwood Camp.

Roads and Trails. Average daily traffic may nearly double over that of existing volumes on the valley road. With the use of the road system as under existing conditions and major increases in volumes and noise would be substantially greater as well as maintenance activities to support the roadway systems. There would be the potential for substantially more vehicular

accidents on the Valley Road and other roadways. The protection of the Valley Road at mile 8.0 would have similar impacts to that in the proposed action for this alternative. The construction of a new segment of the Company Creek road would enable the roadway to be open during high water and reduce maintenance for roadway restoration after flooding.

Landing. With an over 100% increase in commercial and private boat passengers, overnight lodging, and shuttle trips, the impacts of pedestrian and vehicular congestion at the Landing would be substantially over that of existing conditions and the proposed action. Overnight docking of one of the commercial passenger boats would product' additional noise and the need for support facilities (restrooms and food service as a minimum). The increase in private boats and overnight docking cannot be accommodated with existing docking facilities. New and perhaps larger docks would be required to accommodate these demands. Parking demands would greatly exceed the existing supply of spaces. Shuttle buses and private vehicular congestion would increase with an increase in volumes and circulation of drivers looking for parking spaces. The congestion problem may increase to the point of restricting private vehicular traffic at the Landing or at best near boat docking facilities.

Conclusion

Major increases in visitor arrivals (105-110%) would cause substantial increases in vehicular congestion, noise, and potential accidents in the national recreation area compared to existing conditions. Increased use would require increased maintenance of facilities, roads, and trails. New or improved facilities would be needed at the Landing to meet the additional demand.

IMPACTS ON VISITOR EXPERIENCES

Impact Assessment

Motorized activities such as shuttles would be kept to slow speeds. A wide variety of resources and experiences would be accessible to elderly visitors and people with disabilities.

Visitors would continue to have motorized access to developments such as lodgings and to features such as Rainbow Falls. The road corridor would present a relaxed, rural character. Primary use would be concentrated along the paved portion of the road. Farther up valley, the nature of the road and the time involved to travel to locations such as Cottonwood Camp may discourage some visitors and keep use at low levels, but would also enhance opportunities for visitors to experience backcountry areas. Visitors would find many options for motorized and nonmotorized travel and various social settings.

Lodging options would vary in cost, types of facilities, amount of social interaction, and degree of physical comfort — with more high-end options available than in the other alternatives. Overall lodging capacity would show a moderate increase in response to demand. Camping opportunities would be greater in number and more or less primitive in character. Visitors would be able to stay a sufficient length of time to experience the Lake Chelan NRA.

Visitors would find more access to Lake Chelan and the Stehekin River; access to other resources would continue generally at present levels. Overall visitor-related resource impacts would stay constant or increase slightly

Visitors would receive orientation information through a variety of media limed to facilitate effective decision making. Visitors would have a variety of opportunities to learn primary interpretive themes, safety concerns and resource issues

relating to the national recreation area. Enhanced interpretive media and facilities would interest a wider variety of visitors than at present. Programs would respond to interest in prime features and stories and to visitation patterns, and would provide greater access to the perspectives of residents and other private interests. Visitors would have much better access to in-depth educational activities.

Backcountry experiences for parties with stock would be similar to those for the adjacent Chelan-Sawtooth Wilderness, and parties traveling between the two areas would not have to follow different grazing or wood collecting rules. Maximum stock party size would be the same as it currently is, 36 pairs of eyes.

Conclusion

A wide spectrum of visitors would have diverse means of access to prime natural, cultural, scenic, and recreational resources with some impacts on park resources and the experiences of other visitors.

IMPACTS ON THE REGIONAL ECONOMY

Impact Assessment

Visitors, Lodging, and Economic Impacts. Visitor arrival projections are based on a rapid (5%) annual rate of growth in visitor arrivals through the first 15 years during plan implementation and at the no-action/ minimum requirements alternative historical rate (1.8%) thereafter. Major expansion (up to 200 additional spaces) of improved lodging capacity and related visitor services is assumed under this alternative. Similarly, increased promotion of Lake Chelan NRA as a destination resort can be expected. For purposes of analysis, it is assumed that equal shares of expanded lodging capacity would be provided by the National Park Service and private businesses.

Visitor arrivals are estimated at 56,6]9 persons in 2007, a 108% increase over 1992 (27,234 visitors). Additional lodging of 161 spaces, consisting of 80 spaces at North Cascades Lodge and 81 spaces by the private sector are projected for 2007, thus increasing the total to 311 spaces.

Visitor expenditures arc based on 53,787 tourism-related arrivals in 2007 and total $11.3 million of which $3.4 million are in Stehekin. These and NPS expenditures generate direct FTE employment of 453 workers and $4.8 million earnings. Total economic impacts (including ripple effects) are estimated at 571 FTE workers, $6.5 million earnings, and $20.9 million output.

Population. Population is estimated to increase to 160 year-round and 557 seasonal residents in 2007. Alternative C is assumed to allow new summer construction at the historical peak of five units per year (based on 1969-79 permit activity).

Public Services and Fiscal Impacts. The net
fiscal impact for the Chelan County general fund is a projected surplus of $18,697, slightly above that for alternative B. For the road fund, the net fiscal balance is a projected surplus of $11,336 for 2007, quite a bit above the alternative B figure. The projected enrollment for Stehekin School District No. 69 is 32 in 2007. The district has n projected fiscal surplus of $178,815 in that year. For this alternative, the population and visitor activity levels would result in significant increases in service from the Chelan-Douglas Health District and in Chelan County PUD No. 1 load growth, though these are fee-funded public activities. The NPS-provided services would also likely be expanded.

Community Changes. Regarding community structures, the National Park Service would be least aggressive with respect to land purchase and resource use compatibility under this alternative. Privatization of visitor services would be pursued, with local residents given greater opportunity to

compete and expand in terms of businesses that attract visitor expenditures, thereby allowing them to remain and thrive. However, difficulty in capital acquisition by local businesses/investors might draw in new economic interests such as developers from larger areas. In such a case, the non-NIPS local residents could feel pushed aside in favor of "outsiders." Land use regulations would require much further clarification and enforcement with respect to development.

Conclusion

Alternative C would have the highest positive impacts on the regional economy. By 2007 visitor arrivals and lodging spaces would increase. Visitor expenditures are also the largest among the five alternatives. The total direct, indirect, and induced activities are projected to generate workers, earnings, and output at more than double those of

The net fiscal impacts on the Chelan County general and road funds would have a higher surplus in 2007 than in 1992. The school district is expected to have 32 pupils in 2007

Service demands and costs would increase for the Chelan-Douglas Health District and Chelan County PUD No. 1, although these are funded by fees.

NPS-provided services and costs would also expand substantially.

Community effects would reflect less stringent NPS policies regarding commercialization of visitor services, resource use compatibility, and land purchase. Local residents would have greater business opportunities, but might face competition from outsiders.

UNAVOIDABLE ADVERSE IMPACTS, AND THE RELATIONSHIP BETWEEN SHORT-TERM USE OF THE ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Unavoidable adverse impacts are primarily biological. Some upland biotic communities would be adversely affected. Also, 7 acres of wetland would be adversely affected. Unavoidable adverse impacts on sensitive wildlife species would be similar to the proposed action except that increased lower valley developments would preclude habitat use by many species. Eight species — grizzly bear, northern spotted owl, bald eagle, gray wolf, California wolverine, Pacific fisher, northern goshawk, and harlequin duck — would be adversely affected over the long term. The species-level biodiversity of the park complex would be adversely affected. Adverse impacts or loss of historic landscapes and historic properties would also occur.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Irreversible commitments are similar to the proposed action. The continued use of sand, rock and gravel from the existing borrow pit would be considered an irreversible commitment of these resources. Financial resources committed to this alternative are. the greatest of any of the alternatives — these commitments would be irreversible. Irretrievable commitments are the same as those for the proposed action.

CONSULTATION AND COORDINATION AND PREPARERS

CONSULTATION AND COORDINATION

SCOPING

Notice of Intent Filed in the Federal Register

The forma] scoping process was initiated on April 30, 1991, when the National Park Service published in the *Federal Register* its intent to prepare an environmental impact statement on a general management and seven implementation plans for Lake Chelan National Recreation Area.

Public Scoping Meetings

Initial public scoping meetings were held in June 1991 in Stehekin, Chelan, and Seattle, Washington to identify major issues to be addressed in the HIS. Letters and public response from these meetings were compiled, analyzed, and reported in newsletter, volume 3.

Newsletters

The following newsletters were sent to approximately 638 agencies, organizations, and individuals:

- Vol. 1, Public Issues and Concerns, March 1992
- Vol. 2, Laws Affecting Administration of Lake Chelan NRA, July 1992 (see appendix C)
- Vol. 3, Summary of Major Issues and Concerns and Controversy Over the Purpose of Lake Chelan National Recreation Area, December 1992

Data Booklet

A booklet, *Data Summary Booklet, Support Studies for She General Management Plan,* was sent in March 1993 to all Stehekin Valley, private landowners, government agencies, private organizations, and anyone who requested a copy by returning the request card from Newsletter, Vol. 3. This booklet described and summarized the primary data set supporting the HIS. It included the following topics:

- 100-Year Floodplain
- Vegetation/Landcover
- Wetlands
- Riparian Vegetation
- Soil Classes
- Geological Hazards
- Visual Features
- Visitor Use Features
- Property Types
- River Changes
- Forestry
- Transportation
- Visitor Use
- Socioeconomic
- Energy
- Wildlife Investigations

Data Set

A complete set of the data summarized in the booklet, Data Summary Booklet, Support Studies for the General Management Plan — including full-size CIS plots, copies of the complete study reports, and other selected materials — was made available for examination beginning mid-March 1993 at the following locations:

Stehekin NPS Ranger Station, Stehekin, Washington

North Cascades NPS Complex Headquarters, Sedro Woolley, Washington

National Park Service - Pacific Northwest Regional Office, Seattle Washington

Chelan U.S. Forest Service District Ranger Office, Chelan, Washington

University of Washington Suzzallo Library, Seattle, Washington

Seattle Main Public Library, Seattle, Washington

Wenatchee Public Library, Wenatchee, Washington

Washington State Library, Olympia, Washington

Data Workshops

A series of workshops were held in April 1993 in Stehekin, Chelan, and Seattle, Washington. Briefings and discussions on the primary data set were conducted at these workshops.

Alternatives Newsletter

A newsletter describing the preliminary alternatives was sent in May 1993 to approximately 638 agencies, organizations, and individuals. Public responses to this newsletter were compiled and analyzed.

Consultation with the U.S. Fish and Wildlife Service

Informal consultation with the U.S. Fish and Wildlife Service began in July 1990 and continued throughout preparation of this document.

Consultation with the Advisory Council on Historic Preservation

Kormal consultation with the Advisory Council on Historic Preservation was begun in March 1992.

Copies of the *Draft General Management Plan / Environmental Impact Statement* were sent to the Advisory Council on Historic Preservation in August 1994. The advisory council did not comment on the draft EIS. Consultation will continue through completion of the project.

Consultation with Native Americans

Consultation with Native Americans was informally initiated in February 1994.

Copies of the *Draft General Management Plan / Environmental Impact Statement* were sent to the Yakima Indian Nation and the Colville Confederated Tribes in August 1994. Consultation will continue through completion of the project.

Consultation with the Washington State Historic Preservation Office

Formal consultation with the Washington State Historic Preservation Office was begun in March 1992.

Copies of the *Draft General Management Plan / Environmental Impact Statement* were sent to the Washington Stale Historic Preservation Office in August 1994. Comments received from the Historic Preservation Office have been taken into account in the final EIS. Consultation will continue through completion of the project.

SIGNIFICANT ISSUES AND CONCERNS RAISED DURING SCOPING

Protection of water quality
Water rights and protection of resources
Man-caused channel modification of the Stehekin River Air pollution/acid precipitation impacts on resources Protection of wetlands
Cost to protect and maintain roads and property from natural river processes
Impacts of sand, rock, and gravel extraction on vegetation, wildlife, and scenic quality
Amounts of sand, rock, and gravel available for private use

Barging of sand, rock, and gravel from outside the recreation area Forest fire management Unnatural and dangerous levels of forest fuel accumulations Cutting of green trees for firewood Gathering of dead and downed wood for firewood
Amounts and sources of firewood
Barging of firewood from outside the recreation area Impacts of additional electrical generation facilities on air quality and valley growth and development Protection of threatened, endangered, or rare species
Impacts of nonnative species Impacts of grazing by horses on natural vegetation in wilderness Impacts of campfires on meadow vegetation in wilderness Impacts of removing dead wood used for campfires in wilderness Cultural resource protection Airstrip provision of access to the Stehekin Valley Airstrip use for search and rescue and fire control staging Airstrip use for emergencies Airstrip provision of a special recreational experience Safety of the airstrip Impacts of the airstrip on scenic quality Impacts of the airstrip on wetlands Impact of airplane use on natural sights and sounds expected by visitors Impacts of access provided by the roads Impacts of road repair and maintenance on natural resources and the regional economy
Impacts of road closures Impacts of accidental spills or leakage of toxic substances
Development by the National Park Service Impacts of valley growth and development Changes in the size and character of the Stehekin community Adequacy and impacts of land protection plan Adequacy and impacts of compatibility standards
Number and kinds of services provided by (he National Park Service Number and kinds of services provided by the private sector Natural resource and financial impacts of road repair and maintenance

LIST OF AGENCIES, ORGANIZATIONS, AND INDIVIDUALS TO WHOM THE DRAFT E1S WAS SENT

Federal Agencies

Advisory Council on Historic Preservation
Bureau of Indian Affairs, Yakima Agency
Chelan Ranger District, U.S. Forest Service,
Corps of Engineers Environmental Protection Agency U.S. Fish and Wildlife Service U.S. Forest Service
Mt. Baker National Forest
Okanogan National Forest
Wenatchee National Forest
U.S. Post Office, Stehekin, Washington

Washington Congressional Delegation

Senator Slade Gorton
Senator Patty Murray
Representative Maria Cantwell
Representative Al Swift
Representative Jolene Unsoeld
Representative Jay Inslee
Representative Thomas Foley
Representative Norm Dicks
Representative Jim McDermott
Representative Jennifer Dunn
Representative Mike Kreidler
Legislative Counsel - Senator Daniel J. Evans

Canada/International

British Columbia Forest Service British Columbia Ministry of Lands, Environment, and Parks

State of Washington

Governor, State of Washington
State Senator George Sellar
State Senator Harriet Spanel
State Representative Rob Johnson
Stale Representative Clyde Ballard
State of Washington, Department of Ecology
Environmental Review State of Washington, Department of Community Development
Archeology/Historic Preservation
Washington State Department of Transportation
Aeronautics Division Washington State Historic Preservation Office

County and Local **Governments**

Mayor, City of Chelan
Mayor, City of Mount Vernon
Mayor, City of Wenatchee
City of Sedro Woolley
City of Twisp
City of Winthrop
Holden Village
Chelan County Commissioner Tom Green
Chelan County Commissioner Ron Myers
Chelan County Commissioner John S. Wall
Chelan County Health District
Director of Environmental Health Chelan County Planning Department Chelan County Public Utilities District #1 Chelan Library
Lake Chelan Airport Port of Chelan County
Skagit County Commissioner Robby Robinson
Whatcom County

Chambers of Commerce

Lake Chelan Chamber of Commerce

Native American Groups

Colville Confederated Tribes Yakima Indian Nation

Organizations

Admiralty Audubon Society
Aiken, St. Louis & Siljeg, P. S.
American Alpine Club, Conservation/Use
Committee
Bellingham Mountaineers
Breazeale Padilla Bay Interpretive Center Carbon River Enterprises
Cascade Helicopters, Inc.
Cascade Loop Association
Columbia Gorge Coalition
Columbia Bioregional Project East Lake Washington Audubon Society Federation of Western Outdoor Clubs Friends of the Earth
Friends of the Columbia Gorge Greater Ecosystem Alliance
Issues Coordinator, The Mountaineers
Izaak Walton League
Johnson's Real Estate
Jones & Jones
Keep Washington Green
Lake Chelan Boat Co.
Landau Associates, Inc.
League of Conservation Voters
Legal Aid Foundation of Los Angeles
Lower Columbia Basin Audubon Society
Mazamas
Mount Rainier National Park Associates
N.W. Conservation Act Coalition
National Parks & Conservation Association National Outdoor Leadership School
National Inholders Association National Audubon Society National Wildlife Federation National Parks Chairman, Sierra Club Natural Resources Defense Council
Network of Environmental Scientists and Technicians
North Cascades Conservation Council
North Cascades Audubon Society
Northwest Rivers Council Northwest Representative, Sierra Club Northwest Energy Services, Inc.

Okanogan Wilderness League
Olympic Park Associates
Orville Camp
Outdoors West
Pacific Northwest Trail Association
Paddle Trail Canoe Club
Partnership
Pilchuck Audubon Society
Portland Garden Club
Purple Creek Corporation
Rails lo Trails Conservancy
Rainbow Valley Foundation
Recreation Equipment Inc.
Reed Hansen & Associates
Robert Peccia & Associates
Seattle Garden Club
Sedro Woolley Garden Club
Sierra Club / Cascade Chapter
Sierra Club Legal Defense Fund
Silver Bay Inn
Skagit Audubon Society
Skagit Environmental Endowment Commission
Skagit County Upriver Services Stehekin Property Owners Association
Stehekin Heritage
Stehekin Valley Protection Committee
Tacoma Mountaineers Tacoma Garden Club
Tahoma Audubon Society The Student Conservation Association, Inc.
The Wilderness Society, Washington State Office
The Henry M. Jackson Foundation
The Nature Conservancy
The Wilderness Society
The Mountaineers
The Mountaineers - Bellingham Chapter
The Trust for Public Land - Northwest Office
The American Hiking Society
The Richmond Clinic
Trail blazers
Trust for Public Land
Twanoh Group, Sierra Club
Volunteers for Outdoor Washington
Washington Chapter, Backcountry Horsemen of America
Washington Environmental Council
Washington Wilderness Coalition
Washington Trails Association
Weyerhauser

Schools

Botany Department, University of Washington College of Forest Resources, University of Washington Department of Forest Resources & Outdoor Recreation, University of Washington
Huxley College Northwestern University
Stehekin School District #69 University of British Columbia

Newspapers/Magazines

Backpacker Magazine
Defenders of Wildlife Magazine
Lake Chelan Mirror
Seattle Post Intelligencer
Seattle Times
Spokesman Review
Stehekin Choice
Wenatchee World

Radio Stations

KOZI Radio

Individuals

489 Individuals

PUBLIC REVIEW OF THE DRAFT GENERAL MANAGEMENT PLAN / ENVIRONMENTAL IMPACT STATEMENT

This section appears in volume 2, *Comments and Responses.*

PREPARERS, CONTRIBUTORS, AND CONSULTANTS

PREPARERS

Clifford Hawkes
Outdoor Recreation Planner and Lake Chelan Planning Team Captain, Denver Service Center
BA, Biology; MA, Biology; PhD, Zoology

Ron West
Natural Resource Specialist, Denver Service Center
BS, Wildlife Biology

Peter Budde
Geographic Information System Analyst, Denver Service Center
BS Geography; MS Geography

Steven Culver
Natural Resource Specialist, Denver Service Center
BS, Fishery Biology

Pam Griggs
Historian, Denver Service Center
BA, History

Gary Hurelle
A/E Manager, Denver Service Center
BS, Landscape Architecture

J.R. Kirkaldie
Outdoor Recreation Planner, BS, Environment and Resource Management-Land Use

Maurice Miller
Transportation Planner
BS, History; MRP, Regional Planning

Laura Rotegard
Landscape Architect, Asst. Superintendent Woman's Rights NHP, formerly with Denver Service Center
BLA, Landscape Architecture

Patricia Trap
Landscape Architect, Denver Service Center
BS, Park and Recreation Resource Planning; MLA, Landscape Architecture

Harlan Unrau
Historian, Denver Service Center
UA History, MS History

Sam Vaughn
Interpretive Planner, Denver Service Center
BA, Anthropology; MA, Public and Environmental Affairs

Reed Ha men
Reed Hansen & Associates Subcontractor to Jones & Jones, Inc. BA, Political Science; MA, Public Affairs

Curtis Miller
]ones & Jones, Inc.
BA, Landscape Architecture; MA, Landscape Architecture

J. Thomas Atkins
Jones & Jones, Inc.
BA, Landscape Architecture; MA, Regional Planning

CONTRIBUTORS

Pacific Northwest Regional Office
Keith Dunbar, Chief of Planning
Kathy Tope, Chief, Natural Resource Management Dan Nordgren, Chief, Engineer ing/ Design and Maintenance Phillip Parker, Chief, Concessions Management Division Frank Sannino, Cartographic Technician

North Cascades NPS Complex
William Paleck, Superintendent Edward Gastellum, Asst. Superintendent Daniel Alien, Natural Resource Specialist Margie Allen, Concessions Management Analyst

Thomas Belcher, Facility Manager

Thomas Belcher, Facility Manager
Anne Braaten, Natural Resource Specialist
Phil Campbell, Stehekin District Ranger
John Earnst, Former Superintendent
Bruce Freet, Chief of Resource Management
Reed Glesne, Ecologist
Wayne Hill, Chief of Realty Branch, Land Division
Janet Kailin, Fire Management Officer Robert Kuntz, Wildlife Biologist Timothy Manns, Chief of Interpretation Robert Mierendorf, Archeologist
Lloyd Parratt, Park Ranger
Jon Riedel, Geologist
Damian Sedney, Natural Resource Specialist Dave Spirtes, Chief Ranger
Mike Tollefson, Associate Regional Director, Operations
Rick Wagner, Chief, Land Division
Richard Winters, Associate Regional Director, Recreation, Resources & Professional Services

Wrangell-St. Elias National Park and Preserve
Jon Jarvis, Superintendent (formerly with North Cascades NPS Complex)

Denver Service Center
Sarah Bransom, Chief, Western Team Resource Planning and Compliance Section
Mike Spratt, Chief, Western Team Planning Section
Catherine Spude, Archeologist

CONSULTANTS

Orville Camp, Natural Selection Eco-Forester
Mark Longmeier, Northwest Energy Services, Inc., Subcontractor to Jones & Jones, Inc.
Robert Peccia and Associates

PUBIICATION SERVICES

David Hesker, Visual Information Specialist, Denver Service Center

Linda Russo, Writer/Editor, Denver Service Center

APPENDIXES, BIBLIOGRAPHY, GLOSSARY, AND INDEX

APPENDIX A: ENABLING LEGISLATION

Public Law 90-544

October 2, 1968
[S. 1321].

AN ACT

To establish the North Cascades National Park and Ross Lake and Lake Chelan National Recreation Area, To designate the Pasayten Wilderness and to modify the Glacier Peak Wilderness, in the State of Washington, and for other purposes.

State of Washington

Certain recreation areas.

Establishment.

Be it enacted by the Senate and House, of Representatives of the United States of America in Congress assembled.

TITLE I—NORTH CASCADES NATIONAL PARK

SEC 101. In order to preserve for the benefit, use, and inspiration of present and future generations certain majestic mountain scenery, snow fields, glaciers, alpine meadows, and other unique, natural features in the North Cascade Mountains of the State of Washington, there is hereby established, subject to valid existing rights, the North Cascades National Park (hereinafter referred to in this Act as the "park"). The park shall consist of the, lands, waters, and interests therein within the area designated "national park" on the map entitled "Pro posed Management, Units, North Cascades, Washington," numbered NP -CAS-7OO2, and dated October l967. The map shall be on file and available for public inspection in the office of the Director, National Park Service, Department of the Interior, and in the office of the Chief, Forest Service, Department of Agriculture.

TITLE II—ROSS LAKE AND LAKE CHELAN NATIONAL RECREATION AREAS

SEC. 201. In order to provide for the public, outdoor recreation use and enjoyment of portions of (he Skagit River and Ross,, Diablo, and Gorge Lakes, together with the surrounding lands, and for the conservation of the scenic, scientific, historic, and other values contributing to public enjoyment of such lands and waters, there is hereby established, subject to valid existing rights, the Ross Lake National Recreation Area (hereinafter referred to in this Act as the "recreation area"). The recreation area shall consist of the lands and waters within the area designated "Ross Lake National Recreation Area" on the map referred to in section 101 of this Act.

SEC. 202. In order to provide for the public outdoor recreation use and enjoyment of portions of the Stehekin River and Lake Chelan, together with the surrounding lands, and for the conservation of the scenic, scientific, historic, and other values contributing to public enjoyment of such lands and waters, there is hereby established, subject to valid existing rights, the Lake Chelan National Recreation Area (hereinafter referred to in this Act as the "recreation area"). The recreation area shall consist of the lands and waters within the area designated "Lake Chelan National Recreation Area" on the map referred to in section 101 of this Act.

TITLE III—LAND ACQUISITION

SEC. 301. Within the. boundaries of the park and recreation areas, the Secretary of the Interior (hereinafter referred to in this Act as the "Secretary'") may acquire lands, waters, and interests therein by donation, purchase, with donated or appropriated funds, or exchange, except that he may not acquire any such interests within the recreation areas without the, consent of the owner, so long as the lands are devoted to uses compatible, with the purposes of this Act. Lands owned by the Stale of Washington or any political subdivision thereof may be acquired only by donation. Federal property within the boundaries of the park and recreation areas is hereby transferred to the administrative jurisdiction of the Secretary for administration by him as part of the park and recreation areas. The national forest land within such boundaries is hereby eliminated from the national forests within which it was heretofore located.

SEC. 302. In exercising his authority to acquire property by exchange, the Secretary may accept title to any non-Federal property within the boundaries of the park and recreation areas and in ex change therefor he, may convey to the grantor of such property any federally owned properly under his jurisdiction in the State of Washington which he classifies as suitable for exchange or other disposal.

The values of the properties so exchanged either shall be, approximately equal, or if they are not approximately equal the values shall be equalized by the payment of cash to the grantor or to the Secretary as the circumstances require.

SEC. 303. Any owner of property acquired by the, Secretary which on the date. of acquisition is used for agricultural or single-family residential purposes, or for commercial purposes which he finds are compatible with the use and development of the park or the recreation areas, may, as a condition of such acquisition, retain the right of use und occupancy of the property for the same purposes for which it, was used on such date, for a period ending at the death of the owner or the death of his spouse, whichever occurs later, or for a fixed term of not to exceed twenty-five years, whichever the owner may elect. Any right, so retained may during its existence be, transferred or assigned. Any right so retained may be terminated by the Secretary at any time after the date upon which any use of the property occurs which he finds is a use other than one which existed on the date of acquisition. In the event the Secretary terminates a right of use and occupancy under this section, he shall pay to the owner of the right the fair market value of the portion of said right which remains unexpired on the date of termination.

TITLE IV—ADMINISTRATIVE PROVISIONS

SEC. 401. The, Secretary shall administer the park in accordance with the Act of August 25, 1916 (39 Stat. 535; 16 U.S.C. 1-4), as amended and supplemented.

SEC. 402. (a) The Secretary shall administer the recreation areas in a manner which in his judgment will best provide for (1) public outdoor recreation benefits; (2) conservation of scenic, scientific, historic, and other values contributing to public enjoyment; and (3) such management, utilization, and disposal of renewable natural resources and the, continuation of such existing uses and developments as will promote or are compatible with, or do not significantly impair, public recreation and conservation of the scenic, scientific, historic, or other values contributing to public enjoyment. In administering the recreation areas, the Secretary may utilize such statutory authorities pertaining to the administration of the national park system, and such statutory authorities otherwise, available to him for the conservation and management of natural resources as be deems appropriate for recreation and preservation purposes and for resource, development compatible therewith.

(b) The lands within the recreation areas, subject to valid existing rights, are, hereby withdrawn from location, entry, and patent under the, United States mining laws. The Secretary, under such reasonable regulations as he deems appropriate, may permit the removal of the nonleasable minerals from lands or interest in lands within the rec-

reation areas in the manner prescribed by section 10 of (he Act of August 4, 1939, as amended (53 Stat. 1196; 43 U.S.C. S387), and he may permit the removal of leasable minerals from lands or interests in lands within the recreation areas in accordance with the Mineral Leasing Act of February 25,1920, as amended (30 U.S.C. 181 et seq.), or the Acquired Lands Mineral Leasing Act of August 7, 1947 (30 U.S.C. 351 et seq.), if he finds that such disposition would not have significant adverse effects on the administration of the recreation areas. 41 Stat. 437; 60 Stat. 950.

(c) All receipts derived from permits and leases issued on lands or interests in lands within the recreation areas under the Mineral Leasing Act of February 25, 1920, as amended, or the Acquired Lands Mineral Leasing Act of August 7, 1947, shall be disposed of as provided in the applicable Act; and receipts from the disposition of nonleasable minerals within the recreation areas shall be disposed of in the same manner as moneys received from the sale of public lands. 61 Stat. 913.

(d) The Secretary shall permit hunting and fishing on lands and waters under his jurisdiction within the boundaries or the recreation areas in accordance with applicable laws of the United States and of the State of Washington, except that the Secretary may designate zones where, and establish periods when, no hunting or fishing shall be permitted for reasons of public safety, administration, fish and wildlife management, or public use and enjoyment. Except in emergencies, any regulations of the Secretary pursuant to this section shall be put into effect only after consultation with the Department of Game of the State of Washington.

(e) The Secretary shall not permit the construction or use of any road within the park which would provide vehicular access from the North Cross State Highway to the Stehekin Road. Neither shall he permit the construction or use of any permanent road which would provide vehicular access between May Creek and Hozomeen along the. east side of Ross Lake.

TITLE V—SPECIAL PROVISIONS

SEC. 501. The distributive shares of the respective counties of receipts from the national forests from which the national park and recreation areas are created, as paid under the provisions of the Act. of May 23, 1908 (35 Stat. 260), as amended (16 U.S.C. 500), shall not be affected by this elimination of lands from such national forests by the enactment of this Act. 58 5tat. 737; 64 5tat. 87.

SEC. 502. Where any Federal lands included in the park or recreation areas are legally occupied or utilized on the effective date of this Act for any purpose, pursuant to a contract, lease, permit, or license issued or authorized by any department, establishment, or agency of the United States, the Secretary shall permit the persons holding such privileges to continue in the exercise thereof, subject to the terms and conditions thereof, for the remainder of the term of the contract, lease, permit, or license or for such longer period of time as the Secretary deems appropriate.

SEC. 503. Nothing in this Act shall be construed to affect adversely or to authorize any Federal agency to take any action that would affect adversely any rights or privileges of the State of Washington in property within the Ross Lake National Recreation Area which is being utilized for the North Cross State Highway.

SEC. 5(3. Within two years from the date of enactment of this Act, the Secretary of the Interior and the Secretary of Agriculture shall agree on the designation of areas within the park or recreation areas or within national forests adjacent to the nark and recreation areas needed for public use facilities and for administrative purposes by the Secretary of Agriculture or the Secretary of the Interior, respectively. The areas so designated shall be administered in a manner that is mutually agreeable to the two Secretaries, and such public use facilities, including interpretive centers, visitor contact stations, lodges, campsites, and ski lifts, shall be constructed according to a plan agreed upon by the two Secretaries.

SEC. 505. Nothing in this Act shall be construed to supersede, repeal, modify, or impair the jurisdiction of the Federal Power Commission under the Federal Power Act (41 Stat. 1063), as amended (16 U.S.C. 791a et seq.), in the recreation areas.

49 Stat. 863.

Appropriation.

SEC. 506. There are hereby authorized to be appropriated such sums as may be necessary to carry out the purposes or this Act, but not more than $3,500,000 shall be appropriated for the acquisition of lands or interest in lands.

TITLE VI—WILDERNESS

Pasayten Wilderness. Designation. 78 Stat. 890. 16 USC 1131

SEC. 601. (a) In order to further the purposes of the Wilderness Act, there is hereby designated, subject to valid existing rights, the Pasayten Wilderness within and as a part of the Okanogan National Forest and the Mount Baker National Forest, comprising an area of about five hundred thousand acres lying east of Ross Lake, as generally depicted in the area designated as "Pasayten Wilderness" on the map referred to in section 101 of this Act.

(b) The previous classification of the North Cascades Primitive Area is hereby abolished.

Glacier Peak Wilderness, boundary extension.

SEC. 602. The boundaries of the Glacier Peak Wilderness, an area classified as such more than thirty days before the effective date of the Wilderness Act and being within and a part of the Wenatchee National Forest and the Mount Baker National Forest, subject to valid existing rights, are hereby extended to include portions of the Suiattle River corridor and the White Chuck River corridor on the western side thereof, comprising areas totaling about ten thousand acres, as depicted in the area designated as "Additions to Glacier Peak Wilderness" on the map referred to in section 101 of this Act.

Map and legal description, filing with Congressional committees.

SEC. 603. (a) As soon as practicable after this Act takes effect, the Secretary of Agriculture shall file a map and legal description of the Pasayten Wilderness and of the Glacier Peak Wilderness, as hereby modified, with the Interior and Insular Affairs Committees of the United States Senate and House of Representatives, and such descriptions shall have the same force and effect as if included in this Act: *Provided, however,* That correction of clerical or typographical errors in such legal descriptions and maps may be made.

(b) Upon the filing of the legal descriptions and maps as provided for in subsection (a) of this section the Pasayten Wilderness and the additions to the Glacier Peak Wilderness shall be administered by the Secretary of Agriculture in accordance with the provisions of the Wilderness Act and thereafter shall be subject to the provisions of the Wilderness Act governing areas designated by that Act as wilderness areas, except that any reference in such provisions to the effective date of the Wilderness Act shall be deemed to be a reference to the effective date of this Act

Area review report to the president.

SEC. 604. Within two years from the date of enactment of this Act, the Secretary of the Interior shall review the area within the North Cascades National Park, including the Picket Range area and the Eldorado Peaks area, and shall report to the President, in accordance with subsections 3(c) and 3(d) of the Wilderness Act (78 Stat. 890; 16 U.S.C. 1132 (c) and (d)), his recommendation as to the suitability or nonsuitability of any area within the park for preservation as wilderness, and any designation of any such area as a wilderness area shall be accomplished in accordance with said subsections of the Wilderness Act.

Approved October 2, 1968.

Public Law 100-668
100th Congress

An Act

To designate wilderness within Olympic National Park, Mount Rainier National Park, and North Cascades National Park Service Complex in the State of Washington, and for other purposes.

Nov. 16, 1988 [S 2165]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled. That this Act may be cited as the "Washington Park Wilderness Act of 1988".

[Washington Park Wilderness Act of 1988
16 USC 90 note]

TITLE II—NORTH CASCADES NATIONAL PARK SERVICE COMPLEX WILDERNESS

SEC 2111. DESIGNATION.

(a) WILDERNESS.—In furtherance of the purposes of the Wilderness Act (16 U.S.C. 1131 et seq.; 78 Stat. 890), certain lands in the North Cascades National Park, Ross Lake National Recreation Area, and Lake Chelan National Recreation Area, Washington, which—

16 USC 1132 note.

(1) comprise approximately six hundred and thirty-four thou sand six hundred and fourteen acres of wilderness, and approxi mately five thousand two hundred and twenty-six acres of potential wilderness additions, and

(2) are depicted on a map entitled "Wilderness Boundary, North Cascades National Park Service Complex, Washington ", numbered 168-60-186 and dated August 1988,

are hereby designated as wilderness and therefore as components of the National Wilderness Preservation System. Such lands shall be known as the Stephen Mather Wilderness.

SEC. 202. HYDROELECTR1C PROJECTS.

Section 505 of the Act of October 2, 1968 (82 Stat. 930; 16 U.S.C. 90d-4) is amended as follows: strike "in the recreation areas", and insert in lieu thereof "in the lands and waters within the Skagit River Hydroelectric Project, Federal Energy and Regulatory Commission Project 553, including the proposed Copper Creek, High Ross, and Thunder Creek elements of the Project; and the Newhalem Project, Federal Energy and Regulatory Commission Project 2705, within the Ross Lake National Recreation Area; the lands and waters within the Lake Chelan Project, Federal Energy and Regulatory Commission Project 637; the Company Creek small hydroelectric project at Stehekin within the Lake Chelan National Recreation Area; and existing hydrologic monitoring stations necessary for the proper operation of the hydroelectric projects listed herein".

SEC 103. LAND ACQUISITION FOR ADMINISTRATIVE FACILITIES.

Section 301(a) of the Act of October 2, 1968 (82 Stat- 927; 16 U.S.C. 90b) is hereby amended to add a new subsection as follows:

"(b) The Secretary is hereby authorized to acquire, with the consent of the owner, lands outside of the authorized boundaries of North Cascades National Park Service Complex for the purpose of

construction and operation of a backcountry information center not to exceed five acres. The Secretary of the Interior is further authorized to acquire with the consent of the owner, lands for the construction of a headquarters and administrative site or sites, for the North Cascades National Park, Ross Lake National Recreation Area, and Lake Chelan National Recreation Area not to exceed ten acres. The lands so acquired shall be managed as part of the park.".

SEC. 204. AUTHORIZATION OF APPROPRIATIONS.

There are hereby authorized to be appropriated to the Secretary of the Interior such sums as may be necessary to complete the land acquisitions authorized pursuant to section 203 of this Act.

SEC. 205. RENEWABLE NATURAL RESOURCE USE IN RECREATION AREAS.

Section 402(a) of the Act of October 2, 1968 (82 Stat. 928; 16 U.S.C. 90c-l) is hereby amended U) read as follows:

"The Secretary shall administer the recreation areas in a manner which in his judgment will best provide for (1) public outdoor recreation benefits and (2) conservation of scenic, scientific, historic, and other values contributing to public enjoyment. Within that portion of the Lake Chelan National Recreation Area which is not designated as wilderness, such management, utilization, and disposal of renewable natural resources and the continuation of existing uses and developments as will promote, or are compatible with, or do not significantly impair public recreation and conservation of the scenic, scientific, historic, or other values contributing to public enjoyment, are authorized. In administering the recreation areas, the Secretary may utilize such statutory authorities pertaining to the administration of the national park system, and such statutory authorities otherwise available to him for the conservation and management of natural resources as he deems appropriate for recreation and preservation purposes and for resource development compatible therewith. Within the Ross Lake National Recreation Area the removal and disposal of trees within power line rights-of-way are authorized as necessary to protect transmission lines, towers, and equipment;": *Provided,* That to the extent practicable, such removal and disposal of trees shall be conducted in such a manner as to protect scenic viewsheds."

SEC206. MINERAL RESOURCE USE IN RECREATION AREAS.

[16 USC 90c-l]

Section 402(b) of the Act of October 2, 1968 (82 Stat. 928; 16 U.S.C 90c-lb) is hereby amended to read as follows:

"The lands within the recreation areas, subject to valid existing rights, are hereby withdrawn from all forms of appropriation or disposal under the public land laws, including location, entry, and patent under the United States mining laws, and disposition under the United States mineral leasing laws: *Provided, however.* That within that portion of the Lake Chelan National Recreation Area which is not designated as wilderness, sand, rock and gravel may be made available for sale to the residents of Stehekin for local use so long as such sale and disposal does not have significant adverse effects on the administration of the Lake Chelan National Recreation Area.".

CCTO JUDGE.

UNITED STATES DISTRICT COURT
WESTERN DISTRICT OF WASHINGTON
AT SEATTLE

NORTH CASCADES CONSERVATION COUNCIL, a nonprofit Washington corporation,) Civ. NO. C-89-1342D

Plaintiff, v.) CONSENT DECREE

MANUEL LUJAN, Secretary of the United States Department of the Interior, et al., — £KT£R£O 4! fllCflVFD

Defendants.

2 } (991

-)

The parties, plaintiff North Cascades ^ Council, and the defendants, Manuel Lujan, Secretary of the United States Department of the Interior, James M. Ridenour, Director of the United States National Park Service, Charles H, Odegaard, Regional Director of the United States National Park Service, Pacific Northwest Region, and John R. Earnst, Superintendent of the North Cascades National Park Complex ("defendants"), having conferred with counsel and desiring to resolve this dispute between the parties without the intervention of the court, and in consideration of mutual promises, hereby stipulate and agree to undertake the actions set forth below.

ORIGINAL -2

I. General Items

A. Prior to raising by motion, complaint, or other proceeding any alleged violation of this consent decree or any alleged failure to perform any substantive obligation implicated thereby, the aggrieved party shall first consult with the other party pursuant to Local Rule 37 and, in the event the matter cannot be resolved, confirm such consultation in written correspondence to the alleged breaching party,

B. It is understood that the parties undertake these obligations as a compromise settlement of disputed issues of law and fact without admitting any error with respect to their previous actions or legal positions.

II. Preparation of Environmental Impact statement on Lake Chelan National Recreational Area of the North Cascades National Park Complex

A. The National Park Service ("NPS") will prepare an environmental impact statement ("EIS") on the environmental effect of the existing and proposed management of the Lake Chelan National Recreation Area ("LCNRA") of the North Cascades National Park Complex. To the extent that the existing and proposed management of LCNRA has environmental impacts on areas within the North Cascades National Park Complex ("NCNP") outside of the LCNRA, these effects will be considered in the EIS. For the purposes of the EIS, the LCNRA is defined to include those areas of NCNP within the LCNRA administrative boundaries and the Stehekin River watershed.

B. Time Frame - NPS will issue its Record of Decision on the Final EIS no later than October 1, 1993. Both parties recognize that extensions of this deadline may be necessary as a

result of unforeseen developments caused by necessary additional studies, limited availability of appropriated funds, or other delays outside the contemplation or control of either party. Under such circumstances, the parties may agree to extend this deadline without the necessity of court approval. If the parties cannot agree on an extension, then such an extension requires application to and approval by the court. Plaintiffs shall not unreasonably withhold their consent to such an extension. The NPS shall endeavor to avoid the necessity of seeking any such extension.

C. NPS shall control the content of the EIS, subject to requirements of applicable law and the provisions of this consent decree. The EIS will address the following categories of concern, among others:

1. The EIS will consider all management alternatives for LCNRA described in the NCNP General Management Plan of 1988 and shall also address other reasonable alternatives including those presented by the public during scoping and public review of the draft LCNRA EIS. The Final LCNRA EIS preferred alternative, as modified (if appropriate) by public input and determined in the Record of Decision, will be the new General Management Plan for LCNRA.

2. The EIS will examine the environmental effects (as defined in 40 C.F.R. § 1508.8) of the LCNRA Land Protection Plan, the LCNRA Firewood Management Plan, the LCNRA Transportation Plan, the NCNP Wilderness Management Plan (to the extent it addresses wilderness management of the LCNRA), the Sand, Rock and Gravel Plan, the Stehekin Landing Development

Concept Plan, the Forest Fire Hazard Reduction Plan, and management alternatives for the Stehekin River. These plans will be modified, if appropriate, in the Record of Decision after the LCNRA EIS process is complete. Specifically:

a) LCNRA Land Protection Plan.:

i. The EIS will review private lands with respect to their relationship to natural and cultural resources and visitor use. The EIS will review the Compatibility Standards, valley growth and development, and will revisit land protection priorities.

ii. The EIS will describe historic growth and development, including the increase in the number of buildings, within LCNRA since 1968 and compare that analysis to levels set by the Compatibility Standards. The EIS will specifically analyze growth potential in the future under the existing Compatibility Standards as well as under other alternatives.

iii. The EIS will study alternative development scenarios within LCNRA, evaluating all parcels held in private ownership.

iv. NPS agrees that federal lands under consideration for exchange will be reviewed on a site-specific basis for cultural and natural resources, scenic quality and sensitivity, and visitor experience. Public lands considered for exchange will be weighted against LPP acquisition criteria for priorities 1, 2, and 3. This weighting will be completed as part of the EIS and incorporated into a new LPP and will include: (1) identification of all public lands proposed to be available for exchange; (2) a description of the conservation

easements or mitigation measures applicable to each such proposed exchange; and (3) evaluation of the criteria for identifying properties that are eligible for exchange. In particular, the EIS will address whether public lands which would qualify for acquisition priorities 1, 2, and 3 (were they privately owned) should not be available for exchange. The EIS will also evaluate whether other public lands (viz., those which would not qualify for priorities 1, 2, and 3) should be available for exchange only if (1) the adverse impact of the private land development sought to be avoided through the exchange can not be avoided or substantially mitigated through means other than exchange, and (2) the adverse impact of the development of such private lands is clearly more inimical than the impact of the development of public lands which would result from the exchange.

v. The EIS shall review and analyze acquisition priorities assigned by the LPP to all lands in all classifications including the list of lands in which NPS has previously stated it has no acquisition interest (appearing on pages 32 and 33 of the LPP in effect on the date of entry of this consent decree) and shall consider whether development of any of such lands would be inimical to the public interest. The findings of the EIS will be incorporated in subsequent Land Protection Plans (which must be renewed every two years) to the extent determined appropriate in the Final EIS and Record of Decision. NPS will modify and issue a new LPP as part of the Record of Decision.

25 2G 27 28b) LCNRA Firewood Management Plan:

i. The EIS will include an analysis of the alternatives described in the 1987 LCNRA Firewood Management Plan ("FMP") and their associated effects on LCNRA.

ii. The EIS will evaluate alternative energy sources and options. Public demonstration projects of alternative heating sources will be performed by NPS- NPS will also study the feasibility and possibility of barging firewood from outside LCNRA as an alternative in the EIS.

iii. The EIS will evaluate effects (as defined in 40 C.F.R. § 1508.8) on the plant and wildlife resources, scenery, solitude, and other natural amenities of public lands of firewood cutting whether on privately or publicly held properties within LCNRA.

iv. The EIS will evaluate the connection between and among population growth, both winter and summer, the increased number of structures, and increases in energy demands, in the Stehekin Valley. The EIS will also evaluate the effects (as defined in 40 C.F.R. § 1508.8) of curtailing residential and commercial growth.

v. The EIS will address whether it is appropriate to provide green timber from public lands for private firewood use.

vi. The EIS will examine the applicability of NPS Compatibility Standards to the firewood woodlot program.

vii. The harvest level ceilings established in the FMP will be reviewed as part of the EIS process.

c) LCHRA Transportation Plan:

i. All forms of transportation to, from, and within LCNRA, and their associated environmental impacts, shall be analyzed in the EIS, including the following: foot, horseback, automobile, shuttle bus, boat (including the new "Lady Express"), barge, and airplane. The EIS will evaluate all impacts from changes in the service schedule, speed, size, noise, wake, and other characteristics of the commercial vessels operating on Lake Chelan. The EIS will evaluate the impact of changed commercial boat schedules on Park Service operations and community development and activity patterns.

ii. The EIS will examine the use of the airstrip located within LCNRA and its appropriateness as an emergency airstrip. Impacts resulting from continued use and maintenance of the airstrip will be evaluated in the EIS from both a safety and environmental perspective. The EIS will also examine the alternatives of either expressly providing in the special permit that the airstrip be restricted to emergency use only or closing the airstrip altogether.

iii. The EIS will analyze the road system within LCNRA and evaluate the propriety of a selective road closing option, including but not limited to closure of the road segments between High Bridge and Cottonwood. All roads within the LCNRA will be evaluated.

iv. The EIS will evaluate the impacts of all boats, including houseboats, and the use of float planes, as part of

the analysis of the LCNRA Transportation Plan.

d) LCNRA Wilderness Management Plan:

The EIS will consider the NCNP wilderness plan as it relates to campfires and horse-grazing within LCNRA and the Stehekin River watershed.

e) LCNRA Sand. Rock & Gravel Plan;

i. The EIS will analyze alternatives to public and private use of sand, rock, and gravel for administrative use and for sale to the public. The environmental impacts of extracting sand, rock, and gravel from the LCNRA will be evaluated. The alternative of barging such materials into the LCNRA in lieu of additional extraction of materials already located within LCNRA will be considered. Possible means of reducing the use of sand, rock, and gravel within the LCNRA will also be evaluated.

ii. The EIS will address alternatives to NPS selling public gravel for private use, including consideration of the possible termination of the practice.

iii. Development related impacts of each alternative for management of the Sand, Rock and Gravel Plan shall be assessed to the extent possible.

f) Stehekin Landing Development Concept Plan:

The development of alternatives within the Stehekin Landing Development Concept plan will continue and their impacts will be evaluated through the LCNRA EIS process.

g) Stehekin River:

Management alternatives for the river will be analyzed with particular attention to floodplain zoning and other alternatives to the use of rip-rap and other physical means of

stream movement control. Impacts of these management alternatives on water quality, fisheries, hydrology, and riparian vegetation will also be considered. The EIS will consider designation of the Stehekin River as a Wild and Scenic River, as part of the river planning process to be completed within one year after completion of the EIS.

III. Interim Management Pending Completion of EIS and Issuance of Record of Decision

The following are agreed upon as interim management measures only and shall be in effect only until the Final EIS and Record of Decision are released:

A. The existing NCNP General Management Plan, the LCNRA Firewood Management Plan, and the LCNRA Land Protection Plan, as well as all other plans related to the LCNRA that are presently in place, shall be in effect pending completion of the EIS and issuance of the Record of Decision, except as modified by these agreed upon interim measures.

B. NFS will defer adoption of the following plans presently under development: Sand, Rock and Gravel Plan; the Stehekin River Management Plan; and Stehekin Landing Development Concept Plan, pending completion of the LCNRA EIS, Each of these plans, as modified through the EIS process, will be adopted as soon as possible upon completion of the EIS process.

1. Resource extraction for NPS administrative use will continue at the existing UPS gravel site only, and will include the possible use of a crusher for the manufacturing of gravel. NPS will not begin any new major road construction project. Routine road work will continue. The planning process

will continue for resurfacing and minor adjustments to Stehekin roads. Revegetation of mined areas shall be prompt and complete.

2. HPS will permit no private extraction of minerals or other non-renewable resources from publicly held land within LCNRA.

C. LCNRA Land Protection Plan:

1. The LCNRA Land Protection Plan ("LPP") will remain in effect. In the event that the EIS has not been completed when the LPP is up for renewal in 1992, it will be renewed without change until completion of the EIS and issuance of the Record of Decision.

2. NPS will continue to acquire interests and consolidate public holdings within LCNRA through purchase and/or exchange of properties in accordance with the current and approved LPP. NPS will only pursue exchanges of federal lands within LCNRA that will result in both the retention of conservation easements to assure compatible development and/or reduce potential development within the LCNRA and resolve/adjust administrative boundaries that facilitate management and operation of the LCNRA. For all future proposed land exchanges that arise between the date of this Consent Decree and the date of the issuance of a record of decision upon completion of the final environmental impact statement as contemplated herein, notice of any such proposed exchange shall be provided to the public, including the plaintiff, to provide the public and the plaintiff an opportunity to review and comment on the proposed exchange prior to final NPS approval of any such exchange.

3. UPS will review on-going land uses in Stehekin Valley for compliance with the Compatibility Standards presently in place. Violations of the Compatibility Standards will be investigated and pursued in cooperation with local authorities, including documentation and notification of violations, informal negotiations, county enforcement, acquisition, condemnation, or other appropriate measures.

4. NPS will actively encourage County and local officials to adopt the Compatibility Standards, including any revision thereof that may result from compliance with this Consent Decree, through zoning ordinances, and to establish an active cooperative planning and consultation process with landowners.

D. LCHRA Firewood Management Plan:

1. The 1987 plan will remain in effect with some modifications provided by the Technical Advisory Committee and with the following change in usage priorities: administratively derived wood will be elevated to first priority; when this supply has been depleted, the remaining firewood cutting permitted on an annual basis will be on a shelter cut basis of the woodlot area in accordance with the plan. In making administratively derived wood available, NPS will endeavor to avoid any taking of trees which would result in adverse visual impacts.

2. UPS will continue to actively investigate and pursue alternative energy sources for NPS quarters and administrative facilities. The information derived from this evaluation will be shared with Stehekin Valley residents.

3. All informal roads or access routes used exclusively for gathering of firewood will be identified and closed to vehicular access. No new roads or access routes will be opened to access the woodlot area for gathering of firewood.

4. If necessary to meet firewood management needs, shelter cut methods utilized in the interim period shall be designed to avoid negative visual impacts from established roads and trails. "Feathering" and contouring (i.e., designing boundaries in an irregular polygon shape rather than the standard square) of the woodlot will be utilized where possible to avoid any such negative visual impacts.

E. LCHRA Transportation Plan:

1. No final decision will be made to extend, revoke, or decline renewal of the special use permit for the Stehekin airstrip pending completion of the Final EIS. To the extent possible, NPS will continue to monitor and discourage illegal use of the airstrip.

a) NPS will continue its policy of denying commercial use of the airstrip.

b) NPS will continue to pursue its study monitoring overflights of LCNRA.

2. NPS will continue routine maintenance and resurfacing of existing roads within LCNRA. Rip-rapping will be employed only when necessary to protect life, structures, and roads.

IV. Miscellaneous Understandings of the Parties:

A. Wild & Scenic River Designation for Stehekin River: NPS will continue to pursue its review of the

suitability of the river for wild and scenic designation subject to available funding. NPS review will be completed within one year of the issuance of the Final EIS.

B. Environmental Learning Center: NPS planning for this facility will undergo a separate NEPA review process and will not be analyzed in the LCNRA ETS.

C. Fish Stocking NEPA Review: NPS will conduct a NEPA review of the fish-stocking of naturally fish-free lakes within NCNP upon the completion of on-going research; the review will not be initially included in the LCNRA EIS, and may be subject to either separate NEPA compliance or by tiering from the LCNRA EIS. This review shall also evaluate management measures to protect all natural stocks (such as gear restrictions, size and catch limits, or "catch and release" requirements).

D. Protection of Wetlands: NPS shall prohibit development, including placement of rip-rap and road fill and construction of structures, on federally owned wetlands within LCNRA. Where rip-rap is absolutely necessary and the only viable alternative for the protection of life or structures, however, it may be employed along stream courses such as the stehekin River. Such necessary placement of rip-rap along stream courses will occur only when appropriate permits have been obtained from the United States Army Corps of Engineers, and shall avoid "wetlands," defined under Section 404 of the corps' regulations as a marsh, swamp, or bog, wherever possible.

E. Additional studies: NPS will continue to conduct natural and cultural resource studies as necessary to manage the LCNRA subject to available funding.

F. Limitation on Rip-Rapping: NPS will cease using rip-rapping along the Stehekin River except when necessary along with other emergency actions to protect life or structures, but even in these instances, such emergency actions will not be accomplished, if possible, in a long-term and irreversible fashion.

G. Attorneys' Fees Awarded to Plaintiff: The parties bound by this Decree agree that plaintiff is entitled, pursuant to 28 U.S.C. 5 2412(d), to an award of reasonable and appropriate litigation expenses incurred by plaintiff in the amount of $39,170.30. This represents $38,000.00 in attorneys' fees and $1170.30 in litigation costs.

Respectfully submitted this 10th day of April, 1991.

STEPHAN C. VOLKER
Sierra Club Legal Defense Fund
2044 Fillmore Street
San Francisco, CA 94115
Telephone: (415) 567-6100

RICHARD B. STEWART
Assistant Attorney General
KENTON W. FULTON
Environmental 6 Natural Resources Division
U. S. Department of Justice
Washington, DC 20530
Telephone: (202) 272-8236

LYNN D
. WEIR
Mrak;£ Blumberg 1325 Fourth Avenue #600 Seattle, WA 98101 Telephone: (206) 223-0344

PER O. MUELLER
PE Assistant U, S. Attorney
western District of Washington 800 Fifth Avenue #3600 Seattle, WA 98104 Telephone: (2 06) 553-5196

ORDER

INASMUCH as the parties have consented to entry of the foregoing Consent Decree and requested this Court's approval and entry thereof; and

INASMUCH as good cause appears therefor,

THIS CONSENT DECREE IS HEREBY APPROVED AND ENTERED.

IT IS SO ORDERED.

DATED: 4-22-91

UNITED STATES DISTRICT JUDGE

APPENDIX C: A DISCUSSION OF LAWS, POLICIES AND OTHER DOCUMENTS AFFECTING THE ADMINISTRATION OF LAKE CHELAN NATIONAL RECREATION AREA

CONTENTS

I- INTRODUCTION
II. ENABLING LEGISLATION - Public Law 90-544
    1. Land Acquisition, Title III, Section 301
    2. Management, Utilization and Disposal of Renewable Natural Resources, Title IV, Section 402(a)
    3. Minerals, Title IV, Section 402(b)
    4. Hunting, Title IV, Section 402(d)
III. LEGISLATIVE HISTORY OF ENABLING ACT
IV. NATIONAL PARK SERVICE ACT
V. DIFFERENCE BETWEEN A PARK AND A NATIONAL RECREATION AREA
VI. OTHER FEDERAL LEGISLATION
VIL NATIONAL PARK SERVICE AUTHORITY
VIII. CONCLUSION

I. INTRODUCTION

Although the idea of creating a national park in the North Cascades was first proposed in 1892, it would take three quarters of a century and a score of proposals before a park was finally established in 1968. The first proposal for creating a park was a petition circulated in the town of Chelan in 1892 asking the government "to sot aside the larger portion of that beautiful lake and the country contiguous thereto as a national park or reservation." In 1916 members of the Washington Congressional delegation unsuccessfully introduced legislation to create a Mount Baker National Park. In 1937 a National Park Service study was commissioned that concluded that "such a Cascade Park would outrank in its scenic, recreational, and wildlife values any existing national park and any other possibility for such a park within the United Slates." Finally in 1963, President Kennedy appointed a team of National Park Service, United States Forest Service, and Bureau of Outdoor Recreation representatives to study the North Cascades and its future use. A study report was prepared and in 1966 the Senate Interior Committee conducted field hearings in Seattle to gather public opinion about this interagency report. Early in 1967, Sen. Henry Jackson and Rep. Lloyd Meeds introduced identical bills in the Senate and House which proposed creating North Cascades National Park to include the Stehekin Valley and an adjoining Ross Lake National Recreation Area. Ross Lake was to be designated a national recreation area for two main reasons: to retain the potential for future hydroelectric development and to allow the continuation of hunting. Further field hearings were held in Wenatchee, Seattle, and Mount Vernon in May 1967. As a result of those hearings, the bills were amended to reclassify 62,000 acres of the proposed national park as Lake Chelan National Recreation Area. The enabling legislation for Lake Chelan NRA was based on the proposed Ross Lake legislation. On October 22, 1968, President Lyndon Johnson signed P.L. 90-544 establishing North Cascades National Park Service Complex. For the first time, Congress established a single National Park Service (NPS) unit composed of a national park and two adjacent recreation areas with differing statutory provisions.

This document will examine the specific statutory mandate for Lake Chelan NRA, its context within P.L. 90-544, and other laws directing NTS policies and management guidelines that set the framework and provide direction for Lake Chelan NRA policies and management decisions.

II. ENABLING LEGISLATION - Public Law 90-544

Lake Chelan NRA was established by P.L. 90-544 enacted on October 2, 1968. Section 202 defines the primary purpose for creating Lake Chelan NRA:

> In order to provide for public outdoor recreation use and enjoyment of portions of the Stehekin River and Lake Chelan, together with the surrounding lands, and for the conservation of the scenic, scientific,

> historic and other values contributing to the public enjoyment of such lands and waters, there is hereby established, subject to valid existing rights, the Lake Chelan National Recreation Area.

Congress established Lake Chelan NKA for two primary purposes:

1. ". . . public outdoor recreation use and enjoyment. . . ."
2. ". . . conservation of scenic, scientific, historic and other values contributing to the public enjoyment of such lands and waters.

P.L. 90-544, sets specific congressional direction on how Lake Chelan NRA is to be administered. The National Park Service is legally obligated to follow specific congressional guidance on particular management actions. Absent specific legislative direction, general NFS legal mandates, and policies apply. P.L. 90-544 should be interpreted like any other federal law, beginning with an analysis of its plain language applying established principles of statutory construction. If, and only if, there is ambiguity in the language, then the legislative history, administrative interpretation, case law, commentaries, treatises, or law review articles are examined to determine meaning or applicability.

P.L. 90-544 {as amended by the Washington Park Wilderness Act of 1988) has four key provisions in which Congress has provided specific guidance on particular management actions in Lake Chelan NRA. These are:

1. Land Acquisition, title- III § 301
2. Management, utilization, and disposal of renewable natural resources, title IV §4(12(a)
3. Minerals, title IV § 402(b)
4. Hunting, title IV, § 402(d)

1. LAND ACQUISITION - Public Law 90-544 title III § 301

Within the boundaries of the park and recreation areas, the secretary of the interior . . . may acquire lands, waters, and interests therein by donation, purchase with donated or appropriated funds, or exchange, except that he may not acquire any such interests within the recreation areas without the consent of the owner, so long as the lands Lire devoted 1o uses compatible with the purposes of this art.

P.L. 90-544 § 301 has three major elements:

1. It authorizes the National Park Service to acquire lands or interest in lands by donation, purchase, or exchange.
2. It protects the rights of the landowner in the national recreation area by prohibiting the government from acquiring land devoted to a compatible use without the consent of the owner.
3. It implies the right of condemnation when lands are devoted to uses incompatible with the purposes of the act.

Private property may not be taken for public use without just compensation under the Fifth Amendment to the Unites States Constitution. P.L. 90-544 provides that the National Park Service may not exercise its right to condemn property, "so long as the lands are devoted to uses compatible with the purposes of the enabling Act."

NPS land acquisition activities are controlled by departmental and agency policies and guidelines. Most of the land within Lake Chelan NRA has been in the public domain since 1846 when the United States established title to the Oregon territory. It became part of the Washington Forest Reserve in 1897, and management was transferred from the U.S. Forest Service to the National Park Service in 1968. When Lake Chelan NRA was established, there were approximately 1,700 acres in private or nonfederal ownership within its boundary. Between 1968 and 1973, the National Park Service acquired 980 acres from willing sellers, primarily in large undeveloped tracts. Since 1974, the Park Service has acquired an additional 190 acres. This acreage was acquired from willing sellers, and the amount paid was based on professional appraisals of fair market value. Parcels were acquired to protect the

historic scene, natural features, and water quality, provide visitor and administrative facilities, protect wetland habitat, proven! threatened development, and/or provide visitor access. No private lands have been acquired using the doctrine of eminent domain or other adverse action.

In 1981 the General Accounting Office (CAO) investigated NPS land acquisition and management practices and issued a separate report on Lake Chelan NRA. The GAO is the investigative arm of Congress. It conducts studies of activities within federal agencies at the request of Senate and House members or committees, fn this study the GAO recommended that most of the land acquired by the National Park Service in Stehekin should be sold back to (he public. This GAO study did not have the force of law but provided background information and recommendations to Congress.

Neither the Senate Energy and Natural Resources Committee nor the House Committee on Interior Affairs held oversight hearings on the GAO report findings or recommendations, as GAO recommended. Congress acted in direct contradiction to the GAO report by twice appropriating funds for additional NFS land acquisition. This same land acquisition issue was again brought up in the Stehekin Heritage lawsuit of 1984/1985 and was dismissed by the judge. The primary conclusions of the GAO report have never been adopted by Congress.

There is no statutory definition of a "compatible use" in P.L. 90-544. In May 1982 the Department of the Interior issued a policy statement for use of the federal portion of the Land and Water Conservation Fund, 47 FR 19,784, which requires that a land protection plan be prepared for every unit of the national park system that contains private or other nonfederal land or interest in land within it? authorized boundary. A major purpose of *a* land protection plan is to identify what land or interest in land needs to be in federal ownership consistent with the enabling legislation. To comply with this requirement, the National Park Service developed "Standards for the Compatible Use of Land within the Lake Chelan National Recreation Area." These standards underwent public review and comment and were approved by the regional director, Pacific Northwest Region, on August 6, 1982, Based on these standards, the National Park Service developed the Lake Chelan NRA land protection plan, the most recent update being approved by the regional director on June 11, 1991.

On September *7,* 1989, the North Cascades Conservation Council filed a Complaint for Declaratory and Injunctive Relief[l] charging that the National Park Service made a series of planning decisions for Lake Chelan without adequate National Environmental Policy Act (NEPA) compliance. In response to that suit, the National Park Service signed a Consent Decree of April 22, 1991, agreeing to conduct a thorough review of the Lake Chelan NRA compatibility standards and to modify and issue a new land protection plan as part of the Record of Decision. That court challenge should further clarify § 301.

2. MANAGEMENT, UTILIZATION, AND DISPOSAL OF RENEWABLE NATURAL RESOURCES, title IV § 402(a)

P.L. 90-544 § 402(,i) was amended by the Washington Park Wilderness Act, P.L. 100-668 % 205, November 16, 1988. It reads as follows:

> Within that portion of Lake Chelan National Recreation Area which is not designated as wilderness, such management, utilization and disposal of renewable natural resources and tine continuation of such existing uses and developments as will promote, or are compatible with, or do not significantly impair, public recreation and conservation of the scenic, scientific, historic, or other values contributing to public enjoyment, are authorized. In administering the recreation areas, the Secretary may utilize such statutory authorities pertaining to the administration of the national park system, and such statutory authorities otherwise available to him for the conservation and management of natural resources as he deems

> appropriate for recreation and preservation purposes and for resource development compatible therewith.

This section grants the secretary of the interior the authority to allow the use and disposal of renewable natural resources if the uses will promote, are compatible with, or do not significantly impair public recreation and conservation of the scenic, scientific, historic, or other values contributing to public enjoyment. The use of renewable natural resources is not mandated; (he secretary's discretion to authorize use of renewable natural resources is subordinate to his paramount duty of providing for public recreation and conser-vation. The decision of which and how much use of renewable natural resources to allow is dependent on an analysis of the affects and impacts. Such actions require NEPA compliance and generally an environmental assessment or environmental impact statement (EIS) to describe the potential environmental and other impacts of the alternatives. In selecting a proposed action, the National Park Service must consider potential environmental effects, resource protection, visitor safety, visitor use and enjoyment of park resources, interests of park-associated communities and groups, and short and long term cost effectiveness.

Currently authorized uses of renewable resources in Lake Chelan NRA include apple gathering and cider making at the Buckner orchard, recreational stock grazing, and the granting of special use permits for growing and harvesting hay.

The most controversial use of a renewable resource has been the cutting of firewood on public land. In 198(1 the National Park Service contracted with the University of Washington to survey the forest resources in the lower Stehekin Valley. This study by Oliver and Larson, titled "Forest Resource Survey and Related Consumptive Use of firewood in Lower Stehekin Valley," evaluated the amount of firewood available and the potential for sustained firewood yields. The Park Service prepared a Stehekin firewood management plan based on this study, which defined the annual limit of wood that could be taken from an intensive harvest area without significantly impairing the resources and values of the recreation area. It set an annual limit of 120 cords and established a permit system to allocate the wood among Stehekin residents.

In the Consent Decree of April 22, 1991, the National Park Service agreed to analyze all of the alternatives described in the 1987 *Firewood Management Plan,* to review the harvest levels, evaluate alternative energy sources and options, to evaluate the effects of firewood cutting on resources, scenery, solitude, and other natural amenities of public lands, and to address whether it is appropriate to provide green limber from public lands for private firewood use. The HIS will review in detail what, if any, amount of firewood taking is compatible with or will not significantly impair public recreation and conservation.

3. MINERAL RESOURCES, title IV § 402(b)

Under the 1988 enabling act, the secretary was granted authority to permit the removal of nonleasable minerals from Lake Chelan NRA. Section 402(b) was amended by P.L. 100-668 § 206, the Washington Park Wilderness Act, Nov. 16, 1968. Section 402(b) was amended to read as follows:

> The lands within the recreation areas, subject to valid existing rights, are hereby withdrawn from all forms of appropriation or disposal under the public land laws, including location, entry, and patent under the United States mining laws, and disposition under the United States mineral leasing laws; provided, however, that within that portion of the Lake Chelan National Recreation Area which is not designated as wilderness, sand, rock, and gravel may be made available for sale to the residents of Stehekin for local use so long as such sale and disposal does not have significant effects on the administration of the Lake Chelan National Recreation Area.

The effect of this act was to eliminate all mineral leasing in Lake Chelan NRA, since

there are not any patented mining claims within its boundary.

Section 402(b) also provides the authority for the National Park Service to authorize the sale of sand, rock, and gravel from the nonwilderness part of Lake Chelan NRA to residents of Stehekin if it will not have "significant effects" on Lake Chelan NRA. The plain language of the phrase "may be made available" indicates that this use is discretionary; it contrasts with the phrase "shall permit hunting" found in 402(d). Before the National Park Service may authorize the taking of sand, rock, and gravel, it must comply with all provisions of NEPA and the Mining in the Parks Act of 1970.

As part of the Consent Decree of April 22, 1991, the National Park Service agreed to prepare a cumulative effects EIS to include a complete review of all aspects of its sand, rock, and gravel policy. No sand, rock, or gravel may be made available to private citizens until after the. EIS is approved.

4. HUNTING, title IV § 402(d)

> The Secretary shall permit hunting and fishing on lands and waters under his jurisdiction within the boundaries of the recreation areas in accordance with applicable laws of the United Stales and of the Stale of Washington, except that the Secretary may designate /ones where, and establish periods when, no hunting or fishing shall be permitted for reasons of public safety, administration, fish and wildlife management, or public use and enjoyment. Except in emergencies, any regulations of the Secretary pursuant to this section shall be put into effect only after consultation with the Department of Game of the State of Washington.

Hunting, which is prohibited within North Cascades National Park, is mandated in Lake C he Ian NRA. The. secretary possesses the authority to regulate hunting and fishing within NPS lands. Hunting is permitted in accordance with Washington Department of Wildlife regulations. The Washington Department of Wildlife consults with the National Park Service when establishing seasons and closed areas within the national recreation areas. Under 36 C.F.R § 2.2(4), the National Park Service assimilates these regulations. In its compendium , the National Park Service has prohibited hunting in those areas where it conflicts with public safety: the Buckner Homestead historic area or within one-quarter of a mile of a nature trail, developed campground or concession facility. The high elevation buck hunt and general buck seasons are popular uses of the national recreation area.

111. CONGRESSIONAL INTENT: SENATE AND HOUSE REPORTS ON THE ESTABLISHMENT OF LAKE CHELAN NATIONAL RECREATION AREA

Senate Report 700 (Calendar No. 683) and House Report 1870 (to accompany H.R. 8970) are the official records of the debate by Congress on the provisions of the bill to establish the North Cascades National Park, Ross Lake and Lake Chelan National Recreation Areas. If there is ambiguity in the plain language of the statute, the Senate and House reports and congressional debate are the critical documents in determining the intent of Congress.

In the process of drafting enabling legislation for North Cascades, Sen. Henry Jackson, Chairman of the Senate Committee on Interior and Insular Affairs, look the unusual step of conducting hearings in the state of Washington to gather public opinion on the study report prepared by the interagency North Cascades study team. The published records of the public hearings associated with the enactment of legislation for an NPS area in the North Cascades are over 3,000 pages long and only briefly refer to the establishment of the national recreation areas. The views of the three hundred witnesses and thousands of citizens and organizations who sent letters to the committee were considered when preparing legislative proposals, but do **not** in themselves represent the intent of Congress.

Senate Report 700

The Senate Report 700 on S.R. 1321 {the draft Senate bill)**,** outlines a long debate on timber harvests expected to continue within Ross Lake National Recreation Area. Tine result was Section 402(a) of the final bill that authorizes "management, utilization, and disposal of renewable natural resources." The report also documents the modification of the bill from just Ross Lake National Recreation Area and North Cascades National Park into a bill establishing two national recreation areas and the park. The move to create Lake Chelan NRA is outlined as follows:

> Designate the lower Stehekin River Valley and upper Lake Chelan areas (he Lake Chelan National Recreation Area instead of a part of the National Park: Many of the yearlong residents of the Stehekin Valley are descendants of the original homesteaders. Some 1,700 acres, mostly on the valley floor, are in private ownership and in the past several decades a number of summer homes have been built. The only access to the community is by foot, horseback, boat, or plane, even though there is in existence a road some 25 miles extending from the village up the valley. The lake, likened by most to the spectacular fjords of Norway, will serve as the primary access for park and recreation area visitors approaching from the southeast. The village and the lower valley, therefore, will have considerable use and development to accommodate these visitors will be necessary. The Stehekin Valley, the Rainbow Creek Valley and Rainbow Ridge traditionally have been used by high country big game hunters. The Washington State Department of Game, in cooperation with the Chelan Public Utility District, plans to engage in spawning channel improvement on Stehekin River and Company Creek in order to improve fishing in 1,500-foot deep Lake Chelan. All these factors were important in the committee's decision to create a 62,000-acre recreation area here, instead of giving the area national park status.

House Report 1870

House Report 1870 on II.R. 8970 (draft House bill) specifically recommended passage of the legislation to establish the park, recreation areas and U.S. Forest Service wilderness. The report emphasizes the need for outdoor recreation in the North Cascades:

> The area compares favorably with our most superlative national parks — Yellowstone, Yosemite — among others. Although it involves Federally owned lands almost exclusively, the enactment of this legislation would assure their management and utilization for outdoor recreation; whereas their continued administration by the Forest Service might not always result in recreational values being given priority over all other uses.
>
> Alternative recreation uses of the lands were also discussed. Many who testified on the proposed legislation argued vigorously in behalf of full consideration of such outdoor sports activities as hunting, fishing and skiing. In reaching its conclusions on this legislation, the committee accepted the compromise terms of the bill approved by the Senate which converted (he southernmost portion of the originally proposed national park into a national recreation area where hunting would be permitted.

I louse Report 1870 does not mention the private landowner in Stehekin other than from a land acquisition standpoint:

> The National Park Service does not contemplate and the bill prohibits, the. condemnation of these private interests in land as long as their use is compatible with the purposes of the legislation.

The record makes it clear that the House of Representatives took their lead on this legislation from the Senate.

IV. THE NPS ORGANIC ACT

On March 1, 1872, Congress established Yellowstone National Park as the nation's first national park. By 1916, 31 national parks and 19 national monuments had been established; responsibility for their administration was dispersed among a number of government agencies including the Departments of the Interior, Agriculture, and War. (>n August 25, 1916 Congress created the National Park Service with the NPS Organic Act, which was subsequently codified in 16 USC § 1 et seq. This act, as reaffirmed and amended in 1970 and 1978, establishes a broad framework of policy for the administration of these areas:

> The Service thus established shall promote and regulate the use of the Federal areas known as national parks, monuments and reservations . . . by such means and measures as conform to the fundamental purpose of said parks, monuments and reservations, which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such a manner and by such means as will leave them unimpaired for the enjoyment of future generations.-

After 75 years, this language **still** lies at the heart of NPS management, philosophy and policy. Although its interpretation has not been without controversy over the years, the plain meaning of the statute is that the National Park Service has a mandate to conserve and allow for enjoyment of the resources, but only to the extent that the use does not cause impairment Time and time again Congress has reaffirmed this as it continues lo add new areas to the national park system.

By 1970 the national park system had grown to encompass a diverse collection of "superlative natural, historic, and recreation areas in every major region of the United States, its territories and island possessions." That year, Congress, in the NFS General Authorities Act declared:

> That these areas, though distinct in character, are united through their interrelated purposes and resources into one national park system as cumulative expressions of a single national heritage; that, individually and collectively, these areas derive increased national dignity and recognition of their superb environmental quality through their inclusion jointly with each other in one national park system preserved and managed for the benefit and inspiration of all the people of the United States; and that it is the purpose of this Act to include al! such areas in the System and to clarify the authorities applicable to the system.

This act is significant to Lake Chelan NKA because Congress made it clear that all units of the system are equally protected by law without regard to their various titles. It further emphasized that while each unit of the system is to be managed according to its specific enabling statute, each unit is also subject to the purposes and mandates established by the Organic Act to the extent that those mandates do not conflict with the provisions of the units enabling legislation.

Congress further amended the Organic Act on March 27, 1978 (the act expanding Redwoods National Park):

> 1'he authorization of activities shall be construed in light of the high public value and integrity of the National Park System and shall nof be exercised in derogation of the values and purposes for which these various areas have been established, except as may have been or shall be directly and specifically provided by Congress.

This amendment makes it clear that the National Park Service does not have the discretion to authorize activities that are incompatible with, or significantly impair the

recreational, scenic, scientific, historic, and other values of Lake Chelan NRA.

The NPS Management Policies state: "park managers should ascertain park-specific purposes and management direction by reading the park's enabling legislation or proclamation and determine general management direction, not inconsistent with the enabling legislation from the Organic Act. . . . Absent such specific legislative exceptions, general NPS legal mandates and policies apply."

V. DIFFERENCE BETWEEN A PARK AND A NATIONAL RECREATION AREA

Today the National Park Service include;. 367 diverse areas including such "non-traditional" areas as national parkways, scenic trails, recreation areas, national lakeshores, wild and scenic riverways, preserves, and seashores. The first national recreation area was lake Mead established in 1936. Originally, recreation areas were units surrounding reservoirs. Subsequent recreation areas were added that authorized hunting, trapping, prospecting or other activities traditionally barred from national parks. In 1967, when the interagency study team was considering alternatives for the North Cascades, Ross Lake and Lake Chelan most closely fit (he general category of recreation areas; they contained hydroelectric impoundments and were to allow hunting.

When Lake Chelan NRA was established in 1 <?68, the National Park Service divided all units in the national park system into three distinct categories: natural, historic, or recreational. These categories were developed in response to Circular No. 1 of (he Recreation Advisory Council (issued on March 26, 1963), which defined criteria for national recreation areas and made recommendations about their administration; the Act of May 28, 1963, creating the Bureau of Outdoor Recreation; the Land and Water Conservation Fund Act; and (he needs of managing the growing number of nontraditional areas. The National Park Service adopted separate management policy books for each of the three categories and promulgated regulations that allowed such uses as bunting and trapping in every area that it administratively grouped in the recreation category. Trapping, for example, was allowed in Lake Chelan NRA without specific Congressional authorization. Recreation areas were managed differently from national parks from the mid-J960s through the 1970s.

This policy was reversed by Congress, which passed laws amending the National Park Service Organic Act in 1970 and 1978. Acts of Congress always override recommendations from an interagency committee.

The- two amendments to the NPS Organic Act prohibited the National Park Service from authorizing resource-consumptive activities without specific congressional legislation and directed the Park Service to manage national recreation areas and all NPS areas as part of an integrated national park system. One example of this new policy was the elimination of trapping from all recreation areas where it was not specifically authorized by law. This included Lake Chelan NRA. New management policies were published in 1978 that eliminated all references to national recreation areas. New regulations WCTC promulgated that prohibited the consumptive use of resources except in those units where Congress specifically authorized them. This new policy and regulations, including the elimination of trapping, were extremely controversial and were challenged in National Rifle Association v. Potter, 628 F.Supp. 903 (D.D.C. 1986). In its ruling upholding the new regulations, the U.S. District Court in Washington, D.C., wrote:

> Beginning in the late !930's, Congress began to add a number of "non-traditional" park areas, such as national seashores, lake-shores, and scenic riverways, in many of which Congress itself specifically undertook to authorize hunting, trapping, and fishing as permitted recreational activities. In the 1960's, in recognition of the heterogeneous character of the territories it was now overseeing, the Park Service evolved on its own a concept of management categories . . . natural, historical and recreational. . . . Two subsequent amendments to the Organic Act, however, caused the Park

> Service to doubt (he extent of its autonomy in the matter. Perceiving in these amendments an implied reproof for having strayed from the true purpose of the Organic Act {and specifically for its "management categories" system), NPS concluded that Congress conceived of the park system as an integrated whole, wherein the Park Service was to permit hunting and trapping only where it had been specifically authorized to do so, by Congress in the applicable enabling act....[W]hile the Service may have succumbed to error in the late 1960's and 1970's, it has now acted to restore itself to grace. . . . Notwithstanding his recent predecessors may have permitted hunting and trapping in selected park areas of their choosing, the present Secretary has reexamined the subject in light of recent amendments to the Organic Act and has concluded that his primary management function with respect to Park, wildlife' is preservation unless Congress has declared otherwise.

The meaning of (he designation "recreation area" has changed since 1968 in response to the 1970 and 1978 revisions to the NPS Organic Act and numerous court decisions. Trapping in the Lake Chelan NRA was terminated because it was occurring without congressional authorization. Take Chelan NRA is an area of national significance and its designation as a national recreation area does not carry with it the authorization or mandate to impact resources or develop the recreation potential to the derogation of the scenic, scientific, historic and other values of Lake Chelan NRA.

VI. OTHER FEDERAL LEGISLATION

Less than a year after the establishment of Lake Chelan NRA, enactment of the National Environmental Policy Act (NIHPA) of 1969 had a major effect on the policy and decision making process of the National Park Service. The general intent of NEPA was to ensure that environmental concerns and effects were an integral part of the administrative decision making process on all federal actions. Section 102 of the act required that "in every recommendation or report on proposals for legislation and other major Federal actions significantly effecting the quality of the human environment, there be a detailed statement concerning the environmental impact of a proposed action." It sets up procedural requirements for the preparation of environmental impact statements (E1S), which need to be followed "to the fullest extent possible." The EIS requires public involvement throughout the decision-making process. It is required to clearly present the environmental impacts of the proposed action and the alternatives to the proposed action with the purpose of defining the issues and providing a clear basis for choice among the options by the decision maker and the public.

The National Park Service has adopted specific procedures for analyzing environmental impacts and complying with the NEPA found in the *National Environmental Policy Act Guideline* (NPS-12).

The 1988 NPS Management Policies (2:6) state:

> The environmental assessment or environmental impact statement will describe the potential environmental and other impacts of the alternatives. Planners and managers will consider these potential impacts before deciding which actions to implement. Potential environmental effects, resource protection, visitor safety, visitor use and enjoyment of park resources, interests of park associated communities and groups, and short and long term cost effectiveness will be important considerations in the selection of proposed actions.

Additional federal legislation that affects the management of Lake Chelan NRA includes but is not limited to the Historic Preservation Act of 1966, the Wilderness Act of 1%4, the Endangered Species Act of 1973, the Clean Air Act of 1977 (as amended), the Clean Water Act of 1977, and the Mining and Minerals Policy Act of 1970. Various Presidential Executive

Orders also apply such as the E,O 11988 "Floodplain Management."

Policy originates in law. The management of the national park system and Lake Chelan NRA is guided by the Constitution, public law proclamations, executive orders, rules and regulations, and directives by (he secretary of the interior. Since 1968, the enactment of NEPA and other new legislation has had a significant effect on policy formulation for Lake Chelan NRA.

VII. NATIONAL PARK SERVICE AUTHORITY

Authority to regulate NPS areas is an enumerated power under the property clause of the United States Constitution, "Congress shall have power to dispose of and make all needful rules and regulations respecting the territory or other property belonging to the United States."[10]

The National Hark Act, passed by Congress and signed info law by President Wilson on August 25, 1916, delegates rulemaking authority:

> The Secretary of the Interior shall make and publish such rules and regulations as he may deem necessary or proper for the use and management of park, monuments, and reservations under the jurisdiction of the National Park Service.

General and permanent rules promulgated under this authority are codified in the Code of Federal Regulations {CFR), Title 36, which contains regulations specific to the National ['ark Service. 36 CFR Part 2 is dedicated to Resource Protection, Public Use, and Recreation regulations. Special regulations applicable only to Lake Chelan NKA are found in § 7.62. Violations of any of these rules is a misdemeanor, punishable by a fine of up to $5,000 and imprisonment of up to six months. Cases are brought before a Federal District Court or federal magistrate. The General Authorities Act, P.L. 94-458, provides authority for park rangers with law enforcement commissions (o carry firearms, make arrests, execute warrants, and conduct investigations of offenses against the United Stales.

The applicability of some laws and regulations is dependent on the type of jurisdiction that the federal government has. There are four types of jurisdiction exercised by the federal government over federal lands: exclusive, partial legislative, concurrent, and proprietary. The National Park Service has proprietary jurisdiction over Lake Chelan NRA. Under proprietary jurisdiction, the National Park Service regulates the use of resources, public use and recreation. The state of Washington exercises its full civil and criminal jurisdiction over private activities on federal lands in Stehekin. However, the stale may not impose its regulatory power directly upon the United States without specific congressional intent, nor may it tax federal land. The state also cannot regulate the actions of the residents of the federal area in any way which may directly interfere with the performance of a United States function.

The National Park Service generally does not have jurisdiction over felony crimes occurring on privately owned lands within the boundary of Lake Chelan NRA- The National Park Service has jurisdiction over certain Federal offenses, such as the Endangered Species Act, which are offenses wherever they are committed. Tine Park Service also has authority to regulate activities on privately owned land that threaten the resources or values of Lake Chelan NRA. This is an implied power under the property clause of the Constitution which is supported by a wide body of case law going back nearly a century. In United States v. Alford, 274 U.S. 264 (1927), the Supreme Court upheld the conviction of a defendant who left a fire burning on private property adjacent to federal land. The court held that Congress had a statutory authority to prohibit activity on privately owned land that imperiled federal property. The court reasoned that "the danger depends upon the nearness of the fire, not upon the ownership of the land where it was built." In State of Minnesota by Alexander v. Block, 660 F.2d 1240 (8th Cir. 1981), cert, denied, 455 U.S. 1007, in which it had concluded that "under the authority to protect public land, Congress' power must extend to

regulation of the conduct on or off public land that would threaten the designated purpose of Federal lands." In Kleppe v. New Mexico, 426 U.S. 529 (1976), the Supreme Court held that the "property clause is broad enough to reach beyond territorial limits."

The- federal authority to regulate activities on private property in order to protect adjacent federal lands is a complex and controversial constitutional issue. Rulings have consistently uphold the federal governments' authority to regulate activities on nonfederal property necessary to protect federal property from physical harm. Many cases including Brown and Block went further in holding that the Federal government possesses the constitutional power to regulate nonfederal! properly so long as regulations served to foster the goals embodied in the statement of legislative purpose.

Examples of activities on private properly at Stehekin that would impact the resources or values of Lake Chelan NRA include mining, adding fill materials to wetlands, a leaking septic system threatening water quality or construction of a noncompatible development. Procedurally, if such an infraction were to occur, the National Park Service would notify the appropriate jurisdiction a I entities within Chelan County or the state of Washington. If the state and county fail to take effective action, the superintendent then consults with the U.S. Solicitor and/or the U.S. Attorney to determine if civil action, injunctive relief or other federal action is appropriate. If an action on private land within Lake Chelan NRA is determined to be noncompatible with the purposes of the area, and the action cannot be resolved through negotiation or the application of state or county regulations, then the private land can be subject to condemnation under P.L. 90-544 title III § 301.

VIII. CONCLUSION

The Lake Chelan National Recreation Area was established by an Act of Congress, enacted on October 2, 1968. That act, P.L. 90-544, directs the Secretary of the Interior ". . . to manage the recreation area in a manner which in his judgment will best provide for (1) public outdoor recreation benefits; (2) conservation of scenic, scientific, historic and other values contributing to the public enjoyment." This enabling Act mandates that hunting and fishing be permitted in accordance with applicable laws of the United States and of the state of Washington. It prohibits the acquisition i)f land devoted to a compatible use without the consent of the owner. It authorizes the utilization and disposal of sand, rock, gravel, and renewable natural resources in non-wilderness if and to the extent that such use does not significantly impair the recreational, scenic, scientific, historic, or other values contributing to public enjoyment of the area. The use of renewable natural resources is nol mandated; the secretary's discretion to authorize utilization of renewable natural resources use is subordinate to his paramount duty of providing for public recreation and resource protection.

The title "Recreation Area" does nut carry any special authorization or mandate to develop [he recreation potential to the derogation of the scenic, scientific, historic, and other values of Lake Chelan NRA. Recreational activity and development is permitted in such manner and by such means as will leave the resources and values unimpaired for the enjoyment of future generations. The locations and types of recreational activities and developments are determined by the NPS policy.

NPS policies and management decisions must be consistent with the law. Oftentimes the secretary of the interior or superintendent has broad discretion in making management decisions. The Administrative Procedures Act requires only that they exercise discretion in a reasonable manner, with reasons that do not deviate from or ignore the ascertainable legislative intent.

Law and policy are dynamic. Legislation enacted since the establishment of Lake Chelan NRA such as the National Environmental Policy Act, the General Authorities Act, the Redwoods Act, the Endangered Species Act, the Clean Air Act, and the Clean Water Act, have caused some major changes in management policies. The management of Lake Chelan National Recreation Area cannot be

judged solely by an interpretation of the legislation passed in 1968, a broad definition of the. term "recreation" or an application of NPS management polices that were in place in the 1960s. Rather, one must look at the whole body of legislation, amendments, proclamations, executive orders, rules and regulations, and directives that are in effect today.

ENDNOTES

!. U.S. District Court, Western District of Washington at Seattle, Civ. No. C-90-1342D.

2. The Compendium for North Cascades National Park Service Complex is the compilation of ,ill the designations, closures, public use limits, permit requirements, and discretionary actions established by the superintendent pursuant to authority granted under title .36 of the Code of Federal Regulations

3. Calendar No. 683, 90th Congress, *1st Session,* Senate Report No. 700, 1967.

4. H.R. 1870, 90th Congress, 2nd Session (1968)

5- 16 U.S.C. et seq.

IS. 16 U.S.C. § 1a.1

7. 16 U.S.C, § la.l

8. Management Policies, U.S. Department of the Interior, National Park Service, December 1988

9. The natural, historic, and recreational management categories were in effect from 1964-1977

10. U.S. Constitution Art. IV, § 3,cl. 2

11. 16 U.S.C § 3

This methodology was used to analyze on-the-ground conditions expected from the various alternatives. It involves the following five steps:

(1) construction of a geographic information system (CIS)
(2) identification of resources of concern
(3) determination of lands in the valley with resources to be considered for high priority protection
4) agreement on FIS analysis assumptions for land/resource protection
5) creation of a data spreadsheet using information from these components

The GIS is the raw information where resources and other parameters are located in the valley; resources of concern are select resources in need of protection; lands considered for high priority protection are. those areas that contain resources of concern; analysis assumptions assign priorities to land/resource protection; and the spreadsheet calculates resource acreages to be protected under each alternative. An explanation of the five steps follows.

Step 1. Geographic Information System

An extensive GIS was constructed with earliest field work occurring in 1990 and final computer work completed in 1993. A CIS is a sophisticated map database in which any type of mappable data can be digitized into an intricate grid system. One type of data, say vegetation, is called a "theme." Themes are independently digitized into the computer and then can be superimposed on one another on the computer screen or on a paper plot of the information. Most of the themes are further divided into classes; e.g., the vegetation/land cover theme contains 36 distinct classes, or types of land cover.

The computer software is also capable of complex operations such as Boolean logic calculations (for example, it can calculate how many acres of the valley are both within private land *and* contain wetlands), buffering data elements (such as placing a 100-foot buffer down a road segment), selectively masking data elements (such as only considering one vegetation class for a particular analysis), or a combination of these capabilities. Themes in the GIS include the following (see the *Data Summary Booklet* (NPS 1993c) for additional information):

100-year floodplain
High flood influence area
Vegetation/land cover, including roads
Wetlands
Riparian vegetation
Soils
Geological hazards
High visual sensitivity areas
Visitor use features
Property lines/types/ownerships
Structures
River changes
Administrative boundaries, including wilderness Archeological sites
Historic structures and districts
Backcountry campsites Trails
Elevation
Slope/aspect
Past sand/rock/gravel extraction sites
Fish distribution
Landforms
Powerlines
Snags
Viewpoints
Water diversions

Individual "polygons," or closed cells in the GIS, can also have unique labels that provide additional text information about that polygon. So a particular private parcel would have an attendant parcel number attached lo it that the computer can track or sort by.

Even before the next four steps were completed, the GIS was used to calculate baseline, existing conditions concerning numerous interactions between these themes.

For example, each of the 169 nonfederal parcels was examined for overlap with each class in the wetlands theme, as well as other themes.

Step 2. Resources of Concern

Within the context of this methodology, five resources of concern were identified. The values associated with these resources and the rationales for their selection arc reported in the "Affected Environment" chapter and in the "Derivation of Impact Topics" section of the "Environmental Consequences" chapter. The primary concerns associated with these resources are that they contribute to the maintenance of natural ecosystem processes, that they are important ecosystem components, or that their protection is mandated in federal law or the legislation which created the park unit. Additional important resources such as threatened or endangered species, are identified as impact topics in the ETS but are not included here. For some of these species, habitats were identified as a secondary, derived subtheme based on the primary CIS themes, such as vegetation/land cover; these habitats are identified in the "Environmental Consequences" chapter. The five resources of concern are wetlands, 100-year floodplain, high flood influence area, riparian communities, and high visual sensitivity areas.

Wetlands and floodplains are protected under federal law and executive orders, as well as being important aspects of the valley's natural river/hydrologic processes. The high flood influence area is where the most active and dynamic aspects of the natural river process take place. Riparian communities are important for their high degree of community and species-level biodiversity, as habitat for sensitive wildlife species, for maintenance of the natural river process, and as a source of input of woody debris. High visual sensitivity areas are protected under the legislative mandate of the park unit and under the National 1'ark Service organic act.

Step 3. Determination of Land with Resources with High Priority for Protection

A GIS analysis was then completed that examined lands between High bridge and the downlake boundary of the national recreation area. This analysis, in effect, places 10-meter square cells over the entire area, and, for each cell, finds which of the five resources of concern are found within that cell. A cell may contain between zero and five resources (although in the actual analysis, the maximum number of resources was four). This information is then graphically portrayed in a plot that groups the number of resources into four possible categories:

a. areas with low priority for protection
b. one resource, with high priority for protection
c. two resources, with high priority for protection
d. three or more resources, with high priority for protection

Areas with relatively higher "value," or the number of resources with high priority for protection, can then be seen on the plots.

This analysis was completed with four variations — one for the proposed action and alternative B, one for alternative A, one for alternative C, and one for the no-action alternative (table 54). For the proposed action and alternative B analysis, four resources were designated high priority for protection — wetlands, high flood influence area, high visual sensitivity area, and riparian community; for alternative C only three resources were designated high priority for protection — wetlands, high flood influence area, and high visual sensitivity area; for alternative A all lands including all resources of concern were designated high priority for protection; and the no-action alternative includes none of the resources, but simply portrays the lands deemed unsuitable for development in the 1988 *Land Protection Plan* (assumed to be all private lands identified as priority 1 or 2 in that plan).

Plots of the three analyses, excluding the alternative A analysis, are shown on the accompanying three maps. The alternative A analysis was not plotted because- all nonfederal land in the valley would be designated as high priority for protection under this alternative.

TABLE 54: RESOURCE PROTECTION PRIORITIES FOR EIS ANALYSES

Resource	Proposed Action	Alternative A	Alternative B	Alternative C	No Action
Wetland	high	high	high	high	*
High Flood Influence Area	high	high	high	high	
Flood plain	low	high	low	low	
Riparian Community	high	high	high	low	
High Visual Sensitivity Area	high	high	high	high	
Others	low	high	low	low	0

* The 1988 LPP identifies 37 parcels as priority 1 and 30 parcels as priority 2 for acquisition or protection. Only these parcels would be assumed protected.

Step 4. Analysis Assumptions

A federal agency preparing an EIS must disclose the environmental impacts that would result from its proposed action and from the other alternatives being considered. In this EIS there are two primary components that would result in environmental impacts. The first consists of NPS actions on federal lands, while the second is private actions on private lands. The first component is in the control of the National Park Service, while the second component will be determined by many variables. The National Park Service can only purchase private properties or interests (e.g., easements) with the consent of the owner, unless a land use is proposed or carried out which is incompatible with the purposes of the park unit.

Therefore, future impacts stemming from private development on private land are affected by at least the following factors: how much private land or interest in land will be acquired; how many private property owners will be willing sellers of their lands or interests in their lands; timing of these willing seller opportunities (one year from now or twenty); number of undeveloped private properties becoming developed in the future; and Chelan County's role in granting building permits and/or variances to county zoning. Most of these variables are unknowable, yet the National Park Service is required to compare the environmental impacts stemming from management alternatives.

A series of assumptions was therefore developed concerning the protection through acquisition or other means of private lands that contain resources of concern. Alternative land protection plans would differ in the types of resources targeted for protection. Lands with different resources would have differing priorities for acquisition or other type of protection, such as easements. No distinction is made between currently developed or undeveloped parcels. Table 54 above summarizes the priorities for each alternative.

In the EIS, the impacts from each alternative are presented as if the alternative is completely implemented. It is therefore assumed that over the long term a11 lands with high priority for protection for a particular alternative would be acquired, or protected with easements. The result is the assumed acreage of resources of concern protected in each alternative.

Figure p425: Prop Action & Alt B Resource Protection

Figure p427: No Action Resource Protection

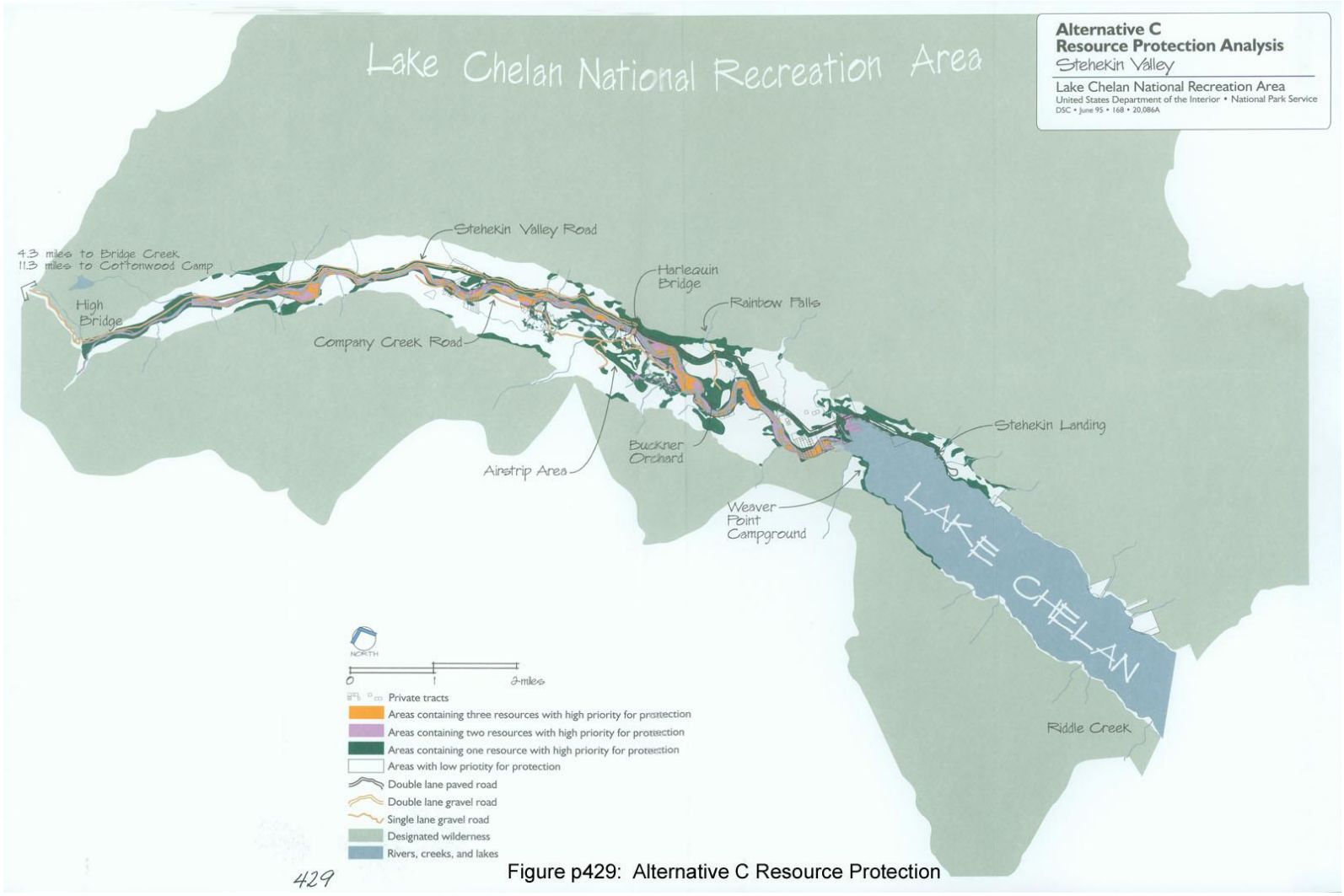


Figure p429: Alternative C Resource Protection

Step 5. Spreadsheet

At this stage individual private parcels are analyzed. This aspect of the analysis was completed using data spreadsheets (see tables 55, 56, and 57). The spreadsheet, based on output from the CIS analyses, calculates and totals for the following parameters. The following de-scribes the data columns in the spreadsheet for the proposed action (table 55).

Column number

1 "Private Tract no." is the NPS (not the county) tract or parcel number.

2 "GIS Parcel Size Acres" is the total acreage of the parcel as recorded in the GIS. It may be slightly different from an acreage in a recorded plat for a parcel due to digitizing, geographic registration, or rounding error.

3-6 "High Priority Resources for Protection Acres" gives the acreages of the four high priority resources.

7 "High Priority for Protection" gives the total acreage covered by any of the high priority resources. The GIS was used to measure this variable to avoid double-counting resources that overlapped. The four high priority resource theme were first combined into one new theme. Then, the area of each private parcel that coincided with this single high priority resource theme was measured.

8 "Low Priority for Protection Acres" gives the total acreage with no high priority resources. This column equals "GIS Parcel Acres" (column 2) minus "High Priority for Protection Acres" (column 7).

9 "Percent of Parcel with High Priority for Protection" is the percentage of the individual parcel covered by any high priority resource. This column equal:, "High Priority for Protection Acres" (column 7) divided by "GIS Parcel Acres" (column 2).

On the last page of the spreadsheet are data for nonfederal lands owned by the Chelan County Public Utility District, the total number of parcels that are 100% high priority for protection, and totals for all the columns, some of which are presented in (he HIS text, primarily in the "Environmental Consequences" chapter.

The second spreadsheet, for alternative B (table 56), is similar except (hat any individual parcel with less than one acre of "Low Priority for Protection" land was also designated as high priority for protection. In other words, if the parcel did not have £il least 1 acre of low priority resources, then the whole parcel was redesignated as high priority for protection (see columns *7* and 9 in table 56). If there *s* more than 1 acre with only low priority resources, then only that part containing high priority resources would be acquired or protected. This is based on the Chelan County Health District's minimum lot size of 1 acre (unless there is a public water system). Variances could be granted, but the methodology assumes the minimum lot size would be enforced, and assumes that public water systems would not be used.

The third spreadsheet, for alternative C {table 57), is similar except that data are only presented for three of the resources of concern, based on the assumptions of that alternative.

Table 55: Lake Chelan National Recreation Area - Land Protection Analysis for Proposed Action
(Field checking will be needed on a case by case basis to verify the accuracy of this data)

Private Tract no.	GIS Parcel Size Acres	High Priority Resources for Protection				High Priority for Protection Acres*	Low Priority For Protection Acres**	Percent of Parcel with High Priority for Protection
		Wetland Acres	High Flood Influence Acres	High Visual Sensitivity Acres	Riparian Acres			
01-100	22.5			7.3		7.3	15.2	32%
01-101	6.5			0.9		0.9	5.6	14%
01-102	6.1			2.7		2.7	3.4	44%
01-103	31.5			7.0		7.0	24.5	22%
02-102	1.4			1.4		1.4	0.0	100%
02-104	13.0	0.1		***12***		7.3	5.7	56%
02-105	21.5			7.5		7.5	14.0	35%
02-106	0.3			0.3		0.3	0.0	100%
03-100	38.8	10.0		29.4		29.4	9.4	76%
03-108	0.1			0.1		0.1	0.0	100%
03-125	0.3	0.2		0.2		0.2	0.1	68%
03-131	0.1			0.1		0.1	0.0	100%
04-100	1.9	0.3	1.2	0.6	1.5	1.9	0.0	100%
04-101	2.1	0.1	1.1	0.5	1.8	2.0	0.1	95%
04-102	1.8	0.7	1.1	1.6	1.0	1.8	0.0	100%
04-103	5.0	1.4	2.6	1.9	3.6	4.8	0.2	95%
04-104	4.4	1.8	2.6	1.4	3.1	4.3	0.1	98%
04-105	0.4				0.3	0.2	0.2	57%
04-106	4.5	2.1	2.7	1.4	2.4	4.1	0.4	91%
04-108	0.6			0.6	0.3	0.6	0.0	100%
04-110	0.4		0.5	01	0.5	0.4	0.0	89%
04-112	3.9	3.2	3.9	3.3	1.4	3.9	0.0	100%
04-114	9.3	3.9	5.2	6.0	4.3	8.7	0.6	94%
04-116	11.7	8.1	11.1	7.6	6.6	11.7	0.0	100%
04-117	0.1			0.1	0.2	0.1	0.0	91%
04-120	0.7	0.2		0.5	0.2	0.6	0.1	92%
04-124	0.6	0.1		0.3		0.3	0.3	46%
04-127	0.2			0,2		0.2	0.0	86%
04-128	0.3			0.3		0.3	0.0	89%
04-130	0.3	0.1		0.3	0.0	0.3	0.0	100%
04-131	0.1			0.2	0.1	0.1	0.0	100%
04-136	0.1			0.1		0.1	0.0	100%
04-137	0.2			0.2	0.2	0.2	0.0	100%
04-139	0.7	0.2		0.6		0.6	0.1	89%
04-143	0.3			0.3	0.3	0.3	0.0	100%
04-144	0.3			0.2		0.2	0.1	78%
04-145	0.2			0.2		0.2	0.0	97%
04-147	0.2			0.2		0.2	0.0	85%
04-148	0.6	0.1		0.6		0.6	0.0	96%
04-149	0.2			0.2		0.2	0.0	100%
04-150	0.2	0.0		0.2		0.2	0.0	100%
04-153	0.2				0.2	0.2	0.0	100%
04-154	0.6	0.5		0.6		0.6	0.0	100%
04-155	0.3	0.1		0.3		0.3	0.0	100%
04-156	0.7	0.1		0.7		0.7	0.0	100%
04-157	0.6	0.1		0.5		0.5	0.1	93%
04-158	0.5	0.0		0.5		0.5	0.0	99%
04-162	0.5	0.1		0.6	0.1	0.5	0.0	100%

Table 55: Lake Chelan National Recreation Area - Land Protection Analysis for Proposed Action

(Field checking will be needed on a case by case basis to verify the accuracy of this data)

Private Tract no.	GIS Parcel Size Acres	High Priority Resources for Protection				High Priority for Protection Acres*	Low Priority For Protection Acres**	Percent of Parcel with High Priority for Protection
		Wetland Acres	High Flood Influence Acres	High Visual Sensitivity Acres	Riparian Acres			
04-163	0.8	0.1		0.8		0.8	0.0	98%
04-164	0.2	0.1		0.2		0.2	0.0	100%
04-165	0.5	0.1		0.5	0.1	0.5	0.0	100%
04-166	0.7	0.4		0.6	0.1	0.6	0.1	94%
04-172	0.7	0.6		0.7	0.0	0.7	0.0	98%
04-173	1.0	0.0		0.9	0.1	0.9	0.1	92%
04-174	5.2	0.4	0.1	3.3	4.4	5.1	0.1	98%
04-177	0.5		0.1		.1	0.2	0.3	40%
04-178	0.5				.4	0.5	0.0	100%
04-179	1.2	0.4		1.1	0.2	11	0.1	92%
04-181	0.0				0.0	0.0	0.0	0%
04-184	0.5			0.5	0.2	0.5	0.0	100%
04-186	0.3	0.0		0.2	0.0	0.2	0.1	86%
04-187	0.4	0.3		0.4		0.4	0.0	95%
04-188	3.9	2.4		3.9	0.3	3.9	0.0	100%
04-189	0.2			0.2		0.2	0.0	88%
04-190	0.3				.1	0.0	0.3	18%
04-191	0.4				0.1	0.1	0.3	41%
04-192	0.4				0.1	0.2	0.2	42%
04-193	1.1			0.1	0.4	0.2	0.9	18%
04-194	0.4				0.4	0.4	0.0	100%
04-195	0.4		0.1		0.4	0.4	0.0	100%
04-196	0.4		0.0		0.4	0.3	0.1	91%
04-197	0.5				*0.3*	0.3	0.2	65%
04-198	0.4				0.2	0.4	0.0	100%
04-199	0.5				0.4	0.4	0.1	79%
05-102	1.7	0.6	0.7	1.7	0.0	1.7	0.0	98%
05-104	2.0			0.2		0.2	1.8	10%
05-107	27.0	0.6	1.0	10.1	2.2	10.5	16.5	39%
05-108	1.6	0.5	0.7	1.6	0.3	1.6	0.0	100%
05-109	0.7	0.2	0.4	0.7	0.1	0.7	0.0	100%
05-110	0.8	0.2	0.4	0.8	0.3	0.8	0.0	100%
05-111	0.7	0.2	0.4	0.7	0.3	0.7	0.0	99%
05-112	0.9	0.3	0.4	1.0	0.2	0.9	0.0	100%
05-113	0.7	0.3	0.4	0.7	0.3	0.7	0.0	99%
05-119	0.6			0.5		0.5	0.1	85%
05-120	0.7	0.3	0.4	0.7	0.3	0.7	0.0	100%
05-121	7.0			3.3	3.6	6.2	0.8	88%
05-124	0.2				0.1	0.2	0.0	97%
05-125	0.5			0.3		0.3	0.2	67%
05-126	0.8					0.0	0.8	0%
05-127	0.9					0.0	0.9	0%
05-128	0.8				0.3	0.3	0.5	36%
05-130	0.4			0.4		0.4	0.0	97%
05-133	0.8					0.0	0.8	0%
05-135	28.0	3.2		18.0	5.0	18.0	10.0	64%
05-136	0.2			0.2		0.2	0.0	100%
05-140	2.1	0.7	0.5	1.4	0.9	2.1	0.0	97%

Table 55: Lake Chelan National Recreation Area - Land Protection Analysis for Proposed Action

(Field checking will be needed on a case by case basis to verify the accuracy of this data)

Private Tract no.	GIS Parcel Size Acres	High Priority Resources for Protection				High Priority for Protection Acres*	Low Priority For Protection Acres**	Percent of Parcel with High Priority for Protection
		Wetland Acres	High Flood Influence Acres	High Visual Sensitivity Acres	Riparian Acres			
05-141	2.2	0.7	0.7	1.2	1.1	2.0	0.2	88%
05-142	2.4	0.1	0.5	0.4	1.9	2.0	0.4	85%
05-144	0.3				0.3	0.3	0.0	100%
05-145	0.7			0.6		0.6	0.1	81%
05-147	0.4				0.2	0.2	0.2	44%
05-148	0.7			0.8	0.1	0.7	0.0	100%
05-150	0.9			0.7		0.7	0.2	84%
05-157	2.9			1.4		1.4	1.5	50%
05-158	3.1			2.6	1.0	2.7	0.4	86%
05-159	1.3			1.0	0.2	1.2	0.1	87%
05-160	1.8			0.4	1.5	1.5	0.3	82%
06-102	4.3	0.2	1.1	0.6	4.2	4.3	0.0	100%
06-106	2.8		0.2	1.1	0.6	1.1	1.7	39%
06-111	0.2				0.2	0.2	0.0	100%
06-113	0.2			0.0		0.0	0.2	29%
06-114	0.2	0.0		0.0	0.0	0.1	0.1	59%
06-116	1.0	0.4		0.4	0.7	1.0	0.0	100%
06-119	6.7	0.8		4.1	1.8	6.0	0.7	89%
06-120	0.3	0.1		0.1	0.2	0.3	0.0	83%
07-100	4.5					0.0	4.5	0%
07-105	0.6	0.0	0.1	0.1	0.4	0.4	0.2	77%
07-107	1.1	0.8	1.1	1.1	0.4	1.1	0.0	100%
07-109	0.8		0.5	0.8	0.2	0.8	0.0	95%
07-110	0.8	0.0	0.1	0.7		0.7	0.1	90%
07-112	0.7		0.1	0.4	0.2	0.4	0.3	65%
07-114	4.1	0.0		3.5	0.8	3.5	0.6	84%
07-116	1.6	0.0	0.4	0.6	0.7	1.1	0.5	70%
07-121	0.4			0.1	0.3	0.3	0.1	83%
07-122	2.1	0.2			1.9	1.9	0.2	92%
07-124	1.0				1.0	0.9	0.1	90%
07-125	2.2	0.1	0.2		2.1	2.1	0.1	95%
07-127	2.2	0.4		1.7	1.2	2.0	0.2	90%
07-130	2.1			0.7	1.8	1.9	0.2	89%
07-131	0.9	0.4		0.8	0.3	0.9	0.0	100%
07-133	7.9	1.5	3.6	2.6	6.3	7.8	0.1	99%
07-138	2.2	0.3	0.0	0.0	1.4	1.4	0.8	65%
07-142	11.2	7.0	8.9	9.9	4.2	11.2	0.0	100%
07-145	0.8				0.4	0.4	0.4	45%
07-147	0.6	0.3		0.0	0.4	0.4	0.2	71%
07-149	0.5			0.3	0.3	0.5	0.0	88%
07-150	1.0			0.3	0.3	0.6	0.4	63%
07-153	0.8			0.2		0.2	0.6	30%
07-157	26.5	0.2	1.7	8.7		9.0	17.5	34%
07-161	0.6		0.6	0.3	0.7	0.6	0.0	98%
07-166	0.4				0.3	0.3	0.1	90%
07-168	0.5				0.3	0.3	0.2	74%
07-172	1.3		1.0	0.4	1.2	1.2	0.1	95%
07-176	2.3	0.4	1.0	0.9	2.0	2.1	0.2	89%

Table 55: Lake Chelan National Recreation Area - Land Protection Analysis for Proposed Action

(Field checking will be needed on a case by case basis to verify the accuracy of this data)

Private Tract no.	GIS Parcel Size Acres	High Priority Resources for Protection				High Priority for Protection Acres*	Low Priority For Protection Acres**	Percent of Parcel with High Priority for Protection
		Wetland Acres	High Flood Influence Acres	High Visual Sensitivity Acres	Riparian Acres			
07-177	0.6	0.1	0.5	0.6	0.3	0.6	0.0	100%
07-179	1.0			0.5	0.3	0.8	0.2	85%
07-184	0.9	0.3	0.9	0.9	0.6	0.9	0.0	100%
07-185	0.9		0.6	0.7	0.8	0.9	0.0	100%
07-186	3.5	0.7	1.7	2.6	3.0	3.3	0.2	97%
07-187	0.1				0.0	0.1	0.0	92%
07-188	0.5			0,2	0.2	0.4	0.1	76%
07-189	0.5				0.4	0.4	0.1	96%
07-190	0.4				0.2	0.1	0.3	38%
07-191	2.5	0.2		1.9	1.1	2.3	0.2	90%
07-192	1.4			0/7	0.8	0.9	0.5	66%
07-193	2.0			0.4	1.7	2.0	0.0	97%
07-194	2.2		0.1	0.8	1.8	2.2	0.0	100%
07-195	2.0		0.2	0.7	1.4	1.8	0.2	90%
07-196	2.0		0.2	0.1	2.0	2.0	0.0	98%
07-197	2.0		0.2	0,1	1.7	1.8	0.2	94%
07-198	2.0		0.2	0.0	1.8	1.7	0.3	84%
07-199	4.9	1.6	3.6	4.9	2.8	4.9	0.0	100%
07-200	1.6			0.4		0.4	1.2	24%
07-201	2.9			0.8		0.8	2.1	26%
08-101	24.0		1.9	17.0	0.2	17.0	7.0	71%
Subtotal	469.4	62.9	69.6	236.2	115.3	307.7	161.9	66%
Parcel Count		**165**		**Number of parcels that are 100% high priority for protection**				**47**
CPUD Tract no.								
02-103	45.3	0.9		19.9		45.3	0.0	100%
03-133	149.2	148.6		148.9		148.9	0.3	100%
04-201	8.4	5.8	4.3	**7.7**	2.9	8.4	0.0	100%
05-117	0.0				0.0	0.0	0.0	0%
Subtotal	202.9	155.4	4.3	176.5	2.9	202.6	0.3	100%
Parcel Count		**4**		**Number of parcels that are 100% high priority for protection**				**2**
Grand Total	672.3		74.0	412.7	118.3	510.3	162.2	76%
218.3				**Number of parcels that are 100% high priority for protection**				**49**
Parcel Count		**169**						

*This is the combined area for all high priority resources and was measured using GIS to account for resource overlap.

**Equals GIS parcel size minus area with high priority for protection.

Table 56: Lake Chelan National Recreation Area - Land Protection Analysis for Alternative B

(Field checking will be needed on a case by case basis to verify the accuracy of this data)

Private Tract no.	GIS Parcel Size Acres	High Priority Resources for Protection				High Priority for Protection Acres*	Low Priority for Protection Acres**	Parcel has 1.0 or More Acres with only Low Priority Resources	Percent of Parcel with High Priority for Protection
		Wetland Acres	High Flood Influence Acres	High Visual Sensitivity Acres	Riparian Acres				
01-100	22.5			7.3		7.3	15.2	yes	32%
01-101	6.5			0.9		0.9	5.6	yes	14%
01-102	6.1			2.7		2.7	3.4	yes	44%
01-103	31.5			7.0		7.0	24.5	yes	22%
02-102	1.4			1.4		1.4	0.0	no	100%
02-104	13.0	0.1		7.2		7.2	5.8	yes	56%
02-105	21.5			7.5		7.5	14.0	yes	35%
02-106	0.3			0.3		0.3	0.0	no	100%
03-100	38.8	10.0		29.4		29.4	9.4	yes	76%
03-108	0.1			0.1		0.1	0.0	no	100%
03-125	0.3	0.2		0.2		0.3	0.0	no	100%
03-131	0.1			0.1		0.1	0.0	no	100%
04-100	1.9	0.3	1.2	0.6	1.5	1.9	0.0	no	100%
04-101	2.1	0.1	1.1	0.5	1.8	2.1	0.0	no	100%
04-102	1.8	0.7	1.1	1.6	1.0	1.8	0.0	no	100%
04-103	5.0	1.4	2.6	1.9	3.6	5.0	0.0	no	100%
04-104	4.4	1.8	2.6	1.4	3.1	4.4	0.0	no	100%
04-105	0.4				0.3	0.4	0.0	no	100%
04-106	4.5	2.1	2.7	1.4	2.4	4.5	0.0	no	100%
04-108	0.6			0.6	0.3	0.6	0.0	no	100%
04-110	0.4		0.5	0.1	0.5	0.4	0.0	no	100%
04-112	3.9	3.2	3.9	3.3	1.4	3.9	0.0	no	100%
04-114	9.3	3.9	5.2	6.0	4.3	9.3	0.0	no	100%
04-116	11.7	8.1	11.1	7.6	6.6	11.7	0.0	no	100%
04-117	0.1			0.1	0.2	0.1	0.0	no	100%
04-120	0.7	0.2		0.5	0.2	0.7	0.0	no	100%
04-124	0.6	0.1		0.3		0.6	0.0	no	100%
04-127	0.2			0.2		0.2	0.0	no	100%
04-128	0.3			0.3		0.3	0.0	no	100%
04-130	0.3	0.1		0.3	0.0	0.3	0.0	no	100%
04-131	0.1			0.2	0.1	0.1	0.0	no	100%
04-136	0.1			0.1		0.1	0.0	no	100%
04-137	0.2			0.2	0.2	0.2	0.0	no	100%
04-139	0.7	0.2		0.6		0.7	0.0	no	100%
04-143	0.3			0.3	0.3	0.3	0.0	no	100%
04-144	0.3			0.2		0.3	0.0	no	100%
04-145	0.2			0.2		0.2	0.0		100%
04-147	0.2			0.2		0.2	0.0	no	100%
04-148	0.6	0.1		0.6		0.6	0.0	no	100%
04-149	0.2			0.2		0.2	0.0	no	100%
04-150	0.2	0.0		0.2		0.2	0.0	no	100%
04-153	0.2				0.2	0.2	0.0	no	100%
04-154	0.6	0.5		0.6		0.6	0.0	no	100%
04-155	0.3	0.1		0.3		0.3	0.0	no	100%
04-156	0.7	0.1		0.7		0.7	0.0	no	100%
04-157	0.6	0.1		0.5		0.6	0.0	no	100%
04-158	0.5	0.0		0.5		0.5	0.0	no	100%
04-162	0.5	0.1		0.6	0.1	0.5	0.0	no	100%

Table 56: Lake Chelan National Recreation Area - Land Protection Analysis for Alternative B

(Field checking will be needed on a case by case basis to verify the accuracy of this data)

Private Tract no.	GIS Parcel Size Acres	High Priority Resources for Protection				High Priority for Protection Acres*	Low Priority for Protection Acres**	Parcel has 1.0 or More Acres with only Low Priority Resources	Percent of Parcel with High Priority for Protection
		Wetland Acres	High Flood Influence Acres	High Visual Sensitivity Acres	Riparian Acres				
04-163	0.8	0.1		0.8		0.8	0.0	no	100%
04-164	0.2	0.1		0.2		0.2	0.0	no	100%
04-165	0.5	0.1		0.5	0.1	0.5	0.0	no	100%
04-166	0.7	0.4		0.6	0.1	0.7	0.0	no	100%
04-172	0.7	0.6		0.7	0.0	0.7	0.0	no	100%
04-173	1.0	0.0		0.9	0.1	1.0	0.0	no	100%
04-174	5.2	0.4	0.1	3.3	4.4	5.2	0.0	no	100%
04-177	0.5		0.1		0.1	0.5	0.0	no	100%
04-178	0.5				0.4	0.5	0.0	no	100%
04-179	1.2	0.4		1.1	0.2	1.2	0.0	no	100%
04-181	0.0				0.0	0.0	0.0	no	100%
04-184	0.5			0.5	0.2	0.5	0.0	no	100%
04-186	0.3	0.0		0.2	0.0	0.3	0.0	no	100%
04-187	0.4	0.3		0.4		0.4	0.0	no	100%
04-188	3.9	2.4		3.9	0.3	3.9	0.0	no	100%
04-189	0.2			0.2		0.2	0.0	no	100%
04-190	0.3				0.1	0.3	0.0	no	100%
04-191	0.4				0.1	0.4	0.0	no	100%
04-192	0.4				0.1	0.4	0.0	no	100%
04-193	1.1			0.1	0.4	1.1	0.0	no	100%
04-194	0.4				0.4	0.4	0.0	no	100%
04-195	0.4		().!		0.4	0.4	0,0	no	100%
04-196	0.4		0.0		0.4	0.4	0.0	no	100%
04-197	0.5				0.3	0.5	0.0	no	100%
04-198	0.4				0.2	0.4	0.0	no	100%
04-199	0.5				0.4	0.5	0.0	no	100%
05-102	1.7	0.6	0.7	1.7	0.0	1.7	0.0	no	100%
05-104	2.0			0.2		0.2	1.8	yes	10%
05-107	27.0	0.6	1.0	10.1	2.2	10.5	16.5	yes	39%
05-108	1.6	0.5	0.7	1.6	0.3	1.6	0.0	no	100%
05-109	0.7	0.2	0.4	0.7	0.1	0.7	0.0	no	100%
05-110	0.8	0.2	0.4	0.8	0.3	0.8	0.0	no	100%
05-111	0.7	0.2	0.4	0.7	0.3	0.7	0.0	no	100%
05-112	0.9	0.3	0.4	1.0	0.2	0.9	0.0	no	100%
05-113	0.7	0.3	0.4	0.7	0.3	0.7	0.0	no	100%
05-119	0.6			0.5		0.6	0.0	no	100%
05-120	0.7	0.3	0.4	0.7	0.3	0.7	0.0	no	100%
05-121	7.0			3.3	3.6	7.0	0.0	no	100%
05-124	0.2				0.1	0.2	0.0	no	100%
05-125	0.5			0.3		0.5	0.0	no	100%
05-126	0.8					0.8	0.0	no	100%
05-127	0.9					0.9	().()	no	100%
05-128	0.8				0.3	0.8	0.0	no	100%
05-130	0.4			0.4		0.4	0.0	no	100%
05-133	0.8					0.8	0.0	no	100%
05-135	28.0	3.2		18.0	5.0	18.0	10.0	yes	64%
05-136	0.2			0.2		0.2	0.0	no	100%
05-140	2.1	0.7	0.5	1.4	0.9	2.1	0.0	ilO	100%

Table 56: Lake Chelan National Recreation Area - Land Protection Analysis for Alternative B

(Field checking will be needed on a case by case basis to verify the accuracy of this data)

Private Tract no.	GIS Parcel Size Acres	High Priority Resources for Protection				High Priority for Protection Acres*	Low Priority for Protection Acres**	Parcel has 1.0 or More Acres with only Low Priority Resources	Percent of Parcel with High Priority for Protection
		Wetland Acres	High Flood Influence Acres	High Visual Sensitivity Acres	Riparian Acres				
05-141	2.2	0.7	0.7	1.2	1.1	2.2	0.0	no	100%
05-142	2.4	0.1	0.5	0.4	1.9	2.4	0.0	no	100%
05-144	0.3				0.3	0.3	0.0	no	100%
05-145	0.7			0.6		0.7	0.0	no	100%
05-147	0.4				0.2	0.4	0.0	no	100%
05-148	0.7			0.8	0.1	0.7	0.0	no	100%
05-150	0.9			0.7		0.9	0.0	no	100%
05-157	2.9			1.4		1.4	1.5	yes	50%
05-158	3.1			2.6	1.0	3.1	0.0	no	100%
05-159	1.3			1.0	0.2	1.3	0.0	no	100%
05-160	1.8			0.4	1.5	1.8	0.0	no	100%
06-102	4.3	0.2	1.1	0.6	4.2	4.3	0.0	no	100%
06-106	2.8		0.2	1.1	0.6	1.1	1.7	yes	39%
06-111	0.2				0.2	0.2	0.0	no	100%
06-113	0.2			0.0		0.2	0.0	no	100%
06-114	0.2	0.0		0.0	0.0	0.2	0.0	no	100%
06-116	1.0	0.4		0.4	0.7	1.0	0.0	no	100%
06-119	6.7	0.8		4.1	1.8	6.7	0.0	no	100%
06-120	0.3	0.1		0.1	0.2	0.3	0.0	no	100%
07-100	4.5					0.0	4.5	yes	0%
07-105	0.6	0.0	0.1	0.1	0.4	0.6	0.0	no	100%
07-107	1.1	0.8	1.1	1.1	0.4	1.1	0.0	no	100%
07-109	0.8		0.5	0.8	0.2	0.8	0.0	no	100%
07-110	0.8	0.0	0.1	0.7		0.8	0.0	no	100%
07-112	0.7		0.1	0.4	0.2	0.7	0.0	no	100%
07-114	4.1	0.0		3.5	0.8	4.1	0.0	no	100%
07-116	1.6	0.0	0.4	0.6	0.7	1.6	0.0	no	100%
07-121	0.4			0.1	0.3	0.4	0.0	no	100%
07-122	2.1	0.2			1.9	2.1	0.0	no	100%
07-124	1.0				1.0	1.0	0.0	no	100%
07-125	2.2	0.1	0.2		2.1	2.2	0.0	no	100%
07-127	2.2	0.4		1.7	1.2	2.2	0.0	no	100%
07-130	2.1			0.7	1.8	2.1	0.0	no	100%
07-131	0.9	0.4		0.8	0.3	0.9	0.0	no	100%
07-133	7.9	1.5	3.6	2.6	6.3	7.9	0.0	no	100%
07-138	2.2	0.3	0.0	0.0	1.4	2.2	0.0	no	100%
07-142	11.2	7.0	8.9	9.9	4.2	11.2	0.0	no	100%
07-145	0.8				0.4	0.8	0.0	no	100%
07-147	0.6	0.3		0.0	0.4	0.6	0.0	no	100%
07-149	0.5			0.3	0.3	0.5	0.0	no	100%
07-150	1.0			0.3	0.3	1.0	0.0	no	100%
07-153	0.8			0.2		0.8	0.0	no	100%
07-157	26.5	0.2	1.7	8.7		9.0	17.5	yes	34%
07-161	0.6		0.6	0.3	0.7	0.6	0.0	no	100%
07-166	0.4				0.3	0.4	0.0	no	100%
07-168	0.5				0.3	0.5	0.0	no	100%
07-172	1.3		1.0	0.4	1.2	1.3	0.0	no	100%
07-176	2.3	0.4	1.0	0.9	2.0	2.3	0.0	no	100%

Table 56: Lake Chelan National Recreation Area - Land Protection Analysis for Alternative B

(Field checking will be needed on a case by case basis to verify the accuracy of this data)

Private Tract no.	GIS Parcel Size Acres	High Priority Resources for Protection				High Priority for Protection Acres*	Low Priority for Protection Acres**	Parcel has 1.0 or More Acres with only Low Priority Resources	Percent of Parcel with High Priority for Protection
		Wetland Acres	High Flood Influence Acres	High Visual Sensitivity Acres	Riparian Acres				
07-177	0.6	0.1	0.5	**0.6**	0.3	0.6	0.0	no	100%
07-179	1.0			0.5	0.3	1.0	0.0	no	100%
07-184	0.9	0.3	0.9	0.9	0.6	0.9	0.0	**no**	100%
07-185	0.9		0.6	0.7	0.8	0.9	0.0	no	100%
07-186	3.5	0.7	1.7	2.6	3.0	3.5	0.0	no	100%
07-187	0.1				0.0	0.1	0.0	no	100%
07-188	0.5			0.2	0.2	0.5	0.0	no	100%
07-189	0.5				0.4	0.5	0.0	no	100%
07-190	0.4				0.2	0.4	0.0	no	100%
07-191	2.5	0.2		1.9	1.1	2.5	0.0	no	100%
07-192	1.4			0.7	0.8	1.4	0.0	no	100%
07-193	2.0			0.4	1.7	2.0	0.0	no	100%
07-194	2.2		0.1	0.8	1.8	2.2	0.0	**no**	100%
07-195	2.0		0.2	0.7	1.4	2.0	0.0	no	100%
07-196	2.0		0.2	0.1	2.0	2.0	0.0	no	100%
07-197	2.0		0.2	0.1	1.7	2.0	0.0	no	100%
07-198	2.0		0.2	0.0	1.8	2.0	0.0	no	100%
07-199	4.9	1.6	3.6	4.9	2.8	4.9	0.0	no	100%
07-200	1.6			0.4		0.4	1.2	yes	24%
07-201	2.9			0.8		0.8	2.1	yes	26%
08-101	24.0		**1.9**	17.0	0.2	17.0	7.0	yes	71%
Subtotal	469.4	62.9	69.6	236.2	115.3	327.8	141.7		70%
Parcel Count		**165**		**Number of parcels that are 100% high priority for protection**					**148**
CPUD Tract no.									
02-103	45.3	0.9		19.9		45.3	0.0	no	100%
03-133	149.2	148.6		148.9		149.2	0.0	no	100%
04-201	8.4	5.8	4.3	7.7	2.9	8.4	0.0	no	100%
05-117	0.0				0.0	0.0	0.0	no	100%
Subtotal	202.9	155.4	4.3	176.6	2.9	202.9	0.0		100%
Parcel Count		**4**		**Number of parcels that are 100% high priority for protection**					**4**
Grand Total	672.3	218.3	74.0	412.7	118.3	530.7	141.7		**79%**
Parcel Count		**169**		**Number of parcels that are 100% high priority for protection**					**152**

*This is the combined area for all high priority resources and was measured using GIS to account for resource overlap, and all parcels with less than one acre suitable for development.

**Equals GIS parcel size minus area with high priority for protection.

Table 57: Lake Chelan National Recreation Area - Land Protection Analysis for Alternative C
(Field checking will be needed on a case by case basis to verify the accuracy of this data)

Private Tract no.	GIS Parcel Size Acres	High Priority Resources for Protection: Wetland Acres	High Flood Influence Acres	High Visual Sensitivity Acres	High Priority for Protection Acres*	Low Priority For Protection Acres**	Percent of Parcel with High Priority for Protection
01-100	22.5			7.3	7.3	15.2	32%
01-101	6.5			0.9	0.9	5.6	14%
01-102	6.1			2.7	2.7	3.4	44%
01-103	31.5			7.0	7.0	24.5	22%
02-102	1.4			1.4	1.4	0.0	100%
02-104	13.0	0.1		7.2	7.2	5.8	56%
02-105	21.5			7.5	7.5	14.0	35%
02-106	0.3			0.3	0.3	0.0	100%
03-100	38.8	10.0		29.4	29.4	9.4	76%
03-108	0.1			0.1	0.1	0.0	100%
03-125	0.3	0.2		0.2	0.3	0.0	100%
03-131	0.1			0.1	0.1	0.0	100%
04-100	1.9	0.3	1.2	0.6	1.1	0.8	59%
04-101	2.1	0.1	1.1	0.5	1.0	1.1	49%
04-102	1.8	0.7	1.1	1.6	1.6	0.2	87%
04-103	5.0	1.4	2.6	1.9	3.0	2.0	60%
04-104	4.4	1.8	2.6	1.4	2.8	1.6	65%
04-105	0.4					0.4	0%
04-106	4.5	2.1	2.7	1.4	2.6	1.9	59%
04-108	0.6			0.6	0.6	0.0	100%
04-110	0.4		0.5	0.1	0.4	0.0	89%
04-112	3.9	3.2	3.9	3.3	3.9	0.0	100%
04-114	9.3	3.9	5.2	6.0	6.1	3.2	65%
04-116	11.7	8.1	11.1	7.6	11.7	0.0	100%
04-117	0.1			0.1	0.1	0.0	91%
04-120	0.7	0.2		0.5	0.6	0.1	84%
04-124	0.6	0.1		0.3	0.3	0.3	46%
04-127	0.2			0.2	0.2	0.0	86%
04-128	0.3			0.3	0.3	0.0	89%
04-130	0.3	0.1		0.3	0.3	0.0	100%
04-131	0.1			0.2	0.1	0.0	100%
04-136	0.1			0.1	0.1	0.0	100%
04-137	0.2			0.2	0.2	0.0	100%
04-139	0.7	0.2		0.6	0.6	0.1	89%
04-143	0.3			0.3	0.3	0.0	100%
04-144	0.3			0.2	0.2	0.1	78%
04-145	0.2			0.2	0.2	0.0	97%
04-147	0.2			0.2	0.2	0.0	85%
04-148	0.6	0.1		0.6	0.6	0.0	96%
04-149	0.2			0.2	0.2	0.0	100%
04-150	0.2	0.0		0.2	0.2	0.0	100%
04-153	0.2					0.2	0%
04-154	0.6	0.5		0.6	0.6	0.0	100%
04-155	0.3	0.1		0.3	0.3	0.0	100%
04-156	0.7	0.1		0.7	0.7	0.0	100%
04-157	0.6	0.1		0.5	0.5	0.1	93%
04-158	0.5	0.0		0.5	0.5	0.0	99%
04-162	0.5	0.1		0.6	0.5	0.0	100%

Table 57: Lake Chelan National Recreation Area - Land Protection Analysis for Alternative C
(Field checking will be needed on a case by case basis to verify the accuracy of this data)

Private Tract no.	GIS Parcel Size Acres	High Priority Resources for Protection			High Priority for Protection Acres*	Low Priority For Protection Acres**	Percent of Parcel with High Priority for Protection
		Wetland Acres	High Flood Influence Acres	High Visual Sensitivity Acres			
04-163	0.8	0.1		0.8	0.8	0.0	98%
04-164	0.2	0.1		0.2	0.2	0.0	100%
04-165	0.5	0.1		0.5	0.5	0.0	100%
04-166	0.7	0.4		0.6	0.6	0.1	94%
04-172	0.7	0.6		0.7	0.7	0.0	98%
04-173	1.0	0.0		0.9	0.9	0.1	92%
04-174	5.2	0.4	0.1	3.3	3.4	1.8	65%
04-177	0.5		0.1		0.1	0.4	20%
04-178	0.5					0.5	0%
04-179	1.2	0.4		1.1	1.1	0.1	92%
04-181	0.0					0.0	0%
04-184	0.5			0.5	0.5	0.0	100%
04-186	0.3	0.0		0.2	0.2	0.1	86%
04-187	0.4	0.3		0.4	0.4	0.0	95%
04-188	3.9	2.4		3.9	3.9	0.0	100%
04-189	0.2			0.2	0.2	0.0	88%
04-190	0.3					0.3	0%
04-191	0.4					0.4	0%
04-192	0.4					0.4	0%
04-193	1.1			0.1	0.1	1.0	7%
04-194	0.4					0.4	0%
04-195	0.4		0.1		0.1	0.3	23%
04-196	0.4		0.0		0.0	0.4	7%
04-197	0.5					0.5	0%
04-198	0.4					0.4	0%
04-199	0.5					0.5	0%
05-102	1.7	0.6	0.7	1.7	1.7	0.0	98%
05-104	2.0			0.2	0.2	1.8	10%
05-107	27.0	0.6	1.0	10.1	10.1	16.9	37%
05-108	1.6	0.5	0.7	1.6	1.6	0.0	100%
05-109	0.7	0.2	0.4	0.7	0.7	0.0	100%
05-110	0.8	0.2	0.4	0.8	0.8	0.0	100%
05-111	0.7	0.2	0.4	0.7	0.7	0.0	99%
05-112	0.9	0.3	0.4	1.0	0.9	0.0	100%
05-113	0.7	0.3	0.4	0.7	0.7	0.0	99%
05-119	0.6			0.5	0.5	0.1	85%
05-120	0.7	0.3	0.4	0.7	0.7	0.0	100%
05-121	7.0			3.3	3.3	3.7	47%
05-124	0.2					0.2	0%
05-125	0.5			0.3	0.3	0.2	67%
05-126	0.8					0.8	0%
05-127	0.9					0.9	0%
05-128	0.8					0.8	0%
05-130	0.4			0.4	0.4	0.0	97%
05-133	0.8					0.8	0%
05-135	28.0	3.2		18.0	18.0	10.0	64%
05-136	0.2			0.2	0.2	0.0	100%
05-140	2.1	0.7	0.5	1.4	1.4	0.7	67%

Table 57: Lake Chelan National Recreation Area - Land Protection Analysis for Alternative C
(Field checking will be needed on a case by case basis to verify the accuracy of this data)

Private Tract no.	GIS Parcel Size Acres	High Priority Resources for Protection: Wetland Acres	High Flood Influence Acres	High Visual Sensitivity Acres	High Priority for Protection Acres*	Low Priority For Protection Acres**	Percent of Parcel with High Priority for Protection
05-141	2.2	0.7	0.7	1.2	1.2	1.0	56%
05-142	2.4	0.1	0.5	0.4	0.7	1.7	29%
05-144	0.3					0.3	0%
05-145	0.7			0.6	0.6	0.1	81%
05-147	0.4					0.4	0%
05-148	0.7			0.8	0.7	0.0	100%
05-150	0.9			0.7	0.7	0.2	84%
05-157	2.9			1.4	1.4	1.5	50%
05-158	3.1			2.6	2.6	0.5	83%
05-159	1.3			1.0	1.0	0.3	78%
05-160	1.8			0.4	0.4	1.4	24%
06-102	4.3	0.2	1.1	0.6	1.5	2.8	35%
06-106	2.8		0.2	I.I	1.1	1.7	38%
06-111	0.2					0.2	0%
06-113	0.2			0.0	0.0	0.2	29%
06-114	0.2	0.0		0.0	0.1	0.1	59%
06-116	1.0	0.4		0.4	0.7	0.3	71%
06-119	6.7	0.8		4.1	4.9	1.8	73%
06-120	0.3	0.1		0.1	0.1	0.2	45%
07-100	4.5					4.5	0%
07-105	0.6	0.0	0.1	0.1	0.1	0.5	13%
07-107	1.1	0.8	1.1	1.1	1.1	0.0	100%
07-109	0.8		0.5	0.8	0.8	0.0	95%
07-110	0.8	0.0	0.1	0.7	0.7	0.1	90%
07-112	0.7		0.1	0.4	0.4	0.3	65%
07-114	4.1	0.0		3.5	3.5	0.6	84%
07-116	1.6	0.0	0.4	0.6	0.8	0.8	48%
07-121	0.4			0.1	0.1	0.3	19%
07-122	2.1	0.2			0.3	1.8	14%
07-124	1.0					1.0	0%
07-125	2.2	0.1	0.2		0.2	2.0	10%
07-127	2.2	0.4		1.7	1.7	0.5	77%
07-130	2.1			0.7	0.7	1.4	35%
07-131	0.9	0.4		0.8	0.8	0.1	98%
07-133	7.9	1.5	3.6	2.6	4.8	3.1	61%
07-138	2.2	0.3	0.0	0.0	0.2	2.0	11%
07-142	11.2	7.0	8.9	9.9	10.1	1!	90%
07-145	0.8					0.8	0%
07-147	0.6	0.3		0.0	0.2	0.4	35%
07-149	0.5			0.3	0.3	0.2	51%
07-150	1.0			0.3	0.3	0.7	32%
07-153	0.8			0.2	0.2	0.6	27%
07-157	26.5	0.2	1.7	8.7	9.0	17.5	34%
07-161	0.6		0.6	0.3	0.6	0.0	90%
07-166	0.4					0.4	0%
07-168	0.5					0.5	0%
07-172	1.3		1.0	0.4	1.0	0.3	80%
07-176	2.3	0.4	1.0	0.9	1.6	0.7	69%

Table 57: Lake Chelan National Recreation Area - Land Protection Analysis for Alternative C

(Field checking will be needed on a case by case basis to verify the accuracy of this data)

Private Tract no.	GIS Parcel Size Acres	High Priority Resources for Protection: Wetland Acres	High Flood Influence Acres	High Visual Sensitivity Acres	High Priority for Protection Acres*	Low Priority For Protection Acres**	Percent of Parcel with High Priority for Protection
07-177	0.6	0.1	0.5	0.6	0.6	0.0	100%
07-179	1.0			0.5	0.5	0.5	54%
07-184	0.9	0.3	0.9	0.9	0.9	0.0	100%
07-185	0.9		0.6	0.7	0.9	0.0	100%
07-186	3.5	0.7	1.7	2.6	2.8	0.7	82%
07-187	0.1					0.1	0%
07-188	0.5			0.2	0.2	0.3	40%
07-189	0.5					0.5	0%
07-190	0.4					0.4	0%
07-191	2.5	0.2		1.9	2.1	0.4	82%
07-192	1.4			0.7	0.7	0.7	52%
07-193	2.0			0.4	0.4	1.6	21%
07-194	2.2		0.1	0.8	0.8	1.4	38%
07-195	2.0		0.2	0.7	0.8	1.2	41%
07-196	2.0"		0.2	0.1	0.3	1.7	15%
07-197	2.0		0.2	0.1	0.2	1.8	13%
07-198	2.0		0.2	0.0	0.2	1.8	11%
07-199	4.9	1.6	3.6	4.9	4.9	0.0	100%
07-200	1.6			0.4	0.4	1.2	24%
07-201	2.9			0.8	0.8	2.1	26%
08-101	24.0		1.9	17.0	17.0	7.0	71%
Subtotal	469.4	62.9	69.6	236.2	255.1	214.9	54%
Parcel Count							
02-103	45.3	0.9		19.9	20.0	25.3	44%
03-133	149.2	148.6		148.9	148.9	0.3	100%
04-201	8.4	5.8	4.3	7.7	8.4	0.0	100%
05-117	0.0					0.0	0%
Subtotal	202.9	155.4	4.3	176.6	177.2	25.6	87%
Parcel Count		**4**	**Number of parcels that are 100% high priority for protection**				**1**
Grand Total	672.3	218.3	74.0	412.7	432.3	240.5	64%
Parcel Count		**169**	**Number of parcels that are 100% high priority for protection**				**35**

*This is the combined area for all high priority resources and was measured using GIS to account for resource overlap.

**Equals GIS parcel size minus area with high priority for protection.

APPENDIX E: FUTURE DEVELOPMENT AND ENERGY SCENARIOS

A. Future Development Scenarios

This section presents possible development scenarios that could occur under the alternatives based on certain assumptions. It includes the CIS methodology and assumptions for the scenarios, and maps showing future development areas. Three scenarios are presented — for the proposed action and alternative B, alternative C, and the no-action/minimum requirements alternative. Alternative A is not presented because of its assumption that all private lands would be acquired. These scenarios are limited to private lands.

In keeping with the general methodology (appendix D), it is assumed that the county would not grant variances to the development standards of the Chelan County Health District. Based on these standards, it is assumed that development would not occur within the 10-year floodplain (approximated in this analysis by the high flood influence area), nor on lands of 45% or greater slope. Additionally, minimum lot size is I acre. Health district standards do allow for development in the 100-year floodplain under certain soil conditions, and it is assumed development would occur in the 100-year floodplain under all alternatives.

The GIS analysis begins by isolating the private lands without resource coincidence, as described in appendix D, steps 3 and 5. These arc the private lands that do not contain any resource concerns for the particular alternative being analyzed. It is assumed that these lands are not acquired, or protected for their natural and cultural resource values with easements, and therefore open to possible future development. Then all lands of 45% or greater slope are removed from analysis. For the no-action/minimum requirements alternative, lands within the area of high flood hazard are also removed from analysis. Within this set of remaining lands, all parcel remnants of less than 1 contiguous acre are removed from analysis.

It is then assumed that all remaining private lands will be subdivided into 1-acre lots — the minimum size allowed by the county for development. It is also assumed that access would be provided to these parcels. Finally, it is assumed that each 1-acre lot would be developed with one residence.

Some of these assumptions probably underestimate possible future development — in reality, at least some variances would be granted by the county. Other assumptions, however, overestimate possible future development; for example, not all parcels would be subdivided. This analysis is therefore an approximation of future conditions. Since the assumptions, though, are the same across three alternatives, the analyses allow the comparison of future conditions under the differing alternatives. For this reason the analysis for the no-action alternative also subdivides parcels into 1-acre. lots instead of using the square root formula in the compatibility standards (NPS 1988a).

The number of lots subdivided from each parcel is the suitable land acreage divided by 1, rounded down to the nearest whole. If the suitable area of the parcel already has at least one structure on it, 1 is subtracted from this figure. For example, a 6.5-acre parcel contains 3.5 acres of suitable lands, and has a structure within these 3.5 acres. This would translate into 2 additional future residences (3.5 rounded to 3, minus 1).

The accompanying maps portray the areas of assumed future development under each alternative. In total, there an: 287 existing structures in the valley — including all buildings, from wood sheds to large NFS Structures, not including walls or fences; 194 of these structures are on private lands. Of the 287 structures, 129 are residences (either private or National Park Service). The number of residences is primarily based on the Residential Energy Use Survey conducted by the Chelan County PUD in 1989, as reported in Northwest Energy Services (1993). This survey reports 112 residential electrical accounts, and

it is assumed that each account represents one residence. In addition, there are at least 17 residences that are not on the electric grid, for a total of 129 residences.

The information presented below gives the number of future, single-family residences by alternative derived from the GTS analyses. These analyses do not include assumptions on multifamily dwellings, outbuildings, or commercial development. These figures are [hen added to the existing number of residences.

Summary of Future Development Scenarios by Alternative

	Prop. Action	No Action	Alt. B	Alt. C
Number of Future Residences Number of Existing Residences	85 142	100 142	103 142	85 142
Totals	227	242	245	227

No attempt is made to calculate the changes in the number of existing residences under each alternative. Some existing private residences would be removed after land acquisition, while some additional NPS residences would be built to replace existing housing (hat is now located in more resource-sensitive areas. These figures would vary under the different alternatives, and their estimation would involve many variables. For the sake of comparing future development scenarios, they remain constant here. However, NPS development areas are included on the maps.

B. Future Energy Scenarios

All of the analyses for the energy scenarios use a basic set of data and assumptions. The number of residences is based on the table in the above section of this appendix, and the NPS and concession housing sub-subsection of the "Stehekin Landing and Airport Development Concept Plans Elements" section of each alternative in the "Alternatives, Including the Proposed Action" chapter. Most of the assumptions use baseline information that includes the assumption of continuation of current and past mix of influencing factors (Northwest Energy Services, Inc. 1993). The private residential use is based on there being the same mix of types of residences as that currently in the Stehekin Valley. It is assumed that the ratio of year-round to seasonal use of new residences would be the same as current use. It is assumed that the ratio of propane to electric to firewood use to heat living space and water would be the same for new residences as current patterns. It is assumed is that the level of insulation in (he new housing would not be significantly higher than in existing houses. It is also assumed that the Chelan County PUD would upgrade the hydro plant to the full nameplate capacity and thus, that the diesel use for electricity generation would be consistent with this increased hydrocapacity.

Annual Energy Scenarios by Alternative

	Prop. Action	No-Action Alt.	Alt. A	Alt. B	Alt. C
Firewood (cords)	205	211	3	205	218
Fuel Oil (gal.)	67,445	85,935	800	69,980	111,397
Gasoline (gal.)	64,400	66,441	2,400	64,400	71,391
Propane (gal.)	29,633	33,108	5,266	30,193	62,698

Electrical Scenarios

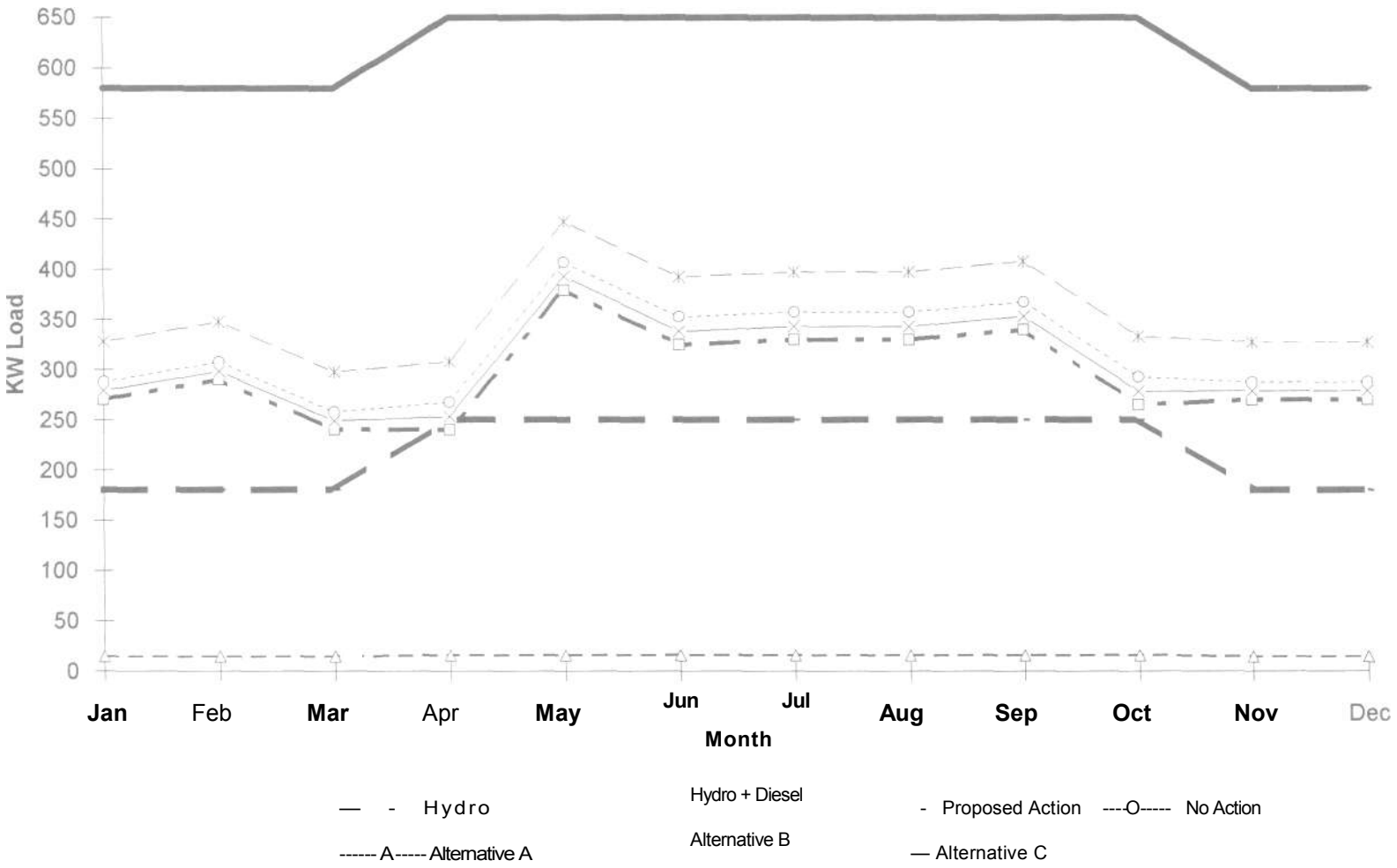


Figure p447: Proposed Action & Alt B Future Dev

449

Figure p449: No Action Alternative Future Dev

Figure p451: Alternative C Future Dev

APPENDIX F: LANDS CONSIDERED FOR EXCHANGE

The exchange of select public lands in the valley for private lands may be a viable method of resource protection. This appendix discusses this possibility and establishes assumptions for defining select public lands as potentially suitable for exchange. Its premise is that private lands with high resource value may be exchanged for public lands with lower resource value.

This discussion is limited to lands within the national recreation area. Although private lands in the valley could be exchanged for public lands outside the recreation area, this possibility is considered beyond the scope of this environmental impact statement. The National Park Service would work with the Bureau of Land Management and the General Services Administration to determine if federal lands outside the national recreation area would be available for exchange if landowners show interest on a willing seller/willing buyer basis.

Exchange possibilities are further limited to those lands that are currently public and that have been acquired since the establishment of Lake Chelan NRA in 1968. The secretary of the interior has the authority to exchange such lands for private holdings. Only Congress can authorize the exchange of private parcels for lands that have always been in public ownership. Lands acquired since 1968 total 1,382 acres and are called "acquired lands" here. All potential exchanges would be based on assessed value for value, not acre for acre.

POSSIBLE EXCHANGE LANDS UNDER THE PROPOSED ACTION, ALTERNATIVE B, AND ALTERNATIVE C

The first step in determining which acquired lands may be considered for exchange was a G1S analysis similar to that described in appendix D. All acreages that contain any of the five resources of concern or any of the three identified development constraints are considered unsuitable for exchange. These development constraints are slopes greater than 20%, sensitive soils, and geohazard areas. To minimize potential long-term management problems in the valley, acquired lands with these constraints would not be exchanged. Slopes greater than 20%, if developed, are possibly subject lo failure, would probably be visually intrusive, and could cause long-term erosion problems on adjacent federal lands. Sensitive soils are soils usually associated with wetlands, and if developed could be. sources of groundwater or surface water contamination. Geohazard areas are a selection of four classes from the geohazard GIS theme, which are considered particularly dangerous for the siting of developments. These classes are areas of rockfall, snow avalanche zones, debris cones, and terrace edges. Additional information on sensitive soils and geohazards is reported in the *Data Summary Booklet (NPS 1993a).*

Additionally, the Buckner Orchard National Historic District, designated wilderness lands, and lands needed for visitor facilities (at the Landing) were removed from exchange consideration.

These lands total 111 acres. Aggregates of these lands were then examined for further constraints. Lands west of the river and east of the airstrip were considered unsuitable for exchange due to the lack of road access. A road lo a large area at Weaver Point could not be constructed due to the area of designated wilderness between Devore and Margerum creeks. In general, aggregates were considered only if they could be accessed by existing roads, lands at the end of the Company Creek road are considered unsuitable for exchange due to the long-term difficulty of maintaining the Company Creek road. All lands of less than 1 contiguous acre were also removed from consideration.

Based on these reductions, there are five general areas that are best suited for possible exchanges — the vicinity of the lower field; the area between Little Boulder and Boulder creeks, including both sides of the road; the area east of the airstrip; the vicinity of the Stehekin Valley Ranch; and the area above

Rainbow Creek on the west side of the road. These lands were plotted as shown on the Proposed Action and Alternatives B and C, Possible Exchange Lands map. Their acreages follow:

	Acres
Vicinity of the lower field	21
Little Boulder/Boulder creeks	16
East of the airstrip	6
Vicinity of Stehekin Valley ranch	5
Above Rainbow Creek	2
Total	50

This 50 acres of acquired lands in the valley may be suitable for future land exchanges. These lands would need to be examined on the ground for the presence of high resource values requiring protection. Lands would be exchanged on a case-by-case basis, based on appraised land values, not based on a 1-acre to 1-acre exchange ratio. Because of the many unknowable variables involved in possible future land exchanges, this EIS does not attempt to assess the secondary impacts of theoretical exchanges.

POSSIBLE EXCHANGE LANDS UNDER THE NO-ACTION ALTERNATIVE

The 1988 *Land Protection Plan* identifies 13 parcels for possible exchange — totaling 94 acres of land (see the No-Action Alternative, Possible Exchange Lands map). A GIS analysis was completed to determine the acreages of resource concerns on these parcels (see below). If these parcels were exchanged, these resources could be affected.

	Acres
Wetlands	8
High Flood Influence Area	4
Floodplain	30
Riparian Communities	54
High Visual Sensitive Area	18

These resource figures are reported independent of each other, and therefore include overlap between resources. Of the total 94 acres, 23 acres contain no resources of concern and could therefore be made available for potential exchange in accordance with "Land Protection Plan Element" guidelines.

Figure p455 Prop Action_Alt B&C Land Exchange

457

Figure p457 No Action Alt Land Exchange

As part of its management and operational responsibilities at Lake Chelan National Recreation Area, the National Park Service maintains the Stehekin Valley road. When the National Park Service assumed this responsibility in 1971, it also committed to maintain the Company Creek road, which is a spur road located to the west of the Stehekin River. It connects with the Stehekin Valley road at the Harlequin Bridge. The lower portion of the Company Creek road provides access to NPS maintenance facilities, seasonal housing area, the Chelan County PUD generating plant, and the emergency airstrip. Tin[1] middle and upper portion of the road provides access to approximately 15 private residences.

While the National Park Service has the legal authority to maintain the Stehekin Valley road, Harlequin Bridge, and the access to these public areas, the authority of the National Park Service to maintain the middle and upper portions of the Company Creek road is less clear. This is because it is not totally in federal ownership.

The National Park Service ordinarily spends public maintenance dollars on roads that arc under federal control.

The National Park Service wants to continue its commitment of routine maintenance on the Company Creek road in good faith with the residents of the Stehekin Valley. Therefore, to to clarify the authority of the National Park Service, it is recommended that Congress amend the legislation establishing the Lake Chelan National Recreation Area to provide the National Park Service the authority to maintain the Company Creek road. Appropriate legislative language to this effect will be drafted and included in the legislative support data package that will be prepared after (he final GMP/EIS and Record of Decision are completed.

In the interim, the National Park Service proposes to continue to honor its long-standing commitment to maintain the road to the extent funding allows without major reconstruction and/or expenditure of funds.

PROPOSED ACTION

IMPORTANT: This estimate, based on minimal detail, includes a 20% increase for remote construction and a 5% contingency for undetermined appurtenances and design-related studies. This estimate is for FY95 Construction. Escalate costs for future years at 4% per year Every effort will be made to reduce costs.

Due to rounding of figures to nearest $1000, totals may appear to be incorrect by a value of 1 ($1000).

COSTS LISTED BELOW ARE IN THOUSANDS OF DOLLARS

DEVELOPMENT ITEM	GROSS CONSTR. COSTS	PLAN COSTS	TOTAL COSTS
VALLEYW1DE DEVELOPMENT			
Roads and Trails Development			
Bike trails (6 mi. connecting lower valley features)	1,188	227	1,415
New hike/equestrian trail (Landing to High Bridge)	962	184	1,146
Erosion control @ Company Cr. Rd.	528	101	629
Rehab, closed side roads	199	38	237
Road width reduction w/pullouts (Harlequin to 9 mile)	206	39	246
Reduce road width & Trailhead parking (9 mile to High Bridge	53	10	63
Trail (on old side roads)	74	14	88
Pedestrian suspension bridge	119	23	142
Paved road, car & bus parking (one-way loop at Landing)	513	98	610
Roads and Trails subtotal	3,843	733	4,576
Utilities Development			
Water system improvements/extensions	1,132	216	1,348
Sewerage system improvements/extensions	390	74	464
Power system improvements/extensions	726	139	865
Utilities subtotal	2,248	429	2,677
Other development			
NPS & Cone, permanent 3 bdrm. res. w/garage (7)	1,791	342	2,133
Campsites relocate/expansion (20 sites, Weaver Point)	99	19	118
NPS HQ or Contact Station @ Chelan	204	39	243
Restoration of vacated floodplain lands	358	68	426
Other development subtotal	2,452	468	2,920
VALLEYWIDE TOTAL	8,543	1,630	10,173
STEHEKIN LANDING DEVELOPMENT			
Restroom, shower, & laundry facil. (1000 SF)	185	35	220
Lodging relocated @ Landing	5,315	1,014	6,329
Housekeeping cabins (4 @ 600 SF ea.)	436	83	519
Bulkhead repair (30 ft. high, steel)	619	118	737
Upgrade/expand small boat moorage	248	47	295
Boat haul-out	220	42	261
Marine fuel dispensing/storage	83	16	98
Marine sanitary dump station	83	16	98

Upgrade/expand existing grocery/deli	165	32	197
Relocated post office	73	14	86
NPS HQ offices constructed @ existing Golden West	111	21	133
Commercial center (retail services)	79	15	94
Deck/gathering area			
Bicycle rental facility			
Enclosed contact/orientation facility			
Landing sitework w/picnic sites (8) & dock shelter	2,105	402	2,507
Bldg. demolition (7 bldgs. @ Avg. 24,000 CF)	97	19	116
Weaver campground anchoring for Purple Pt. dock	25	5	29
STEHEKIN LANDING TOTAL	9,842	1,878	11,720
DEVELOPMENT @ THE AIRSTRIP			
NPS & Cone, seasonal 2 bdrm. apts. (9)	936	179	1,114
NPS efficiency apts. (25)	2,352	449	2,801
NPS vehicle fuel storage/dispensing system	69	13	83
Facility/housing sitework & Helipad	2,307	440	2,747
NPS operations center			
Maintenance/enclosed storage	891	170	1.061
Recycling facility	396	76	472
Vehicle/equipment repair bays	357	68	425
Toxic materials storage	191	37	228
Fire cache w/search & rescue	238	45	283
DEVELOPMENT @ AIRSTRIP TOTAL	7,737	1,477	9,214
PROPOSED ACTION GRAND TOTALS	26,122	4,985	31,107

NO ACTION ALTERNATIVE

IMPORTANT: This estimate, based on minimal detail, includes a 20% increase for remote construction and a 5% contingency for undetermined appurtenances and design-related studies. This estimate is for FY95 Construction. Escalate costs for future years at 4% per year. Every effort will be made to reduce costs.

Due to rounding of figures to nearest $1000, totals may appear to be incorrect by a value of 1 ($1000).

COSTS LISTED BELOW ARE IN THOUSANDS OF DOLLARS

DEVELOPMENT ITEM	GROSS CONSTR. COSTS	PLAN COSTS	TOTAL COSTS
VALLEYWIDE DEVELOPMENT			
Roads and Trails Development Bike trails (6 mi. connecting lower valley features)	1,188	227	1,415
New hike/equestrian trail (Landing to High Bridge)	962	184	1,146
Roads and Trails subtotal	2,151	410	2,561
Other development			
Restoration of vacated floodplain lands	12	2	14
Other development subtotal			
VALLEYWIDE TOTAL	2,163	413	2,575
STEHEKIN LANDING DEVELOPMENT			
Picnic sites (8)	22	4	27
Expand present lodging facil. (15 units)	1,188	227	1,415
Bulkhead repair (30 ft. high, steel)	619	118	737
Upgrade/expand small boat moorage	99	19	118
Marine fuel dispensing/storage	83	16	98
Marine sanitary dump station	83	16	98
Landing sitework (25% of major development)	374	71	446
STEHEKIN LANDING TOTAL	2,468	471	2,939
NO ACTION ALT. GRAND TOTALS	4,631	884	5,515

ALTERNATIVE A

IMPORTANT: This estimate, based on minimal detail, includes a 20% increase for remote construction and a 5%contingency for undetermined appurtenances and design-related studies. This estimate is for FY95 Construction. Escalate costs for future years at 4% per year. Every effort will be made to reduce COSTS.

Due to rounding of figures to nearest $1000, totals may appear to be incorrect by a value of 1 ($1000).

COSTS LISTED BELOW ARE IN THOUSANDS OF DOLLARS

DEVELOPMENT ITEM	GROSS CONSTR. COSTS	PLAN COSTS	TOTAL COSTS
VALLEYWIDE DEVELOPMENT			
Roads and Trails Development			
Hiking trail (11 mi. on old roadbed)	545	104	649
Road obliteration (3.85 mi. Landing to Harlequin Bridge)	1,042	199	1,241
Convert road to trail (7 mi. Bridge Cr. to Cottonwood)	407	78	484
Rehab, closed road (entire Company Cr. road)	198	38	236
Rehab, closed side roads Trail (on old side roads)	397	76	473
Pedestrian suspension bridge	149	28	177
Paved road & car parking (at Landing)	119	23	142
	401	77	478
Roads and Trails subtotal	3,258	622	3,879
Other development			
NPS HQ or Contact Station @ Chelan	409	78	486
Restoration of vacated floodplain lands	901	172	1,072
Other development subtotal	1,309	250	1,559
VALLEYWIDE TOTAL	4,567	872	5,438
STEHEKIN LANDING DEVELOPMENT			
Picnic sites (8)	22	4	27
Dock improvements (existing 30 ft. high bulkhead)	330	63	393
Marine fuel dispensing/storage	83	16	98
Marine sanitary dump station	83	16	98
Upgrade/expand existing grocery/deli	66	13	79
Relocated post office	73	14	86
NPS HQ offices constructed @ existing Golden West	58	11	69
Landing sitework (25% of major development)	62	12	74
Rehabilitate shoreline (800 LF)	99	19	118
Wilderness store (1000 SF)	182	35	216
Bldg. demolition (24 bldgs. @ Avg. 24,000 CF)	333	64	396
NPS & Cone, permanent 3bdrm. res. w/garage (4)	1,023	195	1,219
NPS & Cone, seasonal 2 bdrm. apts. (5)	520	99	619
NPS efficiency apts. (16)	1,694	323	2,017
Maintenance - remodel existing bldg.	218	42	259
Land based fuel storage/dispensing	50	9	59
STEHEKIN LANDING TOTAL	**4,894**	934	5,827
ALT. A GRAND TOTALS	9,460	1,805	11,266

ALTERNATIVE B

IMPORTANT: This estimate, based on minimal detail, includes a 20% increase for remote construction and a 5% contingency for undetermined appurtenances and design-related studies. This estimate is for FY95 Construction. Escalate costs for future years at 4% per year. Every effort will be made to reduce COStS.

Due to rounding of figures to nearest $1000, totals may appear to be incorrect by a value of 1 ($1000).

COSTS LISTED BELOW ARE IN THOUSANDS OF DOLLARS

DEVELOPMENT ITEM	GROSS CONSTR. COSTS	PLAN COSTS	TOTAL COSTS
VALLEYWIDE DEVELOPMENT			
Roads and Trails Development			
Bike trails (6 mi. connecting lower valley features)	1,188	227	1,415
Convert road to trail (7 mi. Bridge Cr. to Cottonwood) Rehab,	407	78	484
closed road (900 LF of Company Cr. road) Gravel road	11	2	13
(relocated Company Cr. road) Road relocated out of	994	190	1,183
floodplain @ 8 mile (incl. old rd. oblit.) Rehab, closed side	447	85	533
roads	199	38	237
Road width reduction w/pullouts (Harlequin to 9 mile) Trail	206	39	246
(on old side roads) Pedestrian suspension bridge Paved	74	14	88
road, car & bus parking (one-way loop at Landing)	119	23	142
	513	98	610
Roads and Trails subtotal	4,158	794	4,952
Utilities Development			
Water system improvements/extensions	1,132	216	1,348
Sewerage system improvements/extensions	390	74	464
Power system improvements/extensions	726	139	865
Utilities subtotal	2,248	429	2,677
Other development			
NPS & Cone, permanent 3 bdrm. res. w/garage (7)	1,791	342	2,133
Restoration of vacated floodplain lands	320	61	381
Other development subtotal	2,110	403	2,513
VALLEYWIDE TOTAL	8,517	1,625	10,142
STEHEKIN LANDING DEVELOPMENT			
Lodging relocated @ Landing	5,315	1,014	6,329
Housekeeping cabins (5 @ 600 SF ea.)	545	104	649
Dock improvements (existing 30 ft. high bulkhead)	330	63	393
Upgrade/expand small boat moorage	124	24	147
Marine fuel dispensing/storage	83	16	98
Marine sanitary dump station	83	16	98
Upgrade/expand existing grocery/deli	165	32	197
Relocated post office	73	14	86
NPS HQ offices constructed @ existing Golden West	111	21	133
Commercial center (retail services)	125	24	149
Deck/gathering area			

Bicycle rental facility			
Enclosed contact/orientation facility			
Landing sitework w/picnic sites (8)	2,018	3385	2,403
Bldg. demolition (7 bldgs. @ Avg. 24,000 CF)	97	19	116
STEHEKIN LANDING TOTAL	9,068	1,731	10,798
DEVELOPMENT @ THE AIRSTRIP			
NPS & Cone, seasonal 2 bdrm. apts. (10)	1,040	198	1,238
NPS efficiency apts. (25)	2,352	449	2,801
NPS vehicle fuel storage/dispensing system	69	13	83
Facility/housing sitework (25% of major development)	2,315	442	2,757
NPS operations center			
Maintenance/enclosed storage	891	170	1,061
Recycling facility	396	76	472
Vehicle/equipment repair bays	357	68	425
Toxic materials storage	191	37	228
Fire cache w/search & rescue	238	45	283
Helipad, 6"concrete slab	24	5	29
DEVELOPMENT @ AIRSTRIP TOTAL	7,874	1,503	9,377
ALT. B GRAND TOTALS	25,458	4,858	30,317

ALTERNATIVE C

IMPORTANT: This estimate, based on minimal detail, includes a 20% increase for remote construction and a 5% contingency for undetermined appurtenances and design-related studies. This estimate is for FY95 Construction. Escalate costs for future years at 4% per year. Every effort will be made to reduce costs.

Due to rounding of figures to nearest $1000, totals may appear to be incorrect by a value of 1 ($1000).

COSTS LISTED BELOW ARE IN THOUSANDS OF DOLLARS

DEVELOPMENT ITEM	GROSS CONSTR. COSTS	PLAN COSTS	TOTAL COSTS
VALLEYWIDE DEVELOPMENT			
Roads and Trails Development			
Bike trails (6 mi. connecting lower valley features)	1,188	227	1,415
Rehab, closed road (600 LF of Company Cr. road)	8	1	9
Gravel road (relocated Company Cr. road)	639	122	761
Road width reduction w/pullouts (Harlequin to 9 mile)	206	39	246
Light vehicle bridges (2 over Battalion Cr.)	396	76	472
Pedestrian suspension bridge	119	23	142
Paved road, car & bus parking (one-way loop at Landing)	513	98	610
Roads and Trails subtotal	3,069	586	3,654
Utilities Development			
Water system improvements/extensions	2,162	413	2,575
Sewerage system improvements/extensions	855	163	1,018
Power system improvements/extensions	1,499	286	1,785
Utilities subtotal	4,516	862	5,378
Other development			
NPS & Cone, permanent 3 bdrm. res. w/garage (8)	2,047	391	2,437
NPS HQ or Contact Station @ Chelan	204	39	243
Sitework @ Rainbow Falls (25% of major development)	413	79	491
Restoration of vacated floodplain lands	217	41	258
Other development subtotal	2,880	550	3,430
VALLEYWIDE TOTAL	10,465	1,997	12,462
STEHEKIN LANDING DEVELOPMENT			
Restroom, shower, & laundry facil. (1000 SF)	231	44	275
Lodging relocated @ Rainbow Falls	5,315	1,014	6,329
Housekeeping cabins (5 @ 600 SF ea.)	545	104	649
Bulkhead repair (30 ft. high, steel)	1,032	197	1,229
Upgrade/expand small boat moorage	248	47	295
Marine fuel dispensing/storage	83	16	98
Marine sanitary dump station	83	16	98
Upgrade/expand existing grocery/deli Relocated post office	165	32	197
NPS HQ offices constructed @ existing Golden West	73	14	86
Commercial center (retail services)	111	21	133
Deck/gathering area	158	30	189

Bicycle rental facility			
Enclosed contact/orientation facility			
Landing sitework w/picnic sites (8) & dock shelter	2,023	386	2,409
Bldg. demolition (7 bldgs. @ Avg. 24,000 CF)	97	19	116
STEHEKIN LANDING TOTAL	10,163	1,939	12,102

DEVELOPMENT @ THE AIRSTRIP

NPS & Conc.seasonal 2 bdrm. apts. (9)	936	179	1,114
NPS efficiency apts. (25)	2,352	449	2,801
NPS vehicle fuel storage/dispensing system	69	13	83
Facility/housing sitework & Helipad	2,387	456	2,843
NPS operations center			
Maintenance/enclosed storage	891	170	1,061
Recycling facility	396	76	472
Vehicle/equipment repair bays	357	68	425
Toxic materials storage	191	37	228
Fire cache w/search & rescue	238	45	283
DEVELOPMENT @ AIRSTRIP TOTAL	**7,818**	**1,492**	**9,310**
ALT. C GRAND TOTALS	28,445	5,429	33,874

INTRODUCTION

Proposed Action

The general management plan's proposed action for Lake Chelan NKA would generally have beneficial effects on wetlands and natural river processes. Actions that would have beneficial impacts include restoring disturbed areas, closing some roads, acquiring interests in private lands for long-term resource protection, limiting river channel modifications, cooperative management with private landowners and other agencies, and carrying out pollution control measures. Potentially hazardous conditions associated with flooding would be substantially reduced by relocating most NPS buildings and facilities now located in the floodplain or geohazard areas and acquiring land interests in the floodplain. A total of 16 buildings and fuels or other toxic material sites al the maintenance areas would be relocated outside the regulatory floodplain. Campgrounds within the regulatory floodplain will be brought into compliance with the floodplain guidelines. Some campsites at the Harlequin campground that may be in high hazard areas would be relocated.

Two actions that must be located in the regulatory floodplain or wetlands and are not excepted under the guidelines are as follows:

1. The upper half of Company Creek road would be maintained in its current alignment to allow continued road and property uses (see appendix G). Three erosion control systems at two locations along the upper Company Creek road would be removed and replaced. The two locations arc on the outside bank of two meander loops where erosion rates are high and the road is particularly vulnerable. The structures would be designed to withstand frequently recurring flood events and would be made from rock, soil, and native vegetation.

2. The Stehekin airstrip would be operated by the Washington State Department of Transportation, Aeronautics Division, for public use under a special use permit. The permittee would keep the airstrip and the approaches equipped and maintained at current levels according to Washington State Department of Transportation existing standards for this type of airstrip.

Site Description

Upper Company Creek Road. The upper 1.3 miles of Company Creek road is located on the southwest side of the Stehekin River. The primary purpose of this road is to provide access to 34 private parcels. About 2.3 acres of road are within the 100-year floodplain, including 0.8 acre in the high flood influence area. The existing roadway crosses Battalion Creek and affects a small area of wetlands. The private parcels served by the road covers 33.7 acres in the 100-year floodplain, including 6.6 acres in the high flood influence area. There are 29 privately owned buildings (i.e., residences and outbuildings) within the 100-year floodplain, including three in the high flood influence area, On the other side of the river across from the project area, there are 10 private parcels covering 36 acres in the 100-year floodplain, including 12 acres in the high flood influence area. There are an additional eight buildings in the high flood influence area that are especially vulnerable to flooding.

Airstrip. The Stehekin Airstrip is located 4 miles from the landing and on the southwest side of the Stehekin River (see the Wetlands and Corresponding Vegetation Affected by the Stehekin Airstrip map). It was originally constructed in l960 primarily for emergency use with occasional use by residents. After I960, trees and shrubs in wetlands at the lower end of the runway were removed to improve clearance for aircraft landing and taking off. Since then, wetland vegetation has slowly recovered to more natural conditions. Today this wetland (5.5 acres) contains a diverse combination of vegetation and ponded water, unlike that found in any other wetlands in the Stehekin Valley. The dominant tall vegetation

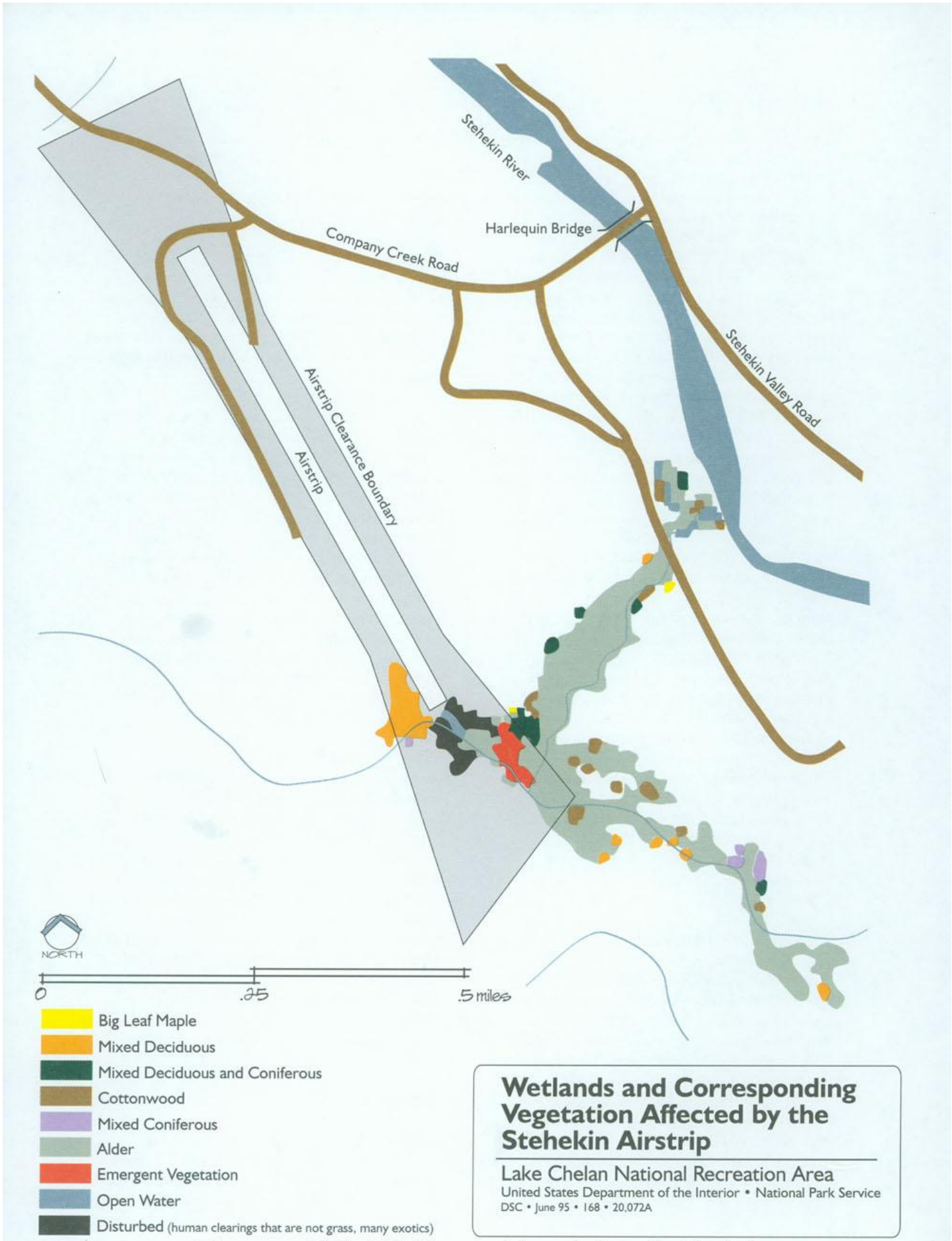


Figure p469: Wetlands Vegetaton & Airstrip

is red alder and bigleaf maple. This wetland is considered the best area in the valley for beavers. The Cascades frog *{Rana cascadae)* is found within riparian areas southeast of the airstrip and has been designated by the U.S. Fish and Wildlife Service as a "candidate species" for listing under the Endangered Species Act. Blackberry Creek flows through the area, and the lower reaches provide some of the best spawning habitat for salmonid species in the valley. Blackberry Creek would also provide suitable habitat for bull trout *(Salvelinus confluentus),* another "candidate species," if they were present. Because of the presence of beaver and other species, this is a favorite place for visitors to observe wildlife. The airstrip also affects about 9.8 acres in the 100-year floodplain in addition to the amount of wetland specified above.

JUSTIFICATION FOR USE OF FLOODPLAINS AND WETLANDS

Why the Proposed Action Must be Located in the Floodplain or Wetlands

The upper Company Creek road must be maintained in the 100-year floodplain in accordance with the GMP proposed action to provide vehicular access to private lands.

The airstrip must be maintained in the wetlands and 100-year floodplain in accordance with the GMP proposed action to allow the state to provide the public with wheeled-aircraft access to the national recreation area.

Investigation of Alternatives

Upper Company Creek Road. Four alternatives for the upper Company Creek road were considered. One alternative would be to acquire ail private land and close the road. This alternative offered the greatest beneficial impact on floodplains and wetlands.

A second alternative would be to reroute the road away from the active river erosion zone and the rehabilitate the existing roadway. A new road would be constructed along 0.9 mile of the floodplain west of the existing road and would cross wetlands and mature forest. Removal of the existing structure would create a flood and erosion hazard for property owners downstream.

The third alternative is similar to the second alternative except the reroute would be 1.1 miles long and would not affect wetlands and mature forest. Because of the steepness of the valley wall, it would be necessary to keep most of the new road within a regulatory floodplain of the Stehekin River.

The no-action alternative would be to continue emergency repairs to reopen the road following flood damage. This alternative is not suitable because the present erosion control structure is inadequate to protect the road **from** flood-caused erosion and is promoting bank erosion immediately downstream. Recent small magnitude (10- to 25-year recurrence interval) floods have caused considerable damage to the road. It is very likely that a large flood could wash away the existing structure, close the road and result in significant realignment of the river channel. Should the roadway erode during the next flood event, residents upvalley would have to park vehicles below the washout and walk 100-1,000 feet to their properties.

Airstrip. Closing the airstrip and restoring sensitive habitat to more natural conditions was the only other alternative considered. This alternative offered a greater beneficial impact on floodplains and wetlands than the proposed action. Relocating the airstrip to another site was rejected because there were no other areas in the valley suitable for development that were large enough to accommodate an airstrip. Modifying the existing airstrip to avoid the wetland of concern was also rejected because it would result in new major disturbances of important wildlife habitat and other wetlands and riparian areas near Company Creek.

FLOOD RISKS

Much of the upper Company Creek road and the private property it serves are located in the high flood influence area of the Stehekin River.

Stehekin River floods can occur three times a year. Summer floods occur during thunderstorms and associated intense rainfall. These floods usually affect areas less than 10 square miles- Due to the size of the Stehekin watershed (359 square miles), these floods affect tributary streams more than the Stehekin River.

Spring floods occur in May or June because of snowmelt The magnitude of these floods varies depending on winter snowpack and spring weather (rain, freezing level, temperature)- Since 1950 the average peak daily spring flood is 8,891 cubic feet per second (cfs). The maximum recorded spring flood was 18,900 cfs in May 1948. Floods on the Stehekin River can also occur in the late fall to early winter period. The Thanksgiving flood of November 1990 occurred because of a large magnitude precipitation event associated with unusually warm temperatures and a pre-existing heavy snowpack and low elevation. Predicted river velocity and maximum depth during a 100-year flood would be about 8-9 ft./sec. and 13 feet deep near the upper Company Creek road (NPS 1993b).

Within the floodplain of the Stehekin River, specific hazards are shallow, slow-moving water and erosion associated with faster moving water along flood channels. Next to the river channel within the floodplain is the high flood influence area. In this area the hazard during a 100-year event would be much greater than the floodplain because of rapid bank erosion, high sediment deposition, channel shifts, water velocities in excess of 3 feet per second and water depths greater than 6 feet. The 500-year floodplain is only slightly larger than the 100-year floodplain.

The airstrip is located in the fringe of the 100-year floodplain. Flood hazards here are . considered minimal.

IMPACTS

Upper Company Creek Road

The road protection structures on the upper Company Creek road would be replaced with a new control system along 2,200 feet of riverbank. The new system would use rock barbs protruding into the channel and bioengineering techniques to reestablish vegetation. The structure would not raise flood elevations significantly. Every effort would be taken to ensure that the new structure does not reroute flows in a manner that might cause more severe flooding or erosion downstream or across the river.

Airstrip

Maintenance of the airstrip would require the occasional cutting of tall vegetation within a wetland area covering 5.5 acres. This would not reduce the size of the wetland, but would adversely affect wetland functions. Cutting of wetland vegetation would cause losses of food, cover, and nesting sites used by dependent wildlife. More area of open water could be exposed to direct sunlight causing increased ultraviolet light exposure and evaporation and slightly increased temperatures. Reduced survival of early life stages of amphibians may be correlated to increased exposure to ultraviolet light. Water temperatures would probably not exceed optimal ranges. Wildlife would likely avoid the area during vegetation cutting activities. The majority of the tall vegetation, including red alder and bigleaf maple, would be expected to grow back quickly after being cut. Wildlife watchers who visit the area may also be adversely affected.

MODIFICATIONS TO MINIMIZE HARM

To reduce natural resource impacts and hazardous conditions associated with developing and occupying the Stehekin River floodplain, the National Park Service would give high priority to acquiring interests m most private lands located in the 100-year floodplain. Unless interests in private lands were acquired with owner's consent, flood hazards would be reduced by other agencies applying their floodplain and shoreline management programs. Also, the NPS compatibility standards for land uses would help discourage development and occupancy of the floodplain. All applicable state and

federal environmental permits would be obtained prior to construction of the river control system. Additional mitigation may be required by other agencies.

To help reduce the impacts of maintaining the wetlands at the lower end of the airstrip in an unnatural condition, the National Park Service would allow only minimal cutting of vegetation within wetlands as necessary to meet Washington State Department of Transportation standards for this type of airstrip. Wetland vegetation would not be removed, but it could be pruned by the Washington Department of Transportation, Aeronautics Division, under the permit and supervision of the National Park Service. Herbicide use would not be allowed. Cutting activities would not be allowed during the reproductive season of any wildlife species occupying the area. Wetland soils would likely be disturbed during wetland vegetation cutting activities. To offset the impacts, the National Park Service would restore about 26 acres of disturbed habitat in or immediately adjacent to wetlands to more natural conditions. A minimum of 7 acres of wetlands would be restored. This mitigation would occur prior to any wetland disturbance activities. Areas that would be restored include the NPS maintenance area, old borrow pits, and habitat within 200 feet of the Stehekin River and Lake Chelan shoreline. Although habitat restoration could not duplicate the affected wetland, restored habitat could potentially support many of the affected wildlife species. Any soil disturbance caused by vegetation management activities would be mitigated to prevent runoff carrying sediment from disturbed areas to wetlands and Blackberry Creek. Additional mitigation may be required by the Army Corps of Engineers and the Washington Department of Ecology to ensure that wetland manipulation activities comply with the federal Clean Water Act.

SUMMARY

The general management plan's proposed action would substantially reduce potentially hazardous conditions associated with flooding by relocating most NPS buildings and facilities now located in floodplain and geohazard areas and acquiring private land interests. However, the maintenance and repair of the upper Company Creek road could indirectly support continued development and occupancy of private property located in the Stehekin River floodplain. In addition, the new river control system could reroute river flows resulting in adverse impacts on private properties along the river.

The proposed action generally would have beneficial impacts on wetlands, including restoring a minimum of 7 acres of wetlands. However, 5.5 acres of wetlands at the lower end of the airstrip would be maintained in an unnatural condition.

Recommended: Keith B. Dunbar
Chief of compliance, Pacific Northwest Region

5-10-95
Date

Concurred: Dan B. Kimball

5-5-95
Date

Chief, Division of Water Resources, Washington Office

William C. Walters

5/17/95
Date

Regional Director, Pacific Northwest Region

APPENDIX J: CALCULATIONS FOR AIR QUALITY ANALYSIS

Combustion Emission Factors

Combustion Appliance	Fuel	Particulate Matter	Carbon Monoxide	Volatile Organic* Sulfur Oxides	Nitrogen Oxides	Hydrocarbons Non-Methane	Hydrocarbons Methane
Woodburning units							
Conventional stove	Firewood	29.8	230.8	0.4	2.8	28.0	64.0
Non catalytic stove	Firewood	18.6	140.8	0.4	nd	nd	nd
Catalytic stove/insert	Firewood	19.4	**104.8**	0.4	2.0	17.2	26.0
Fireplaces	Firewood	21.6	122.2	0.4	1.8	26.0	nd
Heating and Other	Fuel Oil	2.5	5.0	144S	**18.0**	0.7	1.8
Internal Comb. Engine	Diesel (fuel oil)	33.5	102.0	31.2	**469.0**	37.5	nd
Internal Comb. Engine	Gasoline	nd	73.3	nd	6.8	12.9	nd
Various Heaters	Propane	0.4	**1.8**	0.2	**1.8**	0.5	0.2

notes: 1. for firewood, units are pounds per ton of dry wood burned

2. all other emissions are pounds per 100 gallons

3. S indicates that weight percent of sulfur should be multiplied by the given value.

4. Gasoline emissions based on an average vehicle age of 8 years, with consumption of 13.6 miles per gallon, and estimated annual mileage of 8,000 miles for private sector vehicles, and 6500 miles for NPS vehicles

5. nd - indicates no data available

Data Source: Lake Chelan NRA Transportation Inventory and Data Collection Report, Robert Peccia and Associates, January 1992

Exhibits 8a,b,c in this study were updated on 1/25/94

Estimated Annual Quantities (pounds) of Emissions from Energy Consumption in Lake Chelan NRA — Existing Conditions

Combustion Appliance	Fuel	Existing Use Cords	Existing Use Tons or Gallons	Particulate Matter	Carbon Monoxide	Volatile Organics Sulfur Oxides	Volatile Organics Nitrogen Oxides	Volatile Organics Hydrocarbons Non-Methane	Volatile Organics Hydrocarbons Methane	Total	Percent of Total
Conventional stove	Firewood	**117**	254	7,569	58,623	102	711	**7,112**	16,256		
Noncatalytic stove	Firewood	**24**	53	986	7,462	21					
Catalytic stove/insert	Firewood	16	35	679	3,668	**14**	70	602	910		
Fireplaces	Firewood	**12**	**26**	565	**3,197**	10	47	680			
	Firewood Total	**169**	**368**	**9,799**	**72,950**	**147**	**828**	**8,394**	**17,166**	109,285	85 **7%**
Heating and Other	Fuel Oil		55	0	0	0	1	0	**0**		
Vehicles/Equipment	Fuel Oil		4,500	151	459	140	2,111	169	**0**		
Electric Generation	Fuel Oil		16,300	546	1,663	509	7,645	611	**0**		
	Fuel Oil Total		**20,855**	697	**2,122**	**649**	**9,756**	**780**	**0**	14,004	**11 0%**
Internal Comb. Engine	Gasoline		44,746		3,280		304	579		**4,163**	**3.3%**
Heating and Other	Propane		17,200	8	31	3	31	8	**4**	85	**0.1%**
	Grand Total			10,504		*Wm*	10,920	9,761	**17,170**	;:127£J7	
	Percent of Total			8.2%	**61.5%**	0.6%	**8.6V.**	**7.7%**	**13.5%**		

Predicted Annual Quantities (pounds) of Emissions from Energy Consumption in Lake Chelan NRA - Proposed Action and Alternative B

Combustion Appliance	Fuel	Existing Use Cords	Existing Use Tons or Gallons	Particulate Matter	Carbon Monoxide	Volatile Organics Sulfur Oxides	Volatile Organics Nitrogen Oxides	Volatile Organics Hydrocarbons Non-Methane	Volatile Organics Hydrocarbons Methane	Total	Percent of Total
Conventional stove	Firewood		0 0 205	0 0 8,670 0 '	0 0	**0 0**	**0**	0			
Noncatalytic stove	Firewood		447 0 **205**	8,670	46,835 0	179 **0**	894 **0**	7,687 0	0 11,619		
Catalytic stove/insert	Firewood		**447**		46,835	**179**	**894**	**7,687**			
Fireplaces	Firewood								**11,619**		
	Firewood Total									75,884	59 6%
Heating and Other	Fuel Oil Fuel Oil		107	0 151	1 459	0 140	2 2,111	0 169	oo		
Vehicles/Equipment	Diesel (fuel oil)		4,500	2,105	6,410	1,961	29,476	2,357	oo		
Electric Generation	**Fuel Oil Total**		62,848	2,256	6,870	**2,101**	**31,588**	2,526			
			67,455								35.6%
Internal Comb. Engine	Gasoline		64,400	13	4,721 53	5	438	833 14	7	5,992	4.7% 0
Heating and Other	Propane		29,633				53			**146**	**1%**
	Grand Total			**10,939**	**58,479**	2,286	**32,973**	**11,059**	**11,627**	127,363	
	Percent of Total			**8.6%**	**45.9%**	**1.8%**	**25.9%**	**8.7%**	**9.1%**		
Change from Existing Conditions %				436	**-25.4%**	**185.9%**	22,053	1,298	(5,544) -	(174) -	
Change from Existing Conditions				4.1%			202.0%	13.3%	32.3%	0.1%	

Predicted Annual Quantities (pounds) of Emissions from Energy Consumption in Lake Chelan NRA - No Action Alternative

Combustion Appliance	Fuel	Existing Use		Volatile Organics							
								Hydrocarbons			
		Cords	Tons or Gallons	Particulate Matter	Carbon Monoxide	Sulfur Oxides	Nitrogen Oxides	Non-Methane	Methane	Total	Percent of Total
Conventional stove	Firewood		0 0 211	0 0	0 0	0 0	0	0			
Noncatalytic stove	Firewood		460 0 211	8,924 0	48,206 0	184 0	920 0	7,912 0	0 11,959		
Catalytic stove/insert	Firewood		460	8,924	48,206	184	920	7,912			
Fireplaces	Firewood								11,959		
	Firewood Total									78,105	54.9%
Heating and Other	Fuel Oil Fuel Oil		111	0 151	1 459	0 140	2 2,111	0 169	0 0		
Vehicles/Equipment	Diesel (fuel oil)		4,500	2,724	8,295	2,537	38,141	3,050	0 0		
Electric Generation	**Fuel Oil Total**		81,324	2,875	8,755	2,678	40,253	3,218			
			85.935							57,780	40.6%
Internal Comb. Engine	Gasoline		66,441	15	4,870	6	452	860 16	8	163	4.3%
Heating and Other	Propane		33 108		60		60				0.1%
	Grand Total			11,814	61,890	2,868	41,685	12,005	11,968	142,229	
	Percent of Total			8.3%	43.5%	2.0%	29.3%	8.4%	8.4%		
Change from Existing Conditions %				U1 0	-21.0%	258.7%	281.7%	2,244	(5,203)	11.5%	
Change from Existing Conditions				12.5%				23.0%	-30.3%		

Predicted Annual Qua titities (pounds) of Emissions **from** Energy **Consumption in** Lake **Chelan** NRA - **Alternative A**

Combustion Appliance	Fuel	Existing Use		Volatile Organics							
								Hydrocarbons			
		Cords	Tons or Gallons	Particulate Matter	Carbon Monoxide	Sulfur Oxides	Nitrogen Oxides	Non-Methane	Methane	Total	Percent
Conventional stove	Firewood		0 0 3	0 0	0 0	0 0	0	0			
Noncatalytic stove	Firewood		7 0 3	127 0	685 0	3 0	130	112 0	0 170		
Catalytic stove/insert	Firewood		7	127	685	3	13	112			
Fireplaces	Firewood								170		
	Firewood Total									1,110	58.5%
Heating and Other	Fuel Oil Fuel Oil		0 800	0 27	0 82	0 25	0 375	0 30	0 0		28.4%
Vehicles/Equipment	Diesel (fuel oil)		0 800	0 27	0 82	0 25	0	0 30	0 0		
Electric Generation	**Fuel Oil Total**						375				
Internal Comb. Engine	Gasoline		2,400	2	176 9	1	169	31	1	223	11.8%
Heating and Other	Propane		5,266					2		26	1.4%
	Grand Total			156	952	29	414	176	171	1,899	
	Percent of Total			8.2%	50.2%	1.5%	21.8%	9.3%	9.0%		
Change from Existing Conditions %				(10,348) -	(77,431) -	-96.4%	::x(10,SP6):	(9,585) -	(16,999);:	(12^639)	
Change from Existing Conditions				98.5%	98.8%		-96.2%	98.2%	-99.0%	-98.5%	

Predicted Annual Quantities (pounds) **of** Emissions **from Energy Consumption in Lake Chelan** NRA **— Alternative C**

Combustion Appliance	Fuel	Existing Use		Volatile Organics							
								Hydrocarbons			
		Cords	Tons or Gallons	Particulate Matter	Carbon Monoxide	Sulfur Oxides	Nitrogen Oxides	Non-Methane	Methane	Total	iPerCertt of Total
Conventional stove	Firewood		0 0 218	0 0	0 0	0 0	0	0			
Noncatalytic stove	Firewood		475 0 218	9,220 0	49,805 '	190 0	950 0	8,174 0	0 12,356		
Catalytic stove/insert	Firewood		475	9,220	0 49,805	190	950	8,174			
Fireplaces	Firewood								12,356		
	Firewood **Total**									80,696	49.6%
Heating and Other	Fuel Oil Fuel Oil		116 4,500	0 151	459	0 140	2 2,111	0 169	0 0	74,884	46.1%
Vehicles/Equipment	Diesel (fuel oil)		106,731	3,575	10,887	3,330	50,057	4,002	0 0		
Electric Generation	**Fuel Oil** Total		111,347	3,727	11,346	3,471	52,169	4,171			
Internal Comb. Engine	Gasoline		71,391	28	5,233	11	485	924	15	6,642	4,1%
Heating and Other	Propane		62.698		113		113	29		309	0.2%
	Grand Total			12,974	66,497	3,672	53,718	13,298	12,371	162,531	
	Percent of Total			8.0%	40.9%	2.3%	33.1%	8.2%	7.6%		
Change from Existing Conditions %				M70	(11,886) -	2,872	391.9%	3,537	(4,799)	34,994	
Change from Existing Conditions				23.5%	152%	359.3%		36.2%	-27.9%	27.4%	

Data source: Lake Chelan NRA Socioeconomic Inventory, Dec. 1992 and Lake Chelan NRA Socioeconomic Study: Environmental Consequences of the NPS-GMP, Reed Hansen and Associates; Lake Chelan NRA Transportation Inventory and Data Collection Report, Robert Peccia and Associates, January 1992

Predicted Annual Quantities (pounds) of Emissions from Energy Consumption in Lake Chelan NRA — No Action Alternative

Combustion Appliance	Fuel	Existing Use Cords	Existing Use Tons or Gallons	Particulate Matter	Carbon Monoxide	Volatile Organics: Hydrocarbons: Sulfur Oxides	Volatile Organics: Hydrocarbons: Nitrogen Oxides	Volatile Organics: Hydrocarbons: Non-Methane	Volatile Organics: Hydrocarbons: Methane	Total	Percent of Total
Conventional stove	Firewood		0 0 211	0 0	0 0	0 0	0	0			
Noncatalytic stove	Firewood		460 0 211	8,924 0	48,206 0	184 0	920 0	7,912 0	0 11,959		
Catalytic stove/insert	Firewood		460	8,924	48,206	184	920	7,912			
Fireplaces	Firewood								11,959		
	Firewood Total									78,105	54.9%
Heating and Other	Fuel Oil Fuel Oil		111	0 151	1 459	0 140	2 2,111	0 169	0 0		
Vehicles/Equipment	Diesel (fuel oil)		4,500	2,724	8,295	2,537	38,141	3,050	0 0		
Electric Generation	Fuel Oil Total		81,324	2,875	8,755	2,678	40,253	3,218			
			85.935							: 57,780	40.6%
Internal Comb. Engine	Gasoline		66,441	15	4,870	6	452	860 16	8	**6,182**	4.3%
Heating and Other	Propane		33.108		60		60			163	0.1%
	Grand Total			11,814	61,890	2,868	41,685	12,005	11,968	142,229	
	Percent of Total			8.3%	43.5%	2.0%	29.3%	8.4%	8.4%		
Change from Existing (onditions %				U10	(16,493) -	2,068	**3(^765**	2>244	**(S.203)**	11.5%	
Change from Existing Conditions				**12.5%**	21.0%	258.7%	281.7%	**23.0%**	-30.3%		

		Existing Use		Volatile Organics: Hydrocarbons							
		Cords	Tons or Gallons	Particulate Matter	Carbon Monoxide	Sulfur Oxides	Nitrogen Oxides	Non-Methane	Methane		Percent of Total
Conventional stove	Firewood		0 0 3	0 0	0 0	0 0	0	0			
Noncatalytic stove	Firewood		7 0 3	127 0	685 0	3 0	130	112 0	0 170		
Catalytic stove/insert	Firewood		7	127	685	3	13	112			
Fireplaces	Firewood								170		
	Firewood Total									1,110	58.5%
Heating and Other	Fuel Oil Fuel Oil		0 800	0 27	0 82	0 25	0 375	0 30	0 0		28.4%
Vehicles/Equipment	Diesel (fuel oil)		0 800	0 27	0 82	0 25	0	0 30	0 0		
Electric Generation	Fuel Oil Total						375				
Internal Comb. Engine	Gasoline		2,400	2	176 9	1	169	312	1	223	11.8%
Heating and Other	Propane		5,266							26	1.4%
	Grand Total			156	952	29	414	176	171	1,899	
	Percent of Total			8.2%	50.2%	1.5%	21.8%	9.3%	9.0%		
Change from Existing Conditions %				(10,348) -	(77,431) -	***-96 4%***	: (10,506)	(9,585) -	(16,999) -	(12* 639)	
Change from Existing Conditions				98.5%	98.8%		-96.2%	98.2%	99.0%	-98.5%	

Predicted Annual Quantities (pounds) of Emissions from Energy Consump

Predicted Annual Quantities (pounds) of Emissions from Energy Consumption in Lake Chelan NRA -- Alternative C

		Existing Use Cords	Existing Use Tons or Gallons	Particulate Matter	Carbon Monoxide	Volatile Organics: Hydrocarbons: Sulfur Oxides	Volatile Organics: Hydrocarbons: Nitrogen Oxides	Volatile Organics: Hydrocarbons: Non-Methane	Volatile Organics: Hydrocarbons: Methane	Total	Percent bfTbtai
Conventional stove	Firewood		0 0 218	0 0	0 0	0 0	0	0			
Noncatalytic stove	Firewood		475 0 218	9,220 0	49,805 "	190 0	950 0	8,174 0	0 12,356		
Catalytic stove/insert	Firewood		475	9,220	0 49,805	190	950	8,174			
Fireplaces	Firewood								12,356		
	Firewood Total									80,696	49.6%
Heating and Other	Fuel Oil Fuel Oil		116 4,500	0 151	459	0 140	2 2,111	0 169	o o	74,884	46 1%
Vehic l es/Equipment	Diesel (fuel oil)		106,731	3,575	10,887	3,330	50,057	4,002	o o		
Electric Generation	Fuel Oil Total		111,347	3,727	11,346	3,471	52,169	4,171			
Internal Comb. Engine	Gasoline		71,391	28	5,233	11	485	924	15	6,642	4,1%
Heating and Other	Propane		62,698		113		113	29		309	0.2%
	Grand Total			12,974	66,497	3,672	53,718	13,298	12,371	162,531	
	Percent of Total			8.0%	40.9%	2.3%	33.1%	8.2%	7.6%		
Change from Existing Conditions %				**23.5%**	(11,886) -	359.3%	42,799	3,537	(4,799)	34,994	
Change from Existing Conditions					15.2%		391.9%	36.2%	-27.9%	27.4%	

Data source: Lake Chelan NRA Socioeconomic Inventory, Dec. 1992 and Lake Chelan NRA Socioeconomic Study: Environmental Consequences of the NPS-GMP, Reed Hansen and Associates; Lake Chelan NRA Transportation Inventory and Data Collection Report, Robert Peccia and Associates, January 1992

APPENDIX K: FUTURE TRANSPORTATION SCENARIOS FOR YEAR 2007

VISITOR ARRIVALS BY MODE

	Existing 1991-92	**Proposed Action**		**No Action**		**Alternative A**		**Alternative B**		**Alternative C**	
	Number	**Number**	**% Change**	**Number**	**% Change**	**Number**	**% Change**	**Number**	**% Change**	**Number**	**% Change**
Commercial Boat Passengers	23,362	33,660	44.1	30,530	30.7	22,154	**-5.2**	33,660	**44.1**	52,128	123.1
Commercial Air Passengers	3,143	4,107	30.7	4,107	30.7	2,913	**-7.3**	4,107	**30.7**	4,107	30.7
Private Boat Passengers	16,316	22,780	39.6	21,322	30.7	15,120	**-7.3**	22,780	39.6	33,920	107.9
Private Airplane Passengers	417	585	40.0	545	30.7	0	-	0	-	0	-
Visitors Hiking In	312	436		408		289		436		649	
Total Visitor Arrivals	43,550	60,983	40.0 r	56,912	30.7	40,476	**-7.1**	60,983	40.0	90,804	108.5

SOURCE: Lake Chelan National Recreation Area Baseline Socio-economic Inventory, December 1992, and Lake Chelan National Recreation Area Socio-Economic Study: Environmental Consequences of the NPS-GMP, November 1993, Reed Hanson and Associates.

LODGING , TRANSPORTATION, AND POPULATION FORECASTS

	Existing 1991-92	Proposed Action		No Action		Alternative A		Alternative B		Alternative C	
	Number	Number	% Change	Number	% Change	Number	% Change	Number	% Change	Number	% Change
Overnight Lodging	150	209	39.3	196	30.6	40	-73.3	209	39.3	311	107.3
Average Daily Traffic on Valley Road[1]	*185	250	36.0	240	30.0	110 reduced to 0 ulti-mately	-40.0	245	33.0	360	96.0
Public Parking in Landing Area	44	59	4.0	57	29.7	37 or less	-16.0	59	33.0	82	85.6
Shuttle - one-way trip	*7,704	10,760	39.7	10,074	30.8	0		10,760	39.7	16,017	107.9
Year-Round Population	100	122	22.0	114	14.0	70	-30.0	122	22.0	160	60.0
Seasonal Population	300 •1991 data	399	33.0	389	29.7	252 or less	-16.0	399	33.0	557	85.6

1. Vehicles per day observed on August 7-12,1991, at mile 4 near Harlequin Bridge on Stehekin Valley road. Forecasts for traffic volumes prepared by the Branch of Transportation, January 1994.
2. Twenty-two of these spaces have a 14-day limit for parking; the remainder of the 44 spaces are for public day use parking only. Forecasts for parking prepared by the Branch of Transportation, January 1994.

SOURCE: Lake Chelan National Recreation Area Baseline Socio-economic Inventory, December 1992, and Lake Chelan National Recreation Area Socio-Economic Study: Environmental Consequences of the NPS-GMP, November 1993, Reed Hanson and Associates; Lake Chelan National Recreation Area Transportation Inventory and Data Collection Report, Robert Peccia and Associates, January 1992.

BIBLIOGRAPHY

Air Resource Specialist, Inc.
1993 *Visibility Monitoring and Data Analysis Report for the Lake Chelan National Recreation Area, Washington.* Prep, for North Cascades National Park.

Almack, J.A., W.L. Gaines, P.H. Morrison, J.R. Eby, R.H. Naney, G.F. Wooten, S.H. Fitkin, and E.R. Garcia
1993 *North Cascades Grizzly Bear Ecosystem Evaluation.* Final report. Interagency Grizzly Bear Committee, Denver, CO.

Aubry, Keith B., and Douglas B. Houston
1992 "Distribution and Status of the Fisher *(Martes Pennanti)* in Washington." *Northwestern Naturalist* 73: 69-79.

Bader, Mike, Steve Kelly, and Keith Hammer
1993 "The Decline of the Bull Trout and the Future of the West." *Forest Watch* 13(10): 15-18.

Beck, R.W.. and Associates
1983 *Lake Chelan 208 Study Water Quality Management Plan. Phase I: Water Quality Investigation.* Prep, for Chelan County Board of Commissioners.

Behnke, Robert J.
1979 *Monograph of the Native Trouts of the Genus* Salmo *of Western North America.* Prep, for the U.S. Fish and Wildlife Service, Washington, D.C.

Bent, Arthur Cleveland
1961 *Life Histories of North American Birds of Prey,* New York: Dover Publications.

Brown, Larry G.
1984 *Lake Chelan Fishery Investigations,* Washington Department of Game.

Buchanan, Joseph B., Larry L. Irwin and Edwin L. McCutchen
1993 "Characteristics of Spotted Owl Nest Trees in the Wenatchee National Forest." *The Journal of Raptor Research* 27(1): 1-7.

Bull, Evelyn L., and Howard D. Cooper
1991 "Vaux's Swift Nests in Hollow Trees.' *Western Birds* 22: 85-91.

Bull, Evelyn L., and Michael Snider
1993 "Master Carpenter —■ Species Profile: Pileated Woodpecker." *Wildbird* (February 1993).

Byrd, Robert, ed.
1972 *Lake Chelan in the 1890's: 1891 Steamboat Trip to Stehekin on Lake Chelan's First Steamer.* Wenatchee, WA: The World Publishing Company.

Clague, J.J. and G.H. Eisbacher
1984 "Destructive Mass Movements in High Mountains: Hazards and Management." *Geologic Survey of Canada.* Paper no. 84-16.

Clark, William S.
1987 *A Field Guide to Hawks of North America.* Boston, MA: Houghton Mifflin Company.

Council on Environmental Quality
1993 *Incorporating Biodiversity Considerations Into Environmental Impact Analysis Under the National Environmental Policy Act.* Council on Environmental Quality, Executive Office of the President.

Cowardin, Lewis M., Virginia Carter, Francis C. Golet, and Edward T. **LaRoe**
1979 *Classification of Wetlands and Deepwater Habitats of the United States.* U.S. Fish and Wildlife Service, FWS/OBS-79/31.

Craighead, John J., Frank C. Craighead and Ray J. Davis
1963 *A Field Guide to Rocky Mountain Wildflowers from Northern Arizona and New Mexico to British Columbia.* Peterson Field Guide Series. Boston: Houghton Mifflin Company.

Douglas, David C, John T. Ratti, R. Alan Black, and }. Richard Alldredge
1992 "Avian Habitat Associations in Riparian Zones of Idaho's Centennial Mountains" *The Wilson Bulletin* 104(3): 485-500.

Duncan, L. Clint, Steve Kazmirski, Melane Reitz, Rachel Stevenson, and Barbara Samora
1993 *The Chemistry of Precipitation at Mount Rainier National Park.* Cooperative Agreement #CA-9000-1-006.

Duncan, L. Clint
1992 "Chemistry of Rime and Snow Collected at a site in the Central Washington Cascades." *Environ. Sci. Techno].* 26(1): 61-66.

Duncan, L. Clint, E.B. Welch, and Wally Ausserer
1986 The Composition of Precipitation at Snoqualmie Pass and Stevens Pass in the Central Cascades of Washington State." *Water, Air, and Soil Pollution* 30: 217-29.

Duncan, L. Clint, Daniel Stauffer, Steve Wagner, and Matthew Rosa
1991 *Measurement and Assessment of the Composition of Bulk Winter Precipitation at Sites in the Washington Cascades, Winter 1990-91.* Final Report to the Washington State Department of Ecology, Contract #C009093.

Duncan, Clint, and Walter Ausserer
1984 *Acid Precipitation in the Washington Cascades Phase 11.* Project Completion Report Submitted to **the** State of Washington Water Research Center and the U.S. Department of the Interior.

Dunne, Thomas, and Luna B. Leopold
1978 ***Water in*** *Environmental Planning.* San Francisco: W.H. Freeman & Co.

Ehrlich, Paul R., David S. Dobkin, and Darryl Wheye
1988 *The Birder's Handbook — A Field Guide to the Natural History of North American Birds.* New York: Simon & Schuster.

Farrand, John Jr., Ed.
1983 *The Audubon Society Master Guide to Birding, Volumes 1 & 2.* New York: Alfred A. Knopf.

Fielder, Paul C.
1986 *Lake Chelan Salmon Spawning Surveys, 1986.* **P.U.D.** No.l of Chelan County.

1991 "Lake Chelan Big Game Status Report, Winter 1990-1991." Public Utility District No. 1 of Chelan County, Wenatchee, WA.

Fish and Wildlife Service, U.S. Department of the Interior
1986 *Pacific Bald Eagle Recovery Plan.* Portland, OR.

Forest Ecosystem Management Assessment Team (FEMAT)
1993 *Forest Ecosystem Management: An Ecological, Economic, and Social Assessment.* U.S. Department of Agriculture, Forest Service; U.S. Department of Commerce, National Oceanic and Atmospheric Administration/National Marine Fisheries Service; U.S. Department of the Interior, Bureau of Land Management, Fish and Wildlife Service, National Park Service; and Environmental Protection Agency

Forest Service, U.S. Department of Agriculture
1979 *Wildlife Habitats in Managed Forests: The Blue Mountains of Oregon and Washington.* Agricult. Handbook 553.

1988 *From the Forest to the Sea: A Story of Fallen Trees.* Pacific Northwest Research Station General Technical Report PNW-GTR-229, by Chris Maser, Robert F. Tarrant, James M. Trappe, and Jerry F. Franklin, technical editors.

Forest Service, U.S. Department of Agriculture and Bureau of Land Management, U.S. Department of the Interior
1993 *Draft Supplemental Environmental Impact Statement on Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl.*

Forman, Richard T, and Michael Godron
1986 *Landscape Ecology.* New York: John Wiley & Sons.

Fraley, John J. and Bradley B. Shepard
1989 *Life History, Ecology and Population Status of Migratory Bull Trout (Salvelinus confluentus) in the Flathead Lake and River System, Montana, Northwest Science* 63(4): 133-42.

Friedman, Mitch, Ed-
1988 *Forever Wild: Conserving the Greater North Cascades Ecosystem.* Bellingham, WA: Mountain Hemlock Press.

Funk William H., Ervin Hindin, Barry C. Moore, Robert C. Wasem, et al.
1987 *Water Quality Benchmarks in the North Cascades.* State of Washington Water Research Center, Report 68.

Georgette, Susan E. and Ann H. Harvey
1980 "Local Influence and the National Interest," *Ten Years of National Park Service Administration in the Stehekin Valley, Washington — A Case Study.* Publication No. 4, Environmental Field Program, University of California, Santa Cruz.

Gregory, Stanley V, Frederick H. Swanson, W. Arthur McKee, and Kenneth W Cummins
1991 "An Ecosystem Perspective of Riparian Zones." *BioScience* 41(8): 540-551.

Hall, E. Raymond
1981 *The Mammals of North America.* New York: John Wiley & Sons.

Hansen, Reed & Associates
1992 "Lake Chelan National Recreation Area, Baseline Socioeconomic Inventory." Subconsultant to Jones & Jones. Prepared under contract for the National Park Service.

1994 "Lake Chelan National Recreation Area, Socioeconomic Studies: Environmental Consequences of the NPS-GMP." Subconsultant to Jones & Jones. Prepared under contract for the National Park Service

Hays, Steven
1989 *Lake Chelan Fisheries, History, Current Status, and Management Options.* Chelan County Public Utility District, Wenatchee, WA.

Hickman, T, and R.F. Raleigh
1982 *Habitat Suitability Index Models: Cutthroat Trout.* U.S. Department of the Interior, Fish and Wildlife Service. FWS/OBS-82/10.5.

Hitchcock, C. Leo, and Arthur Cronquist
1973 *Flora of the Pacific Northwest.* Seattle: University of Washington Press.

Hynes* H.B.N.
1974 *The Ecology of Running Waters.* Ontario: University of Toronto Press.

Idaho Department of Fish and Game
1990 *Distribution and Status of Flammulated Owls (Otus flammeolus) on the Salmon National Forest.* Natural Heritage Section, Nongame and Endangered Wildlife Program, Bureau of Wildlife, by Eric C. Atkinson and Melonie L. Atkinson.

Interagency Grizzly Bear Committee (IGBC)
1987 *Grizzly Bear Compendium.*

Jones and Jones
1993 "Architectural Character Guidelines, Lake Chelan National Recreation Area." Final draft report. Prepared for the National Park Service.

Kendra, Will, and Lynn R. Singleton
1987 *Morphometry of Lake Chelan.* Water Quality Investigations Section, Washington State Department of Ecology, Report no. 87-1.

Keystone Center
1991 *Final Consensus Report of the Keystone Policy Dialogue on Biological Diversity on Federal Lands.* The Keystone Center, Keystone, Colorado.

Koehler, Gary M
1990 "Population and Habitat Characteristics of Lynx and Snowshoe Hares in North Central Washington." *Canadian Journal of Zoology* 68: 845-851.

Kusler, Jon A.
1983 *Our National Wetlands Heritage: A Protection Guidebook* . Washington DC: The Environmental Law Institute.

Lamb, Berton L., and Eric Lord
1992 "Legal Mechanisms for Protecting Riparian Resource Values." *Water Resources Research* 28(4): 965-977.

Larrison, Earl J.
1976 *Mammals of the Northwest.* Seattle: Seattle Audubon Society.

1981 Birds *of the Pacific Northwest.* Moscow: The University Press of Idaho.

Larrison, Earl J., and Klaus G. Sonnenberg
1968 ***Washington*** *Birds — Their Location and Identification.* The Seattle Audubon Society.

Mason, David T., and John Koon
1985 *Habitat Values of Woody Debris Accumulations of the Lower Stehekin River, with Notes on Disturbances of Alluvial Gravels.* Western Washington University, Bellingham.

Meehan, W.R., F.J. Swanson, and J.R. Sedell.
1977 "Influences of Riparian Vegetation on Aquatic Ecosystems with Particular References to Salmonid Fishes and Their Food Supply." In *Importance, Preservation and Management of Riparian Habitat, a Symposium.* U.S.Department of Agriculture, Forest Service, General Technical Report RM-43, Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO.

Naas, Dorothy, and Ralph Naas
1981 *Exotic Plant Survey.* North Cascades National Park, Ross Lake and Lake Chelan National Recreation Areas, Part I, 1976-1980. Park files.

Naas, Dorothy, Ralph Naas, and Elroy Burnett
1989 *A Checklist of Vascular Plants of the North Cascades, Washington.* Park files.

Naiman, Robert J., Henri Decamps, and Michael Pollock
1993 "The Role of Riparian Corridors in Maintaining Regional Biodiversity." *Ecological Applications* 3(2): 209-212.

Nakano, Shigeru, Kurt D. Fausch, Tetsuo Furukawa-Tanaka, Koji Maekawa, and Hiroya Kawanabe
1992 "Resource Utilization by Bull Char and Cutthroat Trout in a Mountain Stream in Montana, U.S.A." *Japanese journal of Ichthyology* 39(3): 211-17.

National Geographic Society
1983 *Field Guide to the Birds of North America.* Washington DC: National Geographic Society.

National Park Service, U.S. Department of the Interior
1972 *Aquatic Invertebrate Collections and Trout Stomach Content Analysis, 1971 and 1972.* North Cascades National Park, Ross Lake and Lake Chelan National Recreation Areas, Misc. Research Paper NCA-3.

1982 "Standards for the Compatible Use of Land within the Lake Chelan National Recreation Area."

1985 "Diurnal Raptor Migration in the North Cascades Range." Misc. Research Paper NCT-27, by Jonathan Bjorklund and David Drummond. Park files.

1986 *Historic Resource Study, North Cascades National Park Service Complex,* by Gretchen A. Luxenberg. Pacific Northwest Region, Seattle, WA.

1987a *Draft General Management Plan and Environmental Assessment, North Cascades National Park, Ross Lake National Recreation Area, Lake Chelan National Recreation Area.* Park files.

1987b *Environmental Assessment and Firewood Management Plan, lake Chelan NRA, Stehekin Valley.* Park files.

1987c *Historic Structures Preservation Guide,* by Hank Florence. Pacific Northwest Region, Seattle, WA.

1988a *General Management Plan, North Cascades National Park, Ross Lake National Recreation Area, Lake Chelan National Recreation Area.* Park files.

1988b *Lake Chelan National Recreation Area Land Protection Plan.* Park files.

1988c *Effects of Regulated Lake Levels on the Reproductive Success, Distribution and Abundance of the Aquatic Bird Community in Voyageurs National Park, Minnesota.* Research/Resources Management Report MWR-10, Midwest Regional Office, Omaha, NE.

1988d *Management Policies.*

1989a *Environmental Assessment and Proposed Plan: Forest Fire Hazard Reduction Program, Lake Chelan National Recreation Area.* Park files.

1989b *Wilderness Management Plan, North Cascades National Park Service Complex.* Park files.

1990 *Summary/ - 1990 Harlequin Duck Surveys, Stehekin River, Lake Chelan National Recreation Area, Washington,* by Jack Oelfke and Robert Kuntz. Park files.

1991a *Natural Resources Management Guideline (NPS 77).*

1991b *Fire Management Plan, North Cascades National Park.*

1992a *Stehekin Valley Firewood Management Plan.* Lake Chelan National Recreation Area (most recent update). Park files.

1992b *Visitor Services Project, Stehekin, North Cascades National Park and Lake Chelan National Recreation Area.* Report 42. Cooperative Park Studies Unit, Department of Forest Resources, College of Forestry, Wildlife, and Range Sciences, University of Idaho, Moscow, ID.

1992c *Oil/Hazardous Substance Spill Plan, North Cascades National Park Service Complex, Ross Lake National Recreation Area, Lake Chelan National Recreation Area.*

1993a *Data Summary Booklet: Support Studies for the General Management Plan and Environmental Impact Statement.* **Park** <■ files.

1993b *Stehekin River Floodplain Mapping Project, Lake Chelan National Recreation Area,* by Jon L. Reidel. National Park Service, Pacific Northwest Region, Technical Report NPS/PNRNOCA/NRTR-93/011. Park files.

1993c "A Terrestrial Vertebrate Inventory of the Stehekin Valley, Lake Chelan National Recreation Area," Technical Report NPS/PNRNOCA/NRTR-93/010, by Robert C. Kuntz II and Reed S. Glesne. Park files.

1993d "Draft Resources Management Plan, North Cascades National Park, Lake Chelan National Recreation Area, Ross Lake National Recreation Area." Park files.

1993e *Guiding Principles of Sustainable Design.* On file at Denver Service Center, Denver, CO.

1994 *Draft General Management Plan / Implementation Plan Alternatives I Environmental Impact Statement, Lake Chelan National Recreation, Washington.* On file at Denver Service Center, Denver, CO.

Northwest Energy Services, Inc.
1993 *Stehekin Energy Resource Baseline Study.* Prepared for the National Park Service.

Nussbaum, Ronald A., Edmund D. Brodie, Jr., and Robert M. Storm
1983 *Amphibians and Reptiles of the Pacific Northwest.* Moscow: The University of Idaho Press.

Odum, Eugene P.
1973 *Fundamentals of Ecology.* Philadelphia: W.B. Saunders Company.

Oliver, Chad wick D., and Bruce C. Larson
1981 *Forest Resource Survey and Related Consumptive Use of Firewood in Lower Stehekin Valley,* University of Washington, Seattle.

Palmer, Ralph S., Ed.
1988 *Handbook of North American Birds: Diurnal Raptors (parts 1 & 2).* New Haven and London: Yale University Press.

Patmont, Clayton R., Gregory J. Pelletier, Eugene B. Welch, David Ban ton, and Curtis Ebbesmeyer
1989 *Lake Chelan Water Quality Assessment.* Prepared by Harper-Owes for State of Washington Department of Ecology.

Peven, Charles M.
1993 *Lake Chelan Spawning Ground Surveys -1992.* Chelan County Public Utility District, Fish and Wildlife Operations, Wenatchee, WA.

1989 *Lake Chelan Spawning Ground Surveys -1989.* Chelan County Public Utility District, Fish and Wildlife Operations, Wenatchee, WA.

Rhoades, Fred
1986 "Small Mammal Mycophagy near Woody Debris Accumulations in the Stehekin River Valley, Washington." *Northwest Science* 60(3): 150-153.

Rieger, John
1992 "Western Riparian and Wetland Ecosystems." *Restoration and Management Notes* 10(1): 52-55.

Sedell, James R., Fredrick J. Swanson, and Stanley V. Gregory
1984 "Evaluating Fish Response to Woody Debris." In *Pacific Northwest Stream "• Habitat Management Workshop.* October 10-12, 1984, Humboldt State University, Arcata, California.

Sisler, James R, Dale Huffman, and Douglas A. La timer
1993 *Spatial and Temporal Patterns and the Chemical Composition of the Haze in the United States: An analysis of Data from the IMPROVE Network, 1988-1991.* Cooperative Institute for Research in the Atmosphere, Colorado State University, ISSN No. 0737-5352-26.

Strickland, Richard, ed.
1986 *Wetland Functions, Rehabilitation, and Creation in the Pacific Northwest: The State of Our Understanding.* Proceedings of a Conference held April 30 - May 2,1986, Fort Worden State Park, Port Townsend, WA.

Swanson, F.J., and J.F. Franklin
1992 "New Forestry Principles from Ecosystem Analysis of Pacific Northwest Forests." *Ecological Applications* 2(3).

Tanimoto, Philip D.
1991 "Applications of Geographical Information Systems to the Management of Lake Chelan National Recreation Area." Masters thesis. University of Idaho, Moscow.

Trotter, Patrick C.
1987 *Native Trout of the West.* Boulder: Colorado Associated University Press.

Truscott, K.B.
1987 *Lake Chelan Salmon Spawning Surveys, 1987.* P.U.D. No. 1 of Chelan County.

U.S. Department of the Interior
1992 *Draft Recovery Plan for the Northern Spotted Owl.* Marvin Plenert, Team Leader.

Washington Department of Ecology
1993 *Water Rights Claims Register.* #110-93.

Washington Department of Health
1993 Computer printout of Water Quality Data from the W.D.H. Division of Drinking Water's database.

Washington Department of Natural Resources
1990a *Endangered, Threatened & Sensitive Vascular Plants of Washington.* Washington Natural Heritage Program.

1990b July 25 letter from Henry Dietrich, Information Specialist, Washington Natural Heritage Program, to Ron West, Natural Resource Specialist, National Park Service. Park files.

Washington Department of Wildlife
1990 August 1 letter from Thomas E. Owens, Manager, Nongame Data Systems, to Ron West, Natural Resource Specialist, National Park Service. Park files.

1991 *Management Recommendations for Washington's Priority Habitats and Species,* Elizabeth Rodrick and Ruth Milner, technical editors, Wildlife Management, Fish Management, and Habitat Management Divisions.

1993a ***Status*** *of the Western Grey Squirrel* ***(Sciurus*** *griseus) in Washington.*

1993b *Status of the North American Lynx (Lynx canadensis) in Washington.*

1993c "Management Recommendations for Wildlife Priority Species - Northern Goshawk."

Washington State Employment Security
1992 *Employment and Payrolls in Wash ington State by County and Industry, 1990 Annual Averages.* No. 82.

Welch E.B., D.E. Spyridakis, K.B. Easthouse, T.J. Smayda, ad L.C. Duncan
1992 "Response to a Smelter Closure in Cascade Mountain Lakes." *Water, Air, and Soil Pollution* 61: 325-38.

Wilson, E.O.
1988 "The Current State of Biological Diversity," in *Biodiversity,* E.O. Wilson, editor. Washington DC: National Academy Press.

Wright, R. Gerald
1987 *A Compilation of Stream Water Quality Data for North Cascades National Park Complex.* University of Idaho Cooperative Park Studies Unit, Report B-87-2.

GLOSSARY

Acronyms	Abbreviations
CFR-	Code of Federal Regulations
COE-	Army Corps of Engineers
DCA-	Designated Conservation Area
DCP-	Development Concept Plan
DDT-	dichloro-diphenyl-trichloro-ethane
EIS-	Environmental Impact Statement
FERC-	Federal Energy Regulatory Commission
FPHRP-	Forest Fire Hazard Reduction Plan
FMP-	Fire Management Plan
FTE-	Full Time Equivalent
GIS-	Geographic Information System
GMP-	General Management Plan
IMPLAN -	Impact Analysis Related to Planning
kg-	kilogram
LPP-	Land Protection Plan
mg-	milligram
NA-	Not Available
NEPA-	National Environmental Policy Act
NWI-	National Wetland Inventory
PAH-	Poly eye lie Aromatic Hydrocarbons
PUD-	Chelan County Public Utilities District
RCW-	Revised Code of Washington
RMP-	Resource Management Plan
SMA-	Shoreline Management Act
ug-	microgram
USC-	United States Code
USDI-	U.S. Department of Interior
USFS-	U.S. Forest Service
USFWS -	U.S. Fish and Wildlife Service
WDOW-	Washington Department of Wildlife
WMP-	Wilderness Management Plan
WAC-	Washington Administrative Code

Administrative wood - Trees harvested as a result of management activities (e.g. hazard tree removal, blow-down tree removal from developed areas, tree removal from fuel hazard areas).

Alluvial fan - A low, outspread mass of loose rock material deposited by large streams at the place where it issues. Typically having slopes less than five degrees.

Alpine zones - Pertaining to high-altitude habitats, especially above timberline.

Best pollution control measures - Schedule of activities, prohibition of practices, maintenance procedures, and other management practices to prevent or reduce water pollution.

Biomass - The amount of living matter present at any given time, usually expressed as the mass per unit area or volume of habitat**.**

Borrow pits - An excavated area where material has been dug for use at another location (e.g., sand, rock, and gravel).

Candidate species - Those species (plant or animal) included in the *Federal Register* "Notice of Review" listing that are being considered by the USFWS for listing as threatened or endangered species.

Chip seal - A road surface composed of asphalt emulsion covered with crushed aggregate (chips).

Community (natural) - Any group of organisms belonging to a number of different species that co-occur in the same habitat or area and interact through trophic and spatial relationships.

Compatibility criteria - The basis for determining which land uses are consistent with the recreation, scenic, scientific, natural, and historic values of the Lake Chelan National Recreation Area.

Crown cover - The top foliage of trees or shrubs.

Cultural resource - An aspect of a cultural system that is valued by or significantly representative of a culture or that contains significant information about a culture. A cultural resource may be a tangible entity or a cultural practice. Tangible cultural resources are categorized as districts, sites, buildings, structures, and objects for the National Register of Historic Places and as archeological resources, cultural landscapes, structures, museum objects, and ethnographic resources for NPS management purposes. (Source: NPS-28, *Cultural Resource Management Guideline,* Release No. 4, July 1994, p. 190)

Cumulative effect or impact -"… The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR 1508.6}

Debris cones - A mass of loose unstable material constructed in part by mass movement (debris flows, debris torrents). Debris cones are typically associated with small steep streams and have slopes greater than ten degrees.

Direct effect or impact - Effects that are "■ . . caused by the action and occur at the same time and place" (40 CFR 1508.8[a]). Effects are synonymous with impacts (40 CFR 1508.8[b]).

Easements - an interest in land owned by another that entitles its holder to a specific limited use or enjoyment.

Ecosystem - The community including all the component organisms together with the abiotic environment, forming an interacting system.

Eminent domain authority - A right of the federal government to acquire private property for public use by virtue of the superior dominion of the sovereign power over all lands within its jurisdiction.

Endangered species - Any species that is in danger of extinction throughout all or a significant portion of its range due to current or planned activity.

Ethnographic resource - A site, structure, object, landscape, or natural resource feature assigned traditional legendary, religious, subsistence, or other significance in the cultural system of a group traditionally associated with it. (Source: NPS-28, *Cultural Resource Management Guideline,* Release No. 4, July 1994, p. 191)

Exotic - See normative.

Fairways - Areas in the Stehekin Valley that were once part of the old golf course that was partially developed.

Fee title - Ownership of land with all or most rights.

Floodplain - The lowland and relatively flat areas adjoining waters that are subject to temporary inundation. The area which has a one percent chance of being flooded in any given year designates the 100-year floodplain. The area which has a 0.2 percent chance of being flooded in any given year designates the 500-year floodplain.

Floodway - "means those portions of the area of a river valley lying streamward from the outer limits of a watercourse upon which flood waters are carried during periods of flooding that occur with reasonable regularity, although not necessarily annually, said floodway being identified, under normal conditions, by changes in surface soil conditions or changes in types or quality of vegetative ground cover condition. The floodway shall not include those lands that can be reasonably be expected to be protected from flood waters by flood control devices maintained by or maintained under license from the federal government, the state, or a political subdivision of the state. The limit of the floodway is that which has been established in flood regulation ordinance maps or by a reasonable method which meets the objectives of the (Shoreline Management) act" (WAC 173-22-030).

Forest fuel - Standing or down, alive or dead vegetation — the material that burns in a forest fire.

Forest fuel reduction - Lowering the amount of forest fuel in an area through prescribed fire or through mechanically cutting vegetation.

Geological hazards - Threats to structures, facilities, or persons posed by unstable geological aspects. Unstable areas include flood plains, terrace edges, debris cones, and steep slopes associated with snow avalanches, rockfall, or other potentially unstable areas.

Geographic Information System (GIS) - a computer stored, map database used extensively for analysis in the general impact methodology.

Hazardous tree - A woody plant that, because of a recognizable mechanical flaw, poses a threat to people or property.

Hazardous materials - Any material or combination of materials that pose a substantial present or potential hazard to human health or living organisms because such materials are nondegradable, or because they can be lethal, or because they may otherwise cause detrimental cumulative effects.

High flood influence area - Those portions of the floodplain nearest the sources of flooding where **floodwaters** exert their maximum force. During a 100-year flood these areas would have water velocities in excess of three feet per second and water depths greater than six feet.

High visual sensitivity **areas** - Visible areas which lack potential intervening elements (landforms or trees) and provide a visual plane on which the addition of structures and site manipulation will be apparent and contrast with existing conditions.

Historic landscape - a geographical area that has been used by people, or shaped or modified by human activity, occupancy, or intervention, and that possesses a significant concentration, linkage, or continuity of areas of land use, vegetation, buildings and structures, roads and waterways, and natural features.

Indirect effect or impact - Effects that are ". . . caused by the action and are later in time or farther removed in distance" {40 CFR 1508.81b]).

Jurisdictional wetlands - Areas that meet the regulatory definition of a wetland under COE guidelines for implementing Section 404 of the Clean Water Act. Under the regulatory definition, wetlands are those areas that are inundated or saturated by surface or ground water at frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

Lacustrine - Pertaining to wetlands and deepwater habitats produced by, or formed in a lake.

Landscape type - A geographical area of more or less uniform slope and land cover that is characterized in terms of its visual sensitivity to development.

Landscape unit - A geographical area of distinct character that forms a spatially enclosed unit. Landform, topography, and

viewshed information are used to delineate boundaries of units.

Maximum probable flood (extreme flood) - The flood considered to be the largest magnitude possible, at a site.

Native - Indigenous; pertains to plant and animal species that occurs naturally in a particular area, and not introduced by humans.

Nonnative - Exotic; pertains to plant and animal species that do not occur naturally in a particular area, and were introduced by humans.

Palustrine - Pertaining to freshwater wetlands dominated by trees, shrubs, persistent emergents, and emergent mosses and lichens. Also includes wetlands lacking such vegetation, but with all of the following three characteristics: 1) area less than 20 acres, 2) active wave-formed or bedrock shoreline features lacking; 3) maximum water depth less than 2 meters at low water.

Polygon - A closed plane unit that delimits a geographical feature in GIS.

Prescribed fires - Include fires deliberately ignited by managers (prescribed bums) or fires of natural origins permitted to burn under prescribed conditions (prescribed natural fires) to achieve predetermined resource management objectives.

Preserve (cultural resources) - The act or process of applying measures necessary to sustain the existing form, integrity, and materials of a historic property. Work, including preliminary measures to protect and stabilize the property, generally focuses upon the ongoing maintenance and repair of historic materials and features rather than extensive replacement and new construction. New exterior additions are not within the scope of this treatment; however, limited and sensitive upgrading of mechanical, electrical, and plumbing systems and other code-required work to make properties functional is appropriate within a preservation project.

Productivity - Inherent capacity of an environmental unit to support organisms.

Rehabilitate (cultural resources) - The act or process of making possible a compatible use for a property through repair, alterations, and additions while preserving those portions or features that convey its historical, cultural, or architectural values.

Restore (cultural resources) - The act or process of accurately depicting the form, features, and character of a property as it appeared at a particular period of time by means of the removal of features from other periods in its history and reconstruction of missing features from the restoration period. The limited and sensitive upgrading of mechanical, electrical, and plumbing systems and other code-required work to make properties functional is appropriate within a restoration project.

Riparian - A distinct vegetative community that occurs in the transition between the aquatic and upland communities, and is characterized by high species abundance, diversity, and productivity.

River control structures - any stream channel alteration designed to reduce streambank erosion or protect nearby development.

Riverine - All freshwater wetlands and deepwater habitats contained within a stream channel.

Setback - A line some distance from a specific site or area where areas beyond the line would be suitable for development.

Subalpine zones - Pertaining to high-altitude habitats just below timberline.

Terraces - Deposits left long ago by rivers or glaciers.

Threatened species - Any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Turbidity - A measure of water optical clarity. Optical clarity in water is affected by the scattering and absorption of light by suspended material such as clay, silt, organic and inorganic particulates, and plankton.

Upland communities (natural) - All terrestrial communities that are not riparian.

Viewshed - The visible area or seen areas from important viewpoints.

Volatile organic» - Carbon-based line matter that is highly vulnerable to disruption.

Wetlands - Lands transitional between aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water.

Wild and Scenic River Act - Established a national policy that certain selected rivers of the nation which, with their immediate environments, possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values, shall be preserved in their free-flowing condition and protected for the benefit and enjoyment of present and future generations.

Wildfire - All fires that do not meet the criteria for prescribed fires.

Woodlot - A limited area that is maintained as a source of firewood.

Access 7, 11, 12, 23, 24, 25, 29, 30, 32, 39, 41, 57-61, 74, 76, 77, 78, 79, 95, 96, 99, 100, 102-104, 108, 117, 118, 124-126, 128, 129, 136, 147,151,152,153,156,166,167,207, 218, 220, 222, 223, 224, 225, 231, 238, 240,243, 290, 301, 305, 306, 309, 311, 317, 323, 327-329, 337, 340, 341, 342, 352, 354-356, 366, 370-373, 379
Acid precipitation 8, 200, 201, 378
Air pollution 8, 200, 273, 300, 301, 325, 368, 378
Aircraft 11, 33, 220, 223, 224, 227, 229, 248, 306, 308,341,356,371
Airplane 248, 254, 255, 311, 379
Airstrip 10, 11, 17, 33-35, 39, 40, 60, 78, 102-104, 128-130, 154-157, 162, 163, 167, 184, 188,195, 218, 223-225, 227, 229, 276, 277, 279, 280, 281, 283, 285-287, 296, 305, 307, 317, 319, 320, 321, 328, 332-334, 340, 341, 345, 347, 349, 350, 355, 356, 359-364, 370, 371, 379
Aquatic communities 173..191
Archeological resources 202, 273, 302, 326, 354, 369
Army Corps of Engineers 14, 46, 88, 113, 140, 158, 178,274,298

Bakery 104, 129, 216, 217, 305, 327, 340, 354
Bicycles 29, 30, 33, 34, 58, 61, 74, 99, 100, 124, 125, 128, 152, 153, 156, 231, 232, 238
Bicycling 29, 58, 76, 99, 102, 125, 153, 238, 356
Boat docks 225, 229 Boats 11, 29, 32, 39, 58-60, 78, 79, 99, 101, 102, 124,127,152,153,155, 220, 222,223, 229, 231, 233, 234, 238, 239, 248, 252,299, 305, 307, 325, 340, 354, 369, 371, 372 Borrow pits 23, 70, 95, 146, 147, 275, 276, 279, 280, 282, 283, 286, 287, 332, 333, 334, 335, 345-347, 349, 350, 359-362 Boulder Creek 26, 30, 34, 76, 79, 96, 100, 103, 129,173, 217, 224, 242, 283, 305, 327, 340, 354
Bridge Creek 11, 30, 34, 61, 99, 153, 154, 156, 165,173,193,194, 206, 207, 216, 224,225, 230, 293, 295, 307, 323, 328, 334, 352, 356, 363, 366
Bridges 20, 23, 52, 59, 100, 126, 144, 276, 277, 279, 281, 317-319, 346, 348, 360, 362 Buckner Homestead 4, 29, 30, 57, 58, 76, 99,100, 124,125,152,153, 203, 204,239, 276, 303, 317, 326, 332, 339, 340, 345, 353, 359

Campfires 10, 28, 57, 75, 98, 124, 152, 242, 273, 301, 308, 309, 329, 336, 339, 342, 379
Campgrounds 23, 30, 39, 44, 58, 61, 79, 86, 100, 104, 111, 125,129,139,156,187, 229, 233, 239, 240, 247, 252, 253, 255, 294, 309, 342, 351
Chelan 3, 4, 7-14, 17, 19, 20, 24, 26, 27-32, 40-43, 45-49, 51, 52, 56, 58-60, 62-67, 69, 70, 75-78, 80, 83-85, 87, 88, 89-92, 97-102, 104, 107-113, 115, 117, 118, 122-128, 130, 135-141, 143-145, 148, 149, 152-154, 156-158, 166-169, 174, 176, 177,178, 179, 182,188-191, 193-200, 202, 203, 204-209, 215, 220, 222-225, 227, 229, 231, 232-234, 238-240, 242-249, 254-259, 261-263, 272, 274, 278, 279, 281, 284, 290-292, 295, 297-305, 309-315, 321, 324, 325, 327, 329-331, 337, 338, 342-344, 352, 354, 356, 357, 366, 368, 369, 372, 373, 374, 377-382
Chelan Airways 222-224, 248, 255
Chelan County 8, 13,14,19, 20, 27-29, 31, 40-43, 46, 47, 48, 49, 51, 56, 63-67, 69, 70, 75, 80, 83, 84, 85,88, 90-92, 97, 98,101,107-110,113,115, 117, 118, 123,126,130,135-138, 140,141, 143, 152,157,158,166-169,176, 177,179,191,199, 243-249, 256-259, 261-263, 274, 278, 290, 295, 299, 301, 310, 311, 312-315, 324, 325, 329-331, 343, 344, 357, 368, 373, 374, 380
Commercial boats 11, 32, 59, 101, 127, 220, 371
Commercial transportation 220, 221, 248, 254, 311
Commercial uses 40, 67, 83, 89, 107, 114, 135, 142
Company Creek road 12, 34, 61, 79, 103, 122, 128, 149,156,157,162,174,182, 205, 207, 210, 218, 219, 223, 225, 227, 232, 277, 279, 281, 299, 307, 318, 319, 323, 324, 328, 341, 345, 346, 347-350, 352, 355, 356, 359-364, 366, 367, 370, 372
Compatibility criteria 39, 40, 42, 45-47, 83, 84, 86, 87-89,104,107,109,111-114,129,130,135, 136, 139-142, 156-158, 306
Compatibility standards 12, 43-45, 51, 62-66, 85-88, 110413, 137-139, 141, 158, 160, 322, 354, 355
Concessions 47, 48, 67, 89, 114, 142, 382
Cottonwood Camp 58, 61, 79, 103,124,125,128, 142,152-155, 224, 225, 229, 230, 231, 238, 239, 301,309, 320, 321, 328, 329, 352, 353, 362, 368, 371, 372
Courtney Cabin 4, 205

Cultural resources 3,10,17,19, 23,28,40, 57, 70, 75, 80, 90-92, 98, 104, 118, 124, 130, 146, 152, 156,164,199, 202, 203, 273, 300, 302-304, 326, 331, 339, 340, 353, 369

Development 3, 8, 10-14, 17, 19, 20, 23, 26, 31, 32, 34, 35, 40, 42-47, 51, 52, 55, 59-65, 69, 70, 73, 75, 77-80, 83-87, 89, 91, 92, 95, 97, 101, 102-104, 107-112, 114, 118, 121, 122, 126, 128-130, 129, 130, 136-143, 146-149, 156, 158, 160,165-169,174,176,178,179,180, 183,188, 195, 202-204, 206, 207, 208-212, 215, 217, 219, 240, 260, 271, 274, 275, 278, 279,281, 282,284, 289,290,292, 295, 296, 300, 302,305, 306, 309, 311, 313, 315, 318, 319, 322-324, 327, 328, 331, 332, 333, 334, 337, 340, 341,348,354, 355,357, 362, 366, 367, 369-371, 374, 379, 380
Development Concept Plan 34, 35, 61, 79, 80, 103, 104, 129, 130
Disturbance 10, 11, 13, 162, 163, 165, 173, 177, 179,181,183,184,187,195, 277, 279-281, 284, 285, 287, 290, 293, 296, 298,299, 317, 320, 337, 338, 346, 348, 349, 352, 360, 362, 364, 366, 367

Economy 166-168, 205, 245, 246, 248, 273, 310, 313,315,329, 330, 342, 343, 356, 357,373, 374, 379
Electrical generation 8, 10,14, 379 Energy use 9, 26, 74, 97, 122, 151, 200, 339

Facilities 8, 10, 13, 19, 24, 29, 30, 32, 34, 39-41, 43, 44, 48, 52, 55, 59, 60, 62, 64, 67, 69, 75, 76, 78-80, 83, 84, 86, 89, 92, 95, 97, 99, 102-104, 107,109, 111, 114,117, 118,121,122,124,127, 129,130,135,137,138,139,142,143,146,147, 151,154,156,157,162,163,166,167,184, 205, 207, 208, 215, 223, 225-227, 229, 239-241, 243, 247, 253, 255-258, 260, 262, 265, 274, 275, 277, 292, 301, 305, 307-309, 311, 314, 316, 318, 326, 327-330, 333, 338, 340-342, 346, 354, 355, 356, 361, 368-373, 379
Fairways 27, 56, 62, 74, 98, 123, 188, 209, 218, 276, 279,280,282,283, 305, 306,320, 332, 340, 348, 354, 355, 370
Ferry 34, 39, 79, 104, 128, 216
Fields Point 31, 32, 49, 59, 60, 67, 77, 78, 90,101, 102, 115, 126-128, 143, 154, 222, 231, 234
Fire management 9, 25, 73, 95, 379
Firewood 3, 8, 9, 17, 24-28, 51, 55, 56, 73, 74, 95-97, 121, 122, 146, 148-152, 163, 184, 187, 200, 240, 279, 282, 283, 286, 287, 292,294, 297, 301, 317, 319-321, 323-325, 327, 335, 339, 350, 359, 360, 364-366, 368, 379

Fish 4, 7,10,14, 20, 26, 27, 49, 51, 52, 56, 67, 69, 70, 74, 90, 91, 92, 97, 98, 115, 117, 118, 123, 143-145,150,151,162, 163,174,175,178,181, 188-199, 205, 234, 272-274, 276-278, 281, 288-291, 295, 297, 299, 300, 317, 318, 322, 332, 333, 336, 337, 345, 346, 351, 352, 359-361,365, 378, 379
Fish and Wildlife Service 14, 27, 56, 74, 98, 123, 150, 151,178, 191,192, 290, 291, 378, 379
Fish stocking 20, 52, 70, 92, 118, 288, 289, 322, 336, 351, 365
Floatplane 11,30, 39, 60, 61, 78, 79,100,103,125, 129,154, 220, 222,224, 227, 234, 299,307,309, 325, 328, 339, 341, 356, 371
Floodplain 13, 23, 24, 46, 52, 70, 73, 88, 92, 95, 103,113,118,121,141, 146,147,160,162,163, 175,176-178, 210, 218, 234, 271, 272, 274, 275, 276-279, 281, 289, 299, 317-319, 324, 332, 333, 336, 338, 345, 346, 347, 348, 351, 359-362, 365, 377
Food 39, 44, 47, 48, 58, 62, 80, 86, 104, 111, 130, 139, 160, 169, 175, 176, 178, 181, 189, 190, 194-196, 247, 248, 255, 280, 291, 294, 311, 320, 343, 344, 362, 372
Forest fire 9, 51, 379
Forest fuel 3,9,17, 24-27, 55, 73, 95-97,121,122, 146-150, 276, 277, 282, 283, 285, 286, 293, 315, 345, 346, 349, 350, 359, 360, 363
Forest fuel reduction 3, 17, 24-27, 55, 73, 95-97, 121,146-150, 276, 277, 282, 283, 285, 286, 293, 315, 345, 346, 349, 350, 359, 360, 363
Forest Service 14, 19, 20, 31, 32, 48, 49, 59, 67, 69, 78, 89-91,101,115, 117,126,127,142,143, 187,191,197, 203, 205-207, 231, 239, 248, 257, 290, 293, 377, 379 486
Fuel 3, 9-11, 17, 19, 24, 25, 26, 27, 30, 39, 55, 58, 61, 69, 73, 79, 80, 91,95-97,100,104,121,122, 125,130,146,147,148-150,184, 223, 229, 231, 248, 258, 259, 263, 266, 276-279, 282, 283, 285, 286, 293, 294, 297, 299-301, 315, 324, 325, 330, 338, 339, 345, 346,349, 350,359, 360, 363,364, 365, 366, 368, 379

Geohazards 24, 34, 55, 73, 79, 80, 95, 104, 121, 146, 147,156,157, 278 Golden West Lodge 4, 28, 57, 75, 98, 124, 152, 153, 204, 303, 326, 339, 353 Grazing 10,28,57, 75,98,123,152,153,183,242, 273, 284, 286, 294, 308, 309, 318, 319, 321, 326, 329, 334, 336, 342, 349, 350, 364, 373, 379
Grocery store 39, 80, 104, 130, 156

Harlequin Bridge 27, 30, 33, 34, 61, 76, 79, 98, 100,103, 125,128, 129,152,153,154-156,177, 195, 207, 216,225,227, 238, 277, 280,296, 301, 303, 307, 341, 354, 360, 362, 364, 368, 369
Hazards 8, 9, 24, 39, 44, 63, 73, 86, 95, 104, 111, 118, 121,138, 144,145, 160,162,175-177, 275, 278, 318, 333, 346, 361, 377
High Bridge 11, 25, 27-30, 33, 34, 57, 58, 61, 73, 75, 76, 79, 95, 98-100, 102, 103, 115, 121, 124, 125,128,146,152,153, 154-156,165,174,184, 193,195, 202, 205-207, 215, 216, 219, 225, 230, 231, 238, 239, 293, 301, 303, 306, 307, 323, 325-328, 339, 345, 348-353, 355, 356, 360, 362, 363, 366, 368, 370
High Bridge Ranger Station 205, 326, 339, 353
High flood influence area 46, 63, 88, 113, 140, 158, 176,177, 271,272, 275-278,317, 332, 345, 346, 359, 360 .
High visual sensitivity area 423, 424
Hiking 29, 30, 33, 58, 59* 61, 76-78, 99, 100, 118, 125, 126,128,155,187, 220, 222-224, 234, 238, 239, 307, 341, 381
Horseback riding 29, 30, 32, 34, 58, 60, 79, 99, 100,102,103,125,127,128,152,153, 204, 220, 239, 306, 307, 341, 355, 356
Horses 10, 29, 34, 58, 99, 124,152, 156, 225, 238, 242, 309, 379
Housing 13, 39, 44, 62, 63, 79, 80, 86, 102, 104, 111, 129,130,139,156,157,160, 206, 218, 227, 244, 282, 283, 286, 305, 311-314, 320, 327, 330, 335, 340, 343, 349, 350, 354, 357, 363, 370

Interpretation 29, 31, 32, 59, 60, 75-78, 99, 101, 102,124,126,127,152,154,155,164, 234,238, 239, 260, 303, 308, 339, 383

Lake Chelan Boat Company 32, 59, 78,101,127, 220, 222, 223, 229, 231, 233, 248
Land acquisition 169, 240, 315, 357
Land protection 3, 12, 17, 39, 40, 51, 52, 62, 80, 104,107,129, 130,135,156-158,160, 282, 305, 369, 379
Landing 3, 11, 17, 27, 29-35, 34, 39, 51, 52, 58, 59-62, 67, 73, 76-80, 79, 80, 89, 90, 98, 99, 100-104, 125-130, 129, 130, 146, 152, 153, 154-157, 167,168, 193-196, 201, 202, 205, 206, 207, 209, 215-218, 223, 224, 226, 225, 227, 228, 227, 229-234, 238-240, 248, 277, 285, 286, 294, 296, 303, 305, 307, 315, 318, 321, 324, 326-328, 335, 340-342, 349, 350, 353, 354, 356, 363, 364, 366, 367, 369, 371, 372
Landscape units 208, 215, 305, 327, 340, 354
Lodging 30, 32, 34, 39, 44, 47, 48, 58-61, 76, 79, 86, 99, 100, 102-104, 111, 124, 125, 127, 129, 130,139,154-157,160,166,167, 169, 227, 233, 238, 246-248, 255-257, 294, 307, 309-312, 314, 315, 327, 329, 330, 341-344, 353, 356, 357, 364, 370, 372-374
Lucerne 197-199, 222, 234

Manson 199, 222, 263, 266
Marina 19, 30, 58, 100, 125, 229, 248, 260
McGregor Meadows 211, 219, 283, 296

Noise 30, 33, 100, 125, 166, 167, 307, 308, 327, 328, 341, 356, 369, 371, 372 Nonnative plants 11,27, 56, 74, 97,150,151,187, 188, 286, 321, 336, 350, 364 Nonnative species 10, 24, 27, 55, 56, 74, 97,121, 123,150,162,163,183,184,188,286, 287, 289, 290, 298, 321, 336, 350, 351, 364, 365, 379
North Cascades Lodge 232, 248, 249, 255, 343, 373

Orientation 31, 32, 59, 60, 76, 77, 101, 102, 126, 127,130,154, 209, 227, 234,239, 309, 329, 342, 372

Parking 11, 34, 79, 103, 128, 156, 157, 187, 225, 227, 228, 227, 231, 246, 247, 254, 255, 260,307, 341,363,372 Permits 28, 30, 42, 43, 47, 48, 61, 62, 66, 67, 84, 85, 89, 100, 109, 110, 114, 125, 129, 137, 138, 142, 154,155, 224, 225, 248, 261, 264, 274, 314, 321, 330, 343 Population 14, 117, 164, 173, 189, 190, 192, 193, 194,195, 243-245, 259, 263, 266, 289, 290, 292, 294, 295, 298, 307, 310-314, 330, 336, 337, 338, 343, 351, 352, 357, 365, 373 Power lines 28, 39, 56, 62, 75, 80, 98, 104, 123, 130 Private land 8, 9, 40-42, 48, 55, 62, 80, 83, 84, 107-109, 114, 130, 135-137, 142, 146, 157, 158, 163,174, 271, 275, 278, 284, 287,299, 323, 325, 333, 339, 361, 363, 366, 367 Purple Point campground 39,104,129, 216, 229, 238, 239, 305

Rainbow Falls 17, 30, 58, 76, 79, 100, 103, 125, 129,130,129,157,216, 218, 225,227,231,238, 255, 309, 329, 342, 364, 370, 372
Rare species 10, 27, 56, 74, 97,123,150,164,181, 273, 281, 288, 290, 322, 336, 351, 365

Recreation 3, 4, 7-14,17,19, 20,23, 27-29, 31-33, 40-45,47,52,57-63, 65-67, 70,75-78, 80, 83-88, 91, 92, 98, 99,101, 102,107-113,117,118, 123, 124,126,128,130,135-141,146,147,152,154, 157,158,160,174,176,178,179,188-191,193, 195-206, 208, 215, 222, 224, 225, 227, 229, 232-235, 238, 239, 240, 242, 243, 246-249, 253-257, 263, 266, 272, 273, 281, 284, 286, 288-293, 298-302, 304, 308-311, 313, 322, 325, 326, 328, 329, 336, 337-339, 341, 342, 344, 350, 351, 364, 365, 368, 369, 372, 373,377, 379,381, 382, 383
Regional economy 166, 167, 168, 245, 246, 273, 310, 313,315,329,330, 342, 343, 356, 357, 373, 374, 379
Regional landscape 208, 209
Riddle Creek 39, 61, 79, 104, 129, 286, 305, 321, 326, 335, 340, 350, 354
Riparian communities 25, 96,148, 162,163, 271, 272, 281, 282, 283-285, 288, 291, 294, 297, 320, 322, 323, 331, 334, 335, 348, 349, 363, 365, 366
River control structures 70, 145, 164, 275, 276, 277, 279,281,318,319, 323, 324, 332, 333, 338, 346, 348, 360, 362
River erosion 9, 12, 52, 103, 118, 128, 144, 145, 156,157, 279, 281, 317, 319,333, 346,348, 356, 360-362
River processes 8, 23, 70, 77, 92, 118, 162, 163, 173,174,176,187, 272, 275-279, 317, 318, 327, 332, 333, 345, 346, 354, 359-361, 371, 378
Roads 8, 10,11, 20, 23, 25, 30, 33, 4g, 52, 56, 58, 59, 61, 62, 70, 74, 79, 90, 92, 96. 100,103,118, 122,125,126,128,142,144,153,162,163,166, 167,176-180,184, 187,188,199, 200, 225, 227, 232-234, 239, 263, 273, 275-281, 288, 292, 301, 302, 307, 308, 317, 318, 319-321, 323-325, 328, 332-335, 339, 341, 346-348, 352, 353, 356, 360-362, 364, 368, 371, 372, 378, 379

Safety 7, 11, 19, 27, 30, 31, 34, 40, 42, 44, 45, 48, 59, 63, 67, 73, 76, 77, 80, 83, 86, 87, 89, 100, 101,107,108, 111, 112,114,118,125,126,128, 130,136,138,139,142,145,155,160,161,258, 262, 265, 274, 278, 307-309, 312, 329, 342, 356, 372, 379
Sand, rock, and gravel 3, 7-9, 11, 12, 17, 23, 24, 45, 55, 70, 73, 86, 95, 111, 118, 121, 139, 146, 147,199, 277, 281,301, 315, 344, 346, 348, 358, 360, 362, 378, 379
Scenery 12, 69,199, 234, 239, 273, 304
Scenic areas 41, 108, 136
Services 11, 13, 14, 26, 29-32, 34, 39, 40, 43, 44, 47, 48, 51, 58-62, 64, 67, 73, 75-80, 83, 84, 86, 89, 97, 99-102, 104, 107, 109, 111, 114, 117, 122,124,125,127,129,130,135,137,138,139, 142,143,152,154-156,158,160,161,166,168, 169, 191, 200, 222, 223, 229, 231, 233, 234, 239-241, 243, 245-249, 256-267, 301, 308, 309, 311, 313, 314, 315,327, 328, 330, 331, 343, 344, 357, 368, 369, 373, 374, 379-381, 383
Sewage 8,13,19, 39, 43, 48, 61, 67, 79, 85, 89,91, 104, 110,115, 117, 137, 142, 260
Shoreline 13, 23, 27, 41-43, 52, 56, 58, 70, 76, 79, 83-85, 92, 95, 98, 104, 108, 109, 110, 118, 123, 129, 136-138,145,146,147, 152-154, 156, 166, 167,193,195,209, 210, 215,217, 233, 234,274, 300,305, 306, 327, 328, 340,341,354,355, 369, 371
Shuttle bus 32, 60, 61, 78,102,127,128, 224, 229, 230, 231, 238, 240, 260, 307
Smoke 301, 302, 325, 339, 368
Stehekin community 12, 32, 57, 60, 64-66, 102, 154, 238, 243, 310, 326, 330, 379
Stehekin Landing 3, 11, 17, 31, 32, 34, 35, 51, S9-61, 67, 77-80, 101-103, 126, 127, 129, 130, 154,156,157,194, 202, 205-207, 216, 224, 226, 225, 227, 228, 229-233, 238, 239, 248, 303, 326, 353, 369
Stehekin River 4, 8, 10, 20, 23, 24, 26, 30, 31, 46, 52, 58, 63, 69, 70, 73, 76, 79, 88, 92, 95, 97, 100,103,113,118,121,125,126,129,140,144, 146,147,150,154,155,158, 162,163,173-179, 181,183,188-191,193,194,195,197,199, 203, 205-207, 209, 215, 217, 218, 219, 223-225, 227, 229, 234, 238, 240, 242, 272-279, 281, 289, 294, 296, 299, 304, 309, 317-319, 324, 327, 332, 333, 336, 338, 342, 345-347, 351, 356, 359, 360, 361, 365, 367, 372, 378
Stehekin School 4,13,206, 244,258-260,263,266, 267, 313-315, 330, 343, 357, 373, 381
Stehekin Valley road 11, 12, 30, 34, 48, 61, 79, 99, 100, 103, 115, 129, 152-155, 166, 167, 202, 205, 217, 218, 225, 227, 230, 277, 280,281,301, 303, 318, 319, 326, 328, 341, 345, 346, 348-350, 352, 353, 356, 360, 362, 363, 368
Streambank 52, 175, 277, 333

Threatened species 315, 331
Transportation 3,10,11,13, 17,19, 29, 30, 32-34, 58, 60, 61, 63, 67, 74, 76, 78, 79, 90, 99, 102, 103,115,124,125,128,129,142,152-156,166, 220, 221, 222-226, 229-231, 238, 239, 243, 245, 246, 247, 248, 250,251, 254, 256, 257, 273, 280, 306-308, 310, 311, 328, 341, 342, 355, 371, 377, 380, 382

Upland communities 162, 163, 176, 179, 272, 285-288, 294, 297, 321, 322, 335, 344, 349-351, 363-365

Vegetation 4, 8-10, 27, 29, 33, 34, 56, 62, 67, 74, 75, 98, 103, 123, 128, 153, 156, 162, 163, 167, 174-178, 180, 181, 182-184, 187, 195, 200, 208, 209, 212, 215, 216-219, 238, 271, 272, 274-281, 284, 287, 295, 301, 303, 305, 306, 309, 316-318, 320, 325, 327, 332, 345, 346, 355, 359, 360-363, 368, 370, 371, 377-379
Vehicles 11, 12, 27, 30, 33, 34, 61, 63, 74, 79, 103, 128,150,160,167, 223, 225, 227,230, 231, 232, 248, 306, 307, 309, 328, 341, 351, 352
Visibility 8, 28, 199-201, 300-302, 305, 325, 327, 355, 368, 370
Visitor center 28, 31, 32, 57, 59, 60, 75, 78, 98, 101,102,124,127,154, 205,223, 227, 229, 238, 239, 240, 303, 326
Visitor experience 11, 17, 29, 30, 32, 42, 48, 57, 60, 67, 75, 78, 84, 99, 100, 102, 109, 114, 124, 125,128,137,142,143,152,154, 233, 234, 242, 273, 308, 311, 370
Visual resources 166,167,208, 304,306, 327, 328, 340, 341, 355, 369, 370, 371

Washington Department of Fish and Wildlife 10, 20, 92, 191, 192, 274 Washington Department of Natural Resources 49,67,90,115,143 Washington Department of Wildlife 52,118,189, 190, 288-290, 322 Washington State Department of Transportation 33, 60, 154, 223, 280, 380

Water quality 4, 8, 9, 19, 44, 51, 69, 86, 91, 111, 117,138,144,145,156,164,173,175,190,197, 199-201, 273, 275, 279, 289, 298-300, 319, 324, 325, 336, 338, 339,347,351,353, 361, 365,368, 378
Weaver Point campground 39, 61, 79, 104, 129, 216, 286, 305, 321, 354
Wetlands 8, 9, 11, 31, 52, 63, 75, 100, 103, 122, 126,146,156,157,162,163,174,178,179,184, 209, 210, 217, 271, 272, 274, 275, 278, 279-281, 295, 296, 298, 299, 315, 318, 319,320, 331, 333, 334, 344, 347, 348, 361, 362, 364, 377-379
Wild and scenic river 8, 23, 52, 70, 92, 118,162, 318,327,340,370,490
Wilderness 3, 4, 7, 10, 12, 14, 17, 19, 26, 28, 29, 49, 51, 56, 57, 67, *75,* 78, 80, 90, 97-99, 115, 122-124, 143, 150, 152,153, 174,179,193,197, 199, 203, 204, 208, 209, 218, 238,242, 243, 273, 286, 288, 292, 301, 308,318,321, 325, 329,334, 336, 339, 340, 342, 343, 350, 356, 364, 368, 373, 379, 381
Wildlife 4, 7-10, 14, 20, 26, 27, 43, 49, 52, 56, 67, 69, 73, 74, 85, 90, 92, 97, 98,110, 115,118,123, 138,143,150,151,153,165,173,174,176,178, 181,184,187,189,190, 191-193,197,198, 238, 272, 274, 280, 281, 284, 286, 288-292, 297, 300, 304, 316, 320, 322, 331,337, 358, 362, 364, 367, 374, 377, 378-383
Woodstoves 26, 56, 73, 74, *97,* 122, 150
Woody debris 8, 9, 23, 25, 26, 31, 59, 70, 92, 96, 97, 100,122, 126, 144, 145, 150,175,181,182, 272, 275-279, 296, 317, 319, 332,333, 338, 346, 348, 360, 362

As the nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

Volume 1 of 2 NPS D-174A June 1995