

**U.S. Department of the Interior
National Park Service
North Cascades National Park Service Complex
Lake Chelan National Recreation Area
Washington**



**Upper Stehekin Valley Road
Car Wash Falls (MP 12.9) to Cottonwood Camp (MP 22.8)
Environmental Assessment
March 29, 2006**



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PUBLIC AVAILABILITY

Comments on this Environmental Assessment must be postmarked (surface mail) or sent (e-mail or fax) no later than May 27, 2006.

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ACRONYMS

ACHP	Advisory Council on Historic Preservation
ACOE	Army Corps of Engineers
AHPA	Archaeological and Historic Preservation Act
BMP	Best Management Practice
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
Complex	North Cascades National Park Service Complex (North Cascades National Park, Ross Lake National Recreation Area and Lake Chelan National Recreation Area)
CWA	Clean Water Act
DCA	Designated Conservation Area
DO	Director's Order
EA	Environmental Assessment
EO	Executive Order
ESA	Endangered Species Act
FEIS	Final Environmental Impact Statement
FHA	Federal Highway Administration
GBMU	Grizzly Bear Management Unit
GMP	General Management Plan
HPA	Hydraulic project authorization
LACH	Lake Chelan National Recreation Area
MP	Milepost
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NOCA	North Cascades National Park
NPS	National Park Service
NRA	National Recreation Area
NRHP	National Register of Historic Places
OHW	Ordinary High Water
OHV	Off-road Vehicle
ORV	Outstandingly Remarkable Value
PCT	Pacific Crest Trail
PL	Public Law

ROLA	Ross Lake National Recreation Area
SHPO	State Historic Preservation Officer
USDA	United States Department of Agriculture
USFS	USDA Forest Service
USGS	United States Geological Survey
USDI	United States Department of Interior
USFWS	United States Fish and Wildlife Service
WDFW	Washington Department of Fish and Wildlife
WSR	Wild and Scenic River

CHAPTER 1. PURPOSE AND NEED

Project Background. The National Park Service (NPS) is evaluating management options for the flood-damaged portion of the Stehekin Valley Road within North Cascades National Park (NOCA) (Figure 1). Record flooding of the Stehekin River in 1995 and again in 2003 caused severe damage to the upper Stehekin Valley Road. The road provides access to Stephen Mather Wilderness trailheads and NOCA from the Lake Chelan National Recreation Area (LACH), and bisects the Wilderness. The Stehekin River carries large volumes of water during high flow, and there have been other large floods in recent years (e.g. 1989, 1990, and 1997) that have caused erosion of the roadbed.

The area of consideration is a 9.9-mile section of the upper Stehekin Valley Road between Car Wash Falls, milepost (MP) 12.9 and Cottonwood Camp (MP 22.8) surrounded by the Stephen Mather Wilderness (Figure 1). The 1995 flood made the road impassable to vehicles from Glory (MP 20.1) to the end of the road at Cottonwood Camp MP 22.8. The road between Car Wash Falls and Glory was reconstructed and reopened in 1996.

In October 2003, a record 500-year flood severely damaged sections of the road between Car Wash Falls and MP 15.3 near Bridge Creek (Figure 1). Sections of road were either completely removed, or filled with woody debris and sediment (Appendix A1). A large landslide occurred at MP 15 (Appendix A2). In several areas, the floodwaters completely washed away the large rock underlying the roadbed.

The 2003 flood made the road impassable to vehicles, cyclists, and stock from Car Wash Falls to MP 15.3. There is challenging but safe passage for experienced hikers and cyclists to walk and pack their gear around the washed out sections at low flow times of the year. There is no reroute around the landslide at MP 15, and no easy access around the slide. The cumulative damage of the 1995 and 2003 floods is described in detail in Chapter 6, Affected Environment Section 6.7.1: Visitor Access, Experience, and Park Operations.

The NPS is looking for a long-term solution to management of the Stehekin Valley Road within the Stephen Mather Wilderness. Park staff identified five possible alternatives for the road and trail system between Car Wash Falls and Cottonwood Camp. This Environmental Assessment (EA) analyzes the Preferred Alternative, the No Action Alternative, and two other reasonable alternatives and their impacts on the environment.

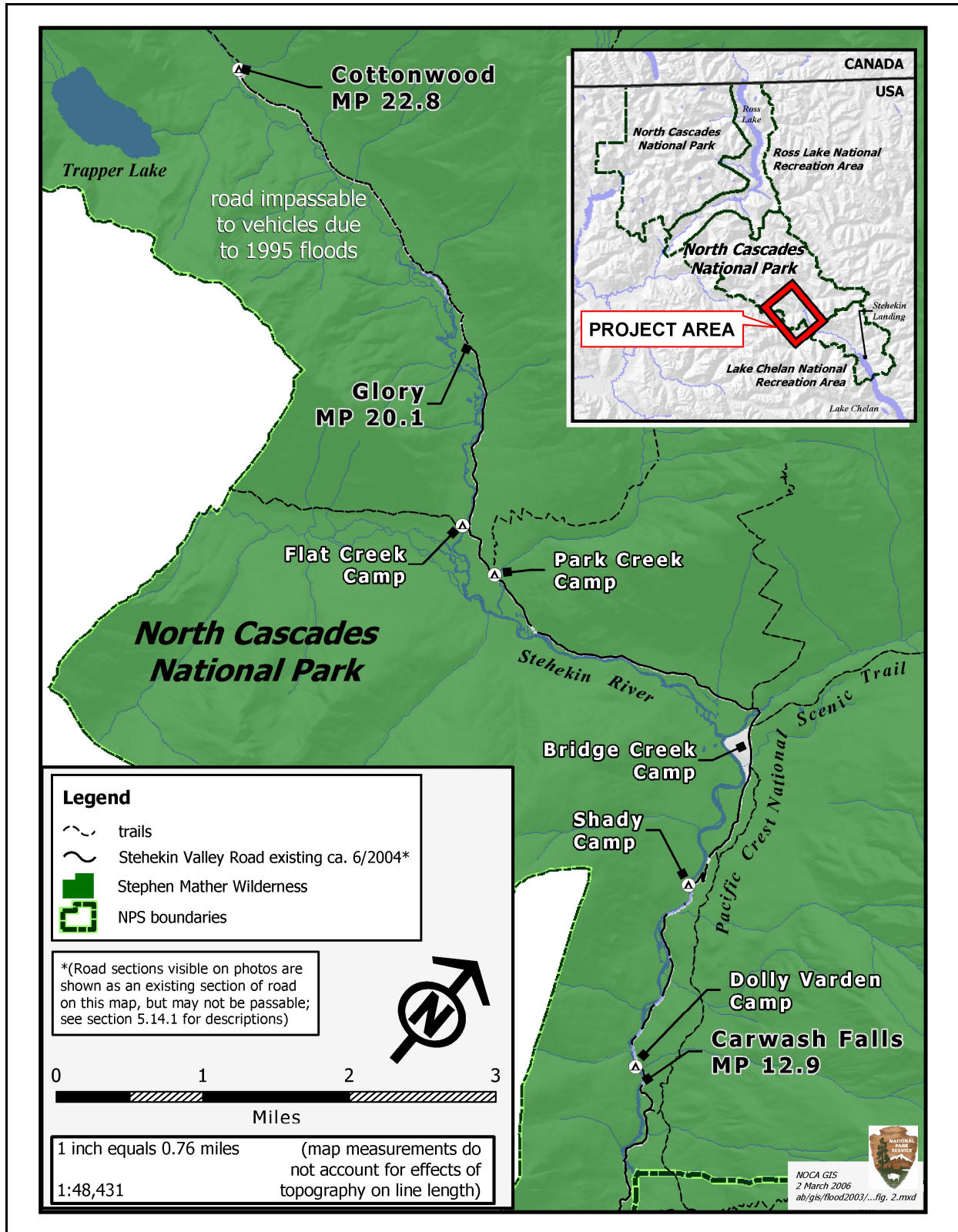
This EA has been prepared in accordance with the 1969 National Environmental Policy Act (NEPA) and implementing regulations, Chapter 40 Code of Federal Regulations (CFR) Parts 1500-1508; NPS Director's Order (DO) #12 and Handbook Conservation Planning, Environmental Impact Analysis, and Decision-making; and Section 106 of the National Historic Preservation Act (NHPA) of 1966 as amended, and implementing regulations, 36 CFR Part 800.

Purpose. The purpose of the proposed action is to define the nature and extent of future public and administrative access to the upper Stehekin Valley from Car Wash Falls to Cottonwood Camp.

Need. The Stehekin Valley Road between Car Wash Falls and Cottonwood Camp has become impassable to motor vehicles, bicycles, stock users, and unsafe for inexperienced hikers during high flows due to floods that occurred in 1995 and 2003, and an expanding landslide that began in 2003. There is challenging but safe passage for experienced hikers and cyclists to walk and pack their gear around the washed out sections at low flow times of the year. There is no reroute around the landslide at MP 15, and no easy access to do so.

Although the 1995 LACH General Management Plan (GMP) calls for retaining vehicle access to Cottonwood Camp, the nature and extent of the damage makes access problematic. Furthermore, the Washington Parks Wilderness Act (Public Law (PL) 100-668) compounds the problem of retaining motorized access.

Figure 1. Project Area



CHAPTER 2. RELEVANT LAWS, POLICIES, AND MANAGEMENT PLANS

2.1 PURPOSE, SIGNIFICANCE, AND MISSION OF THE NORTH CASCADES NATIONAL PARK SERVICE COMPLEX

PL 90-544, enacted October 2, 1968, established NOCA, Ross Lake National Recreation Area (ROLA), and LACH. The three units comprise what is administratively referred to as the North Cascades National Park Service Complex (Complex).

2.1.1 STATEMENT OF PURPOSE

According to the enabling legislation (PL 90-544), the purposes of the Complex are as follows:

- To preserve for the benefit, use, and inspiration of present and future generations certain majestic mountain scenery, snowfields, glaciers, alpine meadows, and other unique natural features, biological processes and cultural resources in the North Mountains of the State of Washington;
- To provide outdoor recreation use and enjoyment for the public, and for the conservation of the scenic, scientific, historic, and other values contributing to public enjoyment within Ross Lake and LACH; and
- To preserve and protect the lands legislatively designated as the Stephen Mather Wilderness for use and enjoyment of the public in a manner that will leave them unimpaired for future use and enjoyment as Wilderness.

2.1.2 STATEMENT OF SIGNIFICANCE

The Complex contains more glaciers than any other national park in the United States outside Alaska. The North Cascades Ecosystem has over half the glaciers in the lower 48 states. These glaciers are an important source of water for salmon, other wildlife, plants, and people in the Puget Sound region.

The vertical relief in the Complex, greater than 9,000 feet, and the great contrast between climates east and west of the Cascade crest provide habitat for one of the greatest diversities of flora and fauna in North America, including rare and sensitive species.

The Complex adjoins public lands preserved in Canada, and is the core of one of the largest protected wild areas in the United States. The Stephen Mather Wilderness encompasses 93 percent of the Complex, and is part of a larger contiguous wilderness areas, including: the Mount Baker, Pasayten, Noisy-Diosbud, Glacier Peak, Lake Chelan-Sawtooth, and Henry M. Jackson wilderness areas managed by the United States Department of Agriculture (USDA) Forest Service (USFS).

There is a large and expanding human population in close proximity to the Complex, and the lakes, rivers, and topography provide a wide array of recreational opportunities, including boating, camping, mountain biking, rock climbing, fishing, horseback riding, day hiking, and backpacking.

The Complex includes 75 eligible and 59 listed National Historic Register structures or sites, 3 Historic Districts, and over 250 archeological sites. It was home to at least four Native American tribes whose descendants live nearby. It includes, within its boundaries, three contemporary communities - Stehekin, Newhalem, and Diablo.

2.1.3 MISSION STATEMENT

As units of the National Park System, NOCA, ROLA, and LACH are dedicated to conserving, unimpaired, the natural and cultural resources and values of for the enjoyment, education, and inspiration of this and future generations. Managers of these units also share responsibility for advancing a great variety of national and international programs designed to help extend the benefits of natural and cultural resource conservation and outdoor recreation.

2.2 NPS Management Policies

NPS Management Policies (NPS 2000) provide management directives for making decisions. NPS Management Policies cover topics such as natural resource management, cultural resource management, Wilderness preservation and management, interpretation and education, park facilities, and commercial visitor services. The NPS Management Policies that are especially relevant to the proposed project are included below.

Many different types of uses take place in the hundreds of parks that comprise the national park system. The 1916 Organic Act, which created the NPS, directs the Service to conserve park resources “unimpaired” for the enjoyment of future generations. The 1970 NPS General Authorities Act, as amended in 1978, prohibits the NPS from allowing any activities that would cause derogation of the values and purposes for which the Parks have been established (except as directly and specifically provided by Congress). Taken together, these two laws impose on NPS managers a strict mandate to protect park resources and values, and a responsibility to actively manage all park uses and, when necessary, to regulate their amount, kind, time, and place. Throughout NPS Management Policies, the term “impairment” is construed to also encompass “derogation” (i.e. to detract or deviate from an expectation or a standard). Providing opportunities for appropriate public enjoyment is an important part of the Service’s mission.

Other park uses may be allowed as a right or a privilege, if law or regulation does not otherwise prohibit them. The Service allows only uses that are appropriate to the purpose for which the Park was established, and can be sustained without causing unacceptable impacts to park resources or values. Recreational activities and other uses that would impair a park’s resources, values, or purposes are not allowed. The only exceptions are activities directly and specifically mandated by Congress.

The fact that a park use may have an impact does not necessarily mean it will impair park resources or values for the enjoyment of future generations. Impacts may affect park resources or values and still be within the limits of the discretionary authority conferred by the Organic Act. However, negative or adverse environmental impacts are never welcome in national parks, even when they fall far short of causing impairment. The Service will not knowingly authorize a park use that would cause negative or adverse impacts unless it has been fully evaluated, appropriate public involvement has been obtained, and a compelling management need is present. In those situations, the Service will ensure that any negative or adverse impacts are the minimum necessary, unavoidable, cannot be further mitigated, and do not constitute impairment of park resources and values. When a use is mandated by law, but causes adverse impacts to park resources or values, the Service will take appropriate management actions to avoid or mitigate the adverse impacts. When a use is authorized by law, but not mandated, and may cause adverse impacts to park resources or values, the Service will avoid or mitigate the impacts to the point where there will be no unacceptable impacts; or, if necessary, the Service will deny a proposed activity or eliminate an existing activity. All proposals for park uses will be evaluated for:

- Consistency with applicable laws, Executive Orders (EOs), DOs, regulations, and policies;
- Consistency with existing plans for public use and resource management;
- Actual and potential effects on park resources and values;
- Total costs to the Service; and
- Whether the public interest will be served.

Park superintendents must continually examine all park uses to ensure that unanticipated and unacceptable impacts do not occur. Unless mandated by statute, only uses that meet the criteria listed in Section 8.2 (below) may be allowed. Specific uses will be guided by the following subsections of this chapter, and must comply with the other chapters of these NPS Management Policies. The Service will coordinate with appropriate state authorities regarding activities that are subject to state regulation, or to joint state/federal regulation.

Section 8.2 states: “Enjoyment of park resources and values by the people of the United States is part of the fundamental purpose of all parks. The Service is committed to providing appropriate, high quality opportunities for visitors to enjoy the Parks, and will maintain within the Parks an atmosphere that is open, inviting, and accessible to every segment of American society. However, many forms of recreation enjoyed by the public do not require a national park setting, and are more appropriate to other venues. The Service will:

- Provide opportunities for forms of enjoyment that are uniquely suited and appropriate to the superlative natural and cultural resources found in the Parks.
- Defer to local, state, and other federal agencies; private industry; and non-governmental organizations to meet the broader spectrum of recreational needs and demands.

To provide for enjoyment of the Parks, the NPS will encourage visitor activities that:

- Are appropriate to the purpose for which the Park was established;
- Are inspirational, educational, or healthful, and otherwise appropriate to the Park environment;
- Will foster an understanding of, and appreciation for, park resources and values, or will promote enjoyment through a direct association with, interaction with, or relation to park resources; and
- Can be sustained without causing unacceptable impacts to park resources or values.”

2.2.1 ROAD SYSTEMS (NPS 2000)

NPS Management Policies state: “Park roads will be well constructed, sensitive to natural and cultural resources, reflect the highest principles of park design, and enhance the visitor experience. Park roads... are intended to enhance the quality of a visit, while providing for safe and efficient travel, with minimal or no impacts on natural and cultural resources (9.2.1.1).”

2.2.2 FLOODPLAIN MANAGEMENT (NPS 2000)

Floodplain Management EO 11988 (May 24, 1977, 42 CFR 26951) and PL 93-234 Section 1 were issued “to avoid to the extent possible the short- and long-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative.” Authority for DO #77-2 Floodplain Management is found in the NPS Organic Act (16 USC 1-4) and delegations of authority contained in Part 245 of the United States Department of the Interior (USDI) manual.

EO 11988 requires federal agencies to provide leadership and take action to: 1) reduce the risk of flood loss, 2) minimize the impact of floods on human safety, health, and welfare, and 3) restore and preserve the natural and beneficial values served by floodplains. The NPS must implement these actions in carrying out its responsibilities for: 1) acquiring, managing, and disposing of Federal lands and facilities; 2) providing federally undertaken, financed, or assisted construction and improvements; and 3) conducting federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities.

EO 11988 also states: “In carrying out the activities described in Section 1 of this Order, each agency has a responsibility to evaluate the potential effects of any actions it may take in a floodplain; to ensure that its planning programs and budget requests reflect consideration of flood hazards and floodplain management; and to prescribe procedures to implement the policies and requirements of this Order.”

In keeping with EO 11988, the NPS will take no action that supports further development in the 100-year floodplain, where floods could threaten development (NPS 2000). NPS Management Policies state: “In managing floodplains on park lands, the NPS shall: 1) manage for the preservation of floodplain values, 2) minimize potentially hazardous conditions associated with flooding, and 3) comply with the NPS Organic Act and all other federal laws and EOs related to the management of activities in flood-prone areas, including EO 11988 Floodplain Management, NEPA, applicable provisions of the Clean Water Act (CWA), and the Rivers and Harbors Appropriation Act of 1899 (4.6.4).” Specifically, the NPS will:

- Protect and preserve the natural resources and functions of floodplains;
- Avoid the short- and long-term environmental effects associated with the occupancy and modification of floodplains;
- Avoid direct and indirect support of floodplain development and actions that could adversely impact the natural resources and functions of floodplains or increase flood risks; and
- Restore, when practicable, natural floodplain values previously affected by land use activities within floodplains.

When it is not practicable to locate or relocate development or inappropriate human activities to a site outside and not affecting the floodplain, the NPS will:

- Prepare and approve a Statement of Findings in accordance with procedures described in Procedural Manual 77-2 Floodplain Management;
- Take all reasonable actions to minimize the impact to the natural resources of floodplains;
- Use non-structural measures as much as practicable to reduce hazards to human life and property; and
- Ensure that structures and facilities are designed to be consistent with the intent of the standards and criteria of the National Flood Insurance Program (44 CFR Part 60).

Other important NPS floodplain-related policies (NPS 2000) state: “The Service will strive to site facilities where they will not be damaged or destroyed by natural physical processes. Natural hazard areas include sites with unstable soils and geologic conditions, fault zones, thermal areas, floodplains, flash-flood zones, fire-prone vegetation, and coastal high-hazard areas. Park development that is damaged or destroyed by a destructive, hazardous, or catastrophic natural event will be thoroughly evaluated for relocation or replacement by new construction at a different location. If a decision is made to relocate or replace a severely damaged or destroyed facility, it will

be placed, if practicable, in an area that is believed to be free from natural hazards. In areas where dynamic natural processes cannot be avoided, such as seashores, developed facilities should be sustainably designed (e.g. removable in advance of hazardous storms or other conditions) (9.1.1.6).”

2.2.3 WETLAND PROTECTION (NPS 2000)

NPS DO #77-1 establishes NPS Management Policies, requirements, and standards for implementing EO 11990 Protection of Wetlands (42 FR 26961). EO 11990 was issued by President Carter in 1977 "...to avoid to the extent possible the short- and long-term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative...."

EO 11990 Section 6 directed federal agencies to issue procedures to implement the EO. NPS wetland protection procedures were originally adopted together with EO 11988 (Floodplain Management) procedures in the 1980 NPS Floodplain Management and Wetland Protection Guidelines (45 FR 35916, minor revisions in 47 FR 36718). Experience with implementing the wetland procedures, and changes in wetland management concepts since they were first published, necessitated updating, streamlining, and clarifying NPS wetland policies and procedures in DO #77-1: Wetland Protection (October 22, 1998). The 1998 DO and the accompanying Procedural Manual #77-1 superseded and replaced the 1980 NPS wetland guidance. Included in DO #77-1 were: 1) adoption of a "no net loss of wetlands" goal, which was first proclaimed in 1989 by President George Bush and has been sustained by subsequent Administrations, and 2) adoption of the Cowardin et al. (1979) wetland classification system as the NPS standard for defining, classifying, and inventorying wetlands.

EO 11990 directs the NPS to: 1) provide leadership and to take action to minimize the destruction, loss, or degradation of wetlands, 2) preserve and enhance the natural and beneficial values of wetlands, and 3) avoid direct or indirect support of new construction in wetlands unless there are no practicable alternatives to such construction and the proposed action includes all practicable measures to minimize harm to wetlands in carrying out the NPS responsibilities related to:

- Acquiring, managing, and disposing of NPS lands and facilities;
- Construction and related development activities;
- Permitting activities as provided for under NPS regulatory authorities; and
- Conducting activities, programs, or planning efforts affecting use of NPS lands in a manner consistent with EO 11990 and with the "no net loss of wetlands" goal.

NPS Management Policies state: "The Service will manage wetlands in compliance with NPS mandates and the requirements of EO 11990 Wetland Protection, the CWA, and the Rivers and Harbors Appropriation Act of 1899, and the procedures described in DO #77-1 Wetland Protection. The Service will: 1) provide leadership and take action to prevent the destruction, loss, or degradation of wetlands, 2) preserve and enhance the natural and beneficial values of wetlands, and 3) avoid direct and indirect support of new construction in wetlands unless there are no practicable alternatives and the proposed action includes all practicable measures to minimize harm to wetlands." The NPS has adopted a goal of "no net loss of wetlands," and will strive to achieve a longer-term goal of net gain of wetlands Service-wide.

For proposed new development or other new activities, plans, or programs that are either located in or otherwise have the potential for direct or indirect adverse impacts on wetlands, the NPS will employ the following sequence;

- Avoid adverse wetland impacts to the extent practicable;
- Minimize impacts that cannot be avoided; and
- Compensate for remaining unavoidable adverse wetland impacts by restoring wetlands that have been previously destroyed or degraded.

2.2.4 RESOURCE PROTECTION (NPS 2000)

All federal actions taken by the NPS must be in accordance with environmental and historic preservation laws. The NPS will strive to understand, maintain, restore, and protect the inherent integrity of both natural and cultural resources. In general, the NPS is guided by the 1916 Organic Act, which states that both natural and cultural resources will be conserved for the enjoyment of this, and future generations. Other laws, including NHPA, NEPA, CWA, the Clean Air Act (CAA), the 1973 Endangered Species Act (ESA), and the Archeological Resources Protection Act, govern the extent of actions taken by the NPS. These laws promote natural and cultural resource protection and preservation.

2.2.5 SOUNDSCAPE PRESERVATION AND NOISE MANAGEMENT (NPS 2000)

DO #47 defines NPS operational policies that will require, to the fullest extent practicable, the protection, maintenance, or restoration of the natural soundscape resource in a condition unimpaired by inappropriate or excessive noise sources. An important part of the NPS mission is to preserve and/or restore the natural resources of the Parks, including the natural soundscapes associated with units of the national park system. Natural sounds are intrinsic elements of the environment that are often associated with parks and park purposes. They are inherent components of "the scenery and the natural and historic objects and the wildlife" protected by the NPS Organic Act. They are vital to the natural functioning of many parks and may provide valuable indicators of the health of various ecosystems. Soundscape refers to the total ambient acoustic environment associated with a given environment (sonic environment) in an area such as a national park.

It also refers to the total ambient sound level for the Park. In a national park setting, this soundscape is usually composed of both natural ambient sounds and a variety of human-made sounds. The natural ambient sound level of a park is the natural soundscape of that park. It is comprised of the natural sound conditions in a park that exist in the absence of any human-produced noises. These conditions are actually composed of many natural sounds, near and far, which often are heard as a composite, not individually. In an acoustic environment subjected to high levels of human-caused sound, natural ambient sounds may be masked by other noise sources. The natural soundscape is an important resource of parks; there may also be important relationships between how this environment is perceived and understood by individuals and society. Natural ambient sound is considered synonymous with the term "natural quiet." This is the basis for determining the "affected environment" in NEPA documents and other EAs related to human actions producing inappropriate or intrusive impacts on the Park soundscape.

2.3 Lake Chelan NRA General Management Plan

The LACH GMP and Final Environmental Impact Statement (FEIS) (NPS 1995a) provide broad management objectives and specific actions to achieve management objectives. The river, floodplain, wetland, visitor access, experience, and park operations, noxious and invasive plants actions that apply to the project area are listed below.

2.3.1 RIVER, FLOODPLAIN, AND WETLAND PROTECTION

The 1995 LACH GMP and FEIS include the following river, floodplain, and wetland protections.

“Preserve or restore ecological processes and conditions in wetland, floodplain, shoreline, and riparian areas.”

“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.”

“The NPS would not manipulate the Stehekin River to protect federal property, except roads and bridges subject 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) the actions will have less impacts than other alternatives, and 4) the actions are permitted by the county, state, and other federal agencies. No new road construction will be proposed in active river erosion zones. Previously manipulated sites that do not meet the above criteria for future manipulation would be restored to approximate natural conditions.”

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

“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 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.”

2.3.2 VISITOR ACCESS, EXPERIENCE, AND PARK OPERATIONS (NPS 2001)

The 1995 LACH GMP and FEIS include the following guidelines for visitor access, experience, and park operations.

“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.”

“Enjoyable and efficient transportation would be provided from the Landing to Bridge Creek 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.”

“The current character of the [Stehekin] road from the Landing to Harlequin Bridge, and from 9-Mile and High Bridge will 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 Camp.”

“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

Camp. Only the public shuttle service, hikers, horses, and bicycles would be allowed to use the road from Bridge Creek to Cottonwood Camp. The NPS would seek a concessionaire 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 Camp 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.”

“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 camps.”

“The road system would not be expanded. Unnecessary roads would be eliminated and the areas restored to natural conditions.”

“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.”

“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.”

“Shuttle buses, operated by the NPS and/or the private sector, would become the primary motorized form of transportation.”

“Visitors would be encouraged to use non-motorized forms of transportation (e.g. walking, riding bicycles or horses, and renting boats and canoes) within the NRA.”

“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 on resources and to minimize conflicts among users. Activities that infringe on the solitude and natural beauty of the NRA or cause unacceptable impacts on resources would be discouraged or prohibited. These would include....using off-road vehicles (OHV) or mountain bikes on trails.”

2.3.3 NOXIOUS AND INVASIVE PLANTS

The 1995 LACH GMP and FEIS include the following guidelines for control of noxious and invasive plants.

“Preserve and restore, where feasible, species and ecological relationships that would exist were it not for human impacts including control of non-native species, and comply with federal, state, and local laws and guidelines.”

“The NPS would monitor and attempt to protect incoming gravel, soil, and firewood from non-native plants, and would control selected non-native species (e.g. knapweed, common mullein, knotweed, and rush skeletonweed) that threaten to spread and adversely affect NRA resources.”

2.4 Wilderness Management Plan

The Wilderness Management Plan (NPS 1989) identifies the framework for how the NPS will manage the natural resources and spirit of the North Cascades on to the next generation unimpaired. The goals and objectives of the Wilderness Management Plan are consistent with the LACH GMP objectives that state the Complex will be managed "...so as to conserve, enhance, or restore the Wilderness, natural resources, and those ecological relationships and processes that would prevail were it not for human influences."

2.5 National Historic Preservation Act

The NHPA, as amended (1992), establishes that the historical and cultural foundations of the Nation's heritage be preserved. Section 106 of the NHPA requires that federal agencies that have direct or indirect jurisdiction over undertakings take into account the effect of those undertakings on cultural resources eligible for or included on the National Register of Historic Places (NRHP). This section also provides the Advisory Council on Historic Preservation (ACHP) and the State Historic Preservation Officer (SHPO) an opportunity to comment on the undertaking. The 1992 amendments to the NHPA have further defined the roles of Native American tribes and the affected public in the Section 106 process.

2.6 National Wild and Scenic Rivers System

The 1968 Wild and Scenic Rivers (WSR) Act (16 USC 1271-1287) states: "...certain 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 free-flowing condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations."

The NPS has determined that all segments of the Stehekin River are eligible for Wild and Scenic Rivers designation based on their free-flowing conditions and outstanding resource values (NPS, 2002). As such, it is an "Agency identified, 5(d)(1) Study River". Interagency guidance regarding the Wild and Scenic River Act requires the NPS to "protect the values that make the river eligible" and "attempt to avoid or mitigate adverse effects" (WSR Section 7, 2004). NPS Policies 2001(Sec. 4.3.4.) further state, "no management actions may be taken that could adversely affect the values that qualify a river for inclusion in the National Wild and Scenic Rivers system".

2.7 Clean Water Act

The 1972 federal Water Pollution Control Act as amended by the 1977 CWA is a national policy to restore and maintain the chemical, physical, and biological integrity of the Nation's waters; to enhance the quality of water resources; and to prevent, control, and abate water pollution. NPS Management Policies also provide direction for the preservation, use, and quality of water in national parks.

2.8 Special Status Species

2.8.1 ENDANGERED SPECIES ACT (ESA) OF 1973

Under the 1973 ESA, the NPS must insure that any action authorized, funded, or carried out is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of habitat of such species. Section 7 of the ESA contains an affirmative mandate for conservation of listed species, and includes a requirement for consultation

with the U.S. Fish and Wildlife Service (USFWS) for any NPS action that may affect a listed species or critical habitat.

2.8.2 NATIONAL PARK SERVICE POLICIES, 2001; SECTION 4.4.2.3 MANAGEMENT OF THREATENED OR ENDANGERED PLANTS AND ANIMALS

NPS Management Policies state, "The Service will survey for, protect, and strive to recover all species native to national park system units that are listed under the Endangered Species Act. The Service will fully meet its obligations under the NPS Organic Act and the Endangered Species Act to both pro-actively conserve listed species and prevent detrimental effects on these species." To meet these obligations, the Service will "manage designated critical habitat, essential habitat, and recovery areas to maintain and enhance their value for the recovery of threatened and endangered species." The NPS will also "...cooperate with other agencies to ensure that the delineation of critical habitat, essential habitat, and/or recovery areas on park-managed lands provides needed conservation benefits to the total recovery efforts being conducted by all the participating agencies."

2.8.3 DIRECTOR'S ORDER #77-8: ENDANGERED SPECIES (DRAFT)

This Order (currently in draft form), issued by the Director of the NPS, further clarifies NPS responsibilities under ESA for management of federally endangered, threatened, proposed, candidate, rare, and sensitive species; experimental populations; designated and proposed critical habitat; and state-listed species. DO 77-8 requires the NPS to "...survey, protect, monitor, restore, and strive to recover all species listed, proposed, or candidates for listing under the ESA that are native to NPS units." It also requires the NPS to manage, to the greatest extent possible, state, and locally endangered and threatened species as federally listed species.

2.8.4 NPS AND USFS INTERIM POLICY ON GRIZZLY BEAR RECOVERY

Managing human access in grizzly bear habitat is an important recovery and conservation issue for this federally threatened species. Research indicates roads and high use trails trigger avoidance among grizzlies and can drive them from areas of otherwise suitable habitat. In light of this research, the NPS and the USFS have agreed to an interim policy of no net loss of "core areas" in the North Cascades ecosystem. Core areas are more than 500 meters (1,640 feet) from roads or high-use trails within each of the Grizzly Bear Management Units (GBMU).

Under this agreement, construction of roads or high-use trails in a core area requires closure of a road and/or trail of similar size, use level, and habitat within the GBMU where the loss occurs. This agreement will remain in effect for NOCA until the GMP is revised and long-term measures are formally adopted for grizzly bear recovery.

The project area is within the 95,000-acre Upper Stehekin River GBMU.

CHAPTER 3. RELATIONSHIP OF THE PROPOSED ACTION TO OTHER PLANNING EFFORTS

3.1 Stehekin Valley Road Improvement Project EA (NPS 2005a)

This EA analyzes a NPS proposal to pave 5.15 miles of the Stehekin Valley Road with asphalt from Harlequin Bridge (MP 4) to above Courtney Ranch entrance at the winter parking turnaround (MP 9.15). The pavement will connect with the existing pavement that ends at MP 4. The road will be a single lane approximately 14-feet wide with appropriately spaced turnouts for two-way traffic (generally not more than 500 feet apart). In two places, the road would be rerouted to move the road further from the river where streambank erosion is threatening the stability of the road and/or out of the 25-year floodplain. In other places, the road grade will be raised to minimize the road flooding. There may be several riverbank barbs installed to control the riverbank erosion, one at Wilson Creek and two at MP 8. A series of drainage improvements are also proposed including culvert repair, replacement, and installations; minor tributary stream channelization; and construction of roadside ditches.

3.2 Protect Floodplain and Provide Motor Vehicle Access Mile 9-10 Stehekin Valley Road EA (NPS 2005b)

The flood of 2003 permanently inundated a section of the Stehekin Valley between MP 9 and 10. In 2005, this project, known as “Coon Run” (NPS 2005b), built a bridge across the wetland/side-channel and reestablished vehicle access as far as Car Wash Falls (MP 12.9). The Proposed Action was needed to reduce impacts of vehicular traffic on floodplain and riparian resources and to provide motorized access to the High Bridge Historic District and trailheads along the upper Stehekin Valley Road for people who are not able to reach the upper valley by bicycle, foot, or stock prior to project implementation.

3.3 Upper Stehekin Valley Road, Flat Creek to Cottonwood Camp EA (NPS 1997)

The November 1995 flood severely damaged portions of the road between Flat Creek and Cottonwood Camp. The Stehekin River changed course and occupied approximately 3,000 feet of the road, making it impassable. Following public review and comment on the Flat Creek to Cottonwood Camp EA (NPS 1997), the NPS decided to “temporarily close the road” and reevaluate the damaged area every year for possible reconstruction. The river has continued to occupy the old roadbed, and the road has remained closed at what is referred to as the “Glory” turnaround.

CHAPTER 4. ISSUES AND IMPACT TOPICS

4.1 Derivation of Issues and Impact Topics

NPS resource specialists identified issues and concerns that may affect this project due to potential impacts. Input from other federal, state, and local agencies, and the general public were also considered.

Specific impact topics were developed for discussion focus and comparison of the environmental consequences of each alternative. These impact topics were identified based on federal laws, regulations, and EOs, NPS Management Policies, and NPS staff knowledge of limited or easily impacted resources.

A brief rationale for the selection of each impact topic is given below, as well as the rationale for dismissing specific topics from further consideration.

4.2 Impact Topics Included in This Document

4.2.1 SOILS

NPS Management Policies directs the NPS to "...strive to site facilities where they will not be damaged or destroyed by natural physical processes. Natural hazard areas include sites with unstable soils and geologic conditions ... Park development that is damaged or destroyed by a destructive, hazardous, or catastrophic natural event will be thoroughly evaluated for relocation or replacement by new construction at a different location. If a decision is made to relocate or replace a severely damaged or destroyed facility, it will be placed, if practicable, in an area that is believed to be free from natural hazards. In areas where dynamic natural processes cannot be avoided....developed facilities should be sustainably designed (9.1.1.6)."

The project area includes a 9.9-mile section of the upper Stehekin Valley Road within the Stehekin River Valley between Car Wash Falls (MP 12.9) to Cottonwood Camp (MP 22.8) (Figure 1). A 100-year flood in 1995 made the road impassable to vehicles from Glory (MP 20.1) to the end of the road at Cottonwood Camp (MP 22.8). The road was reconstructed as far as MP 20.1 in 1996, and a vehicle turnaround was constructed at Glory to access a new Cascade Pass Trailhead. The official Cascade Pass Trailhead was at Cottonwood Camp prior to the 1995 flood.

The upper road washed out again by a record level, 500-year flood in October 2003. The 2003 flood severely damaged sections of the Stehekin Valley Road between Car Wash Falls and Glory, and this section is impassable to vehicles, cyclists, and stock (Appendix A1 & A2). The road is unsafe for inexperienced hikers from Car Wash Falls to MP 15.3 (near Bridge Creek) because sections of road were either scoured out or filled with woody debris and sediment. There is challenging but safe passage for experienced hikers and cyclists to walk and pack their gear around the washed out sections between Car Wash Falls and MP 15.3 at low flow times of the year.

In several areas, the floodwaters completely washed away the large rock underlying the roadbed, and there is a landslide approximately 400-feet long by 140 feet high at MP 15 that has eliminated a section of the road (Appendix A1 & A2). The landslide is on unconsolidated glacial till and will not reach a stable angle of repose (a slope of approximately 35°) for some time to come. There is a depositional point bar across from the slide that forces the river against the toe of the slide during peakflows, and the slide has intercepted groundwater, midway between the old road surface and the river, adding to the long-term instability of the landslide. There is no reroute around the landslide at MP 15, and no easy access to do so.

The road between MP 15.3 and Glory is impassable for vehicles at MP 17.4, MP 17.5, and Glory (MP 20.1) due to washouts or deposition. Hikers and stock can pass around these areas. One alternative would reconstruct the road in its former location within the Stehekin River corridor between Car Wash Falls and Glory. This alternative would require approximately 71,100 cubic yards (yd³) of fill and 1,985 yd³ of surface rock, rock blasting, and concrete work to rebuild the road within the Stehekin River floodplain.

Another alternative would reroute the Stehekin Valley Road to the Old Wagon Road/Pacific Crest Trail (PCT) from MP 12.7 (0.2 miles south of Car Wash Falls parking area) to MP 15.3 (0.6 miles south of Bridge Creek) and reconstruct the road between MP 15.2 and Cottonwood Camp (MP 22.8) (Appendix A3 & A4). This alternative would cause some soil compaction that could adversely impact an old growth western redcedar wetland that was partially killed by the Shady Fire in August 2005. Therefore, topography, geology, and soils are included in the EA.

4.2.2 HYDROLOGY, CHANNEL MORPHOLOGY, FLOODPLAINS

NPS Management Policies direct the Park to "...strive to site facilities where they will not be damaged or destroyed by natural physical processes. Natural hazard areas include sites [in]...floodplains, and flash-flood zones. Park development that is damaged or destroyed by a destructive, hazardous, or catastrophic natural event will be thoroughly evaluated for relocation or replacement by new construction at a different location. If a decision is made to relocate or replace a severely damaged or destroyed facility, it will be placed, if practicable, in an area that is believed to be free from natural hazards. In areas where dynamic natural processes cannot be avoided, ...developed facilities should be sustainably designed (9.1.1.6)."

The LACH GMP directs the NPS to preserve or restore ecological processes and conditions in floodplains and riparian areas. The GMP also provides guidelines for actions that affect the Stehekin River and the Stehekin Valley Road, and allows manipulation of the river for road projects in the erosion/river conflict zones under certain conditions. *It is important to note* that the GMP was signed prior to the road-damaging floods of 1995, 1997, and 2003.

EO 11988 Floodplain Management requires an examination of impacts to floodplains and the potential risk involved in placing facilities within floodplains. NPS Management Policies, DO #77-2 Floodplains Management, DO #77-1 Wetlands Protection, DO #2 Planning Guidelines, and DO #12 Conservation Planning, Environmental Planning, Environmental Impact Analysis, and Decision Making provide guidelines for proposals in floodplains.

The Stehekin River carries large volumes of water during typical peakflows, and is prone to severe flooding in the spring and fall. The largest floods recorded occurred in 1995 and 2003, and caused large changes in the river and associated damage to the Stehekin Valley Road. There have been other large floods in recent years (e.g. 1989, 1990, and 1997) that also caused road damage.

The No Action Alternative would allow the flood-damaged road, Dolly Varden Camp, and the landslide erosional processes to continue until equilibrium is reached. Alternative C would rebuild the road in its former location in the 100-year floodplain of the Stehekin River where periodic flooding would continue. Because the No Action Alternative and all of the action alternatives would beneficially or adversely impact channel morphology and floodplains, or be affected by hydrology to varying degrees, these impact topics are included in the EA.

4.2.3 WATER QUALITY

The 1972 federal Water Pollution Control Act as amended by the 1977 CWA and the NPS Management Policies provide direction for the preservation, use, and quality of water in national parks.

The Stehekin River is a Category I waterway under the Water Quality Standards for Surface Waters of the State of Washington (WSL 2003). Category I waterways meet the tested standards for clean water, and are given maximum protection under Washington State water quality regulations (WAC 173-201A). In its current condition, the Stehekin Valley Road between Car Wash Falls and Bridge Creek is susceptible to ongoing erosion, particularly the fill around the culverts and the active landslide at MP 15 (Appendix A1). The road surface that survived the record flood in 2003 is stable.

Several of the action alternatives would require in-water work for new culverts, or bridges; earth disturbance in the active floodplain; and ongoing road and trail maintenance. Rebuilding the road in its former location would also require periodic reconstruction due to flood damage. These activities would be sources of short- and long-term turbidity and sedimentation, and would affect water quality to varying degrees. Therefore, water quality is included in the EA.

4.2.4 FISHERIES AND AQUATIC HABITAT

The Stehekin River is within the range of ESA listed Columbia River bull trout (*Salvelinus confluentus*), and westslope cutthroat trout (*Oncorhynchus clarki lewisi*), a Washington State Species of Concern, occurs throughout the Stehekin River and its tributaries. Historically, bull trout inhabited the Stehekin River and Lake Chelan, but the last confirmed report of bull trout in Lake Chelan was in 1957. It is believed that bull trout may have been extirpated from the watershed, but in 1993, there were several unconfirmed reports of bull trout being captured in the Stehekin River (NOAA Fisheries 2004). In lieu of specific information on habitat use or conditions, the NPS manages activities: 1) so as not to further degrade existing instream habitat, 2) to protect any potential remaining individuals or population, and 3) to preserve the option of species restoration.

Reconstructing the road in its prior location has a high probability of ongoing, periodic erosion and sediment delivery, and adverse impacts to bull trout, cutthroat trout, and aquatic habitat. Rerouting the road to the PCT would require crossing numerous perennial streams including Canim, Buzzard, and McGregor creeks that may affect fish passage and/or water quality. Because the No Action and the action alternatives would affect fish passage, aquatic habitat, water quality, channel morphology, hydrology, and the floodplain either beneficially or adversely to varying degrees, fisheries and aquatic habitat are included in the EA.

4.2.5 VEGETATION (COMMON NATIVE, SPECIAL STATUS, RIPARIAN, WETLAND, NOXIOUS/INVASIVE)

The 1916 NPS Organic Act and NPS Management Policies serve to protect the components and processes of naturally occurring biotic communities, including the natural abundance, diversity, and ecological integrity of plants. The congressionally designated Stephen Mather Wilderness encompasses approximately 93 percent of the Complex, and protects vegetative communities. The No Action Alternative and most of the action alternatives would require little or no clearing of common native vegetation. One action alternative would require clearing common native vegetation to relocate the road within a new congressionally designated non-Wilderness road corridor, and creating a new PCT in the Wilderness. Therefore, common native vegetation is included in the EA.

ESA requires federal agencies to analyze the potential impacts of federal actions on all ESA listed, candidate, and proposed plant species and their proposed or designated critical habitats. In addition, NPS Management Policies require examination of the impacts of a proposed action on state listed threatened, endangered, candidate, rare, declining, and sensitive plant species. There are no federally listed, candidate, or proposed species in the project area. Therefore, ESA listed plant species are not included in the EA.

The NPS surveyed the project area for Washington State sensitive plants in June and July 2005. There were no Washington State sensitive species found. Therefore, Washington State sensitive plants were not included in the EA.

The vegetation adjacent to the Stehekin Road, developed camps, dispersed campsites, and trail system has been altered by human development and use. Impacts from these developments and ongoing uses, particularly the loss of woody riparian vegetation that helps stabilize riverbanks have exacerbated the problem of rapid scour and erosion during flooding. Riparian areas are naturally limited, and have disproportionately high ecological and hydrologic values relative to their area. Riparian areas would be affected by the alternatives to varying degrees. As a result, riparian vegetation is discussed in the EA.

EO 11990 and DO #77-1 Wetland Protection and NPS Management Policies require wetland protection, preservation of wetlands, and wetland functions and values, and avoidance of direct or indirect impacts to wetlands whenever there are practical alternatives. Like riparian habitat, wetlands are naturally limited and have disproportionately high ecological and hydrologic values relative to their area. The NPS and U.S. Army Corps of Engineers' (ACOE) guidelines for wetland delineation were used to identify wetlands in the project area. There is a small (<1 acre) old growth western redcedar wetland on the PCT near Bridge Creek that experienced some mortality in the August 2005 Shady Fire that may be adversely impacted by the road reroute (Alternative D). Therefore, wetlands are included in the EA.

Noxious and invasive weeds are an increasing problem within the Complex, and the cost of treating noxious and invasive weeds increases annually. These species are associated with soil disturbance and roads, trails, and camps, and are introduced or transported by fill material, vehicles, foot traffic, livestock, manure, and hay. For example, diffuse knapweed (*Centaurea diffusa*) is a highly competitive, noxious weed that was accidentally introduced to the Park, and orchard grass (*Dactylis glomerata*) and bulbous bluegrass (*Poa bulbosa*) are invasive species that are current problems in the project area (Bivin pers. comm. 2005). The action alternatives would cause surface disturbance and create potential seedbeds for noxious and invasive weed seeds, particularly along the roads and trails and in camps to varying degrees. For this reason, noxious and invasive weeds are included in the EA.

The project area contains suitable habitat for various wildlife species. Vegetation as a component of wildlife habitat is discussed in the EA under the next impact topic (Section 4.2.6: Special Status Terrestrial and Amphibious Wildlife).

4.2.6 SPECIAL STATUS TERRESTRIAL AND AMPHIBIOUS WILDLIFE

The NEPA process requires an analysis of the potential impacts of a proposed action on all components of affected ecosystems. NPS Management Policies requires protection of the components and processes of naturally occurring biotic communities, including the natural abundance, diversity, and ecological integrity of plants and animals. ESA requires federal agencies to analyze the potential impacts of federal actions on all ESA listed, candidate, and proposed species

and their proposed or designated critical habitats. In addition, NPS Management Policies requires examination of the impacts of a proposed action on state listed threatened, endangered, candidate, rare, declining, and sensitive species. The terrestrial and amphibious wildlife species addressed in the EA are either federal or Washington State special status (i.e. federal or state listed species).

The No Action Alternative and all the action alternatives would affect aquatic and wetland habitats that many special status species use on daily, seasonal, or reproductive bases. One or more of the action alternatives may adversely impact special status wildlife due to construction activity, post-project habitat alteration, changes in human activity levels and use, creation of artificial wildlife travel corridors, or changes in Wilderness boundaries. One alternative would reconstruct the road along the Stehekin River, separating riparian and upland areas from the river. Another alternative would construct the new road along the existing PCT and reroute the PCT to a new location, which would involve short- and long-term alteration of terrestrial, riparian, and wetland habitat, and numerous perennial stream crossings including Canim, Buzzard, and McGregor creeks. Because avoidance, reproductive disturbance, and/or increases in road-related wildlife mortalities could result if the road is constructed in, or adjacent to, important wildlife habitats, special status terrestrial and amphibious wildlife are included in the EA.

4.2.7 VISITOR ACCESS, EXPERIENCE, AND PARK OPERATIONS

The Organic Act directs the NPS to promote and regulate the use of national parks to conserve resources for their enjoyment by existing and future generations. NPS Management Policies and DO #17 Tourism identify visitor use patterns and the desired park carrying capacity, and encourage or allow appropriate recreational activities within the various park units. The LACH GMP requires the NPS to protect cultural and natural resources, and provide safe visitor facilities and services. The LACH GMP authorizes both motorized and non-motorized uses within the project area. The NPS is responsible for providing a reasonable level of maintenance and visitor safety on the designated roads and trails within the Complex, including the project area.

Local residents as well as visitors from outside the area enjoy the numerous attractions of the project area, including the Stehekin River (an eligible WSR), Stephen Mather Wilderness, PCT, and several historic sites. The Park's primary user groups include hikers, cyclists, and stock users who access the Park during the summer. The project area receives minimal winter use, but is designated as open to snowmobile use (Stehekin Valley Road from High Bridge to Cottonwood Camp per 36 CFR 7.66) and cross-country skiing on the PCT and Stehekin Valley Road (Green Trails Maps 2001).

Historically, visitors have been able to access the project area via the Stehekin Valley Road or any of several trails.

It is reported that the Stehekin Valley Road was built on the north side of the Stehekin River in 1897 and originally provided access to mines in Horseshoe Basin 3.4 miles above Cottonwood Camp (NPS 1995b). Prior to the 2003 flood, the road was the primary means of access to trailheads and camps in the upper Stehekin Valley, and shuttle services transported visitors to Glory (Figure 1). Before the 1995 flood, the shuttle service ran as far as Cottonwood Camp.

The 2003 flood made the road impassable to vehicles, cyclists, and stock from Car Wash Falls to Bridge Creek at high flows. There is challenging but safe passage for experienced hikers and cyclists to walk and pack their gear around the washed out sections at low flow times of the year. There is no reroute around the landslide at MP 15, and no easy access to do so. The frequency of large floods has increased in recent years, and flood damage to the road would continue if the road were rebuilt within the 100-year floodplain.

There is easy access to other park trails via the PCT. The PCT is within the Wilderness and is a National Scenic Trail that is designated as a non-mechanized trail open to foot and stock travel only. Bicycles and motorized vehicles are not permitted on the PCT. If the road is not rebuilt or rerouted, bicycle use would end at MP 12.9 near Car Wash Falls.

Because the alternatives would have either adverse or beneficial affects on Park user groups, some of the resources that attract visitors to the area, and motorized and non-motorized access within the Park, visitor access and experience is included as an impact topic in the EA.

Park Operations activities including facilities maintenance, noxious and invasive weed control, road and trail maintenance, fire suppression, emergency services, and search and rescue, as well as Park Operations budgets would be affected by motorized vehicle access, so this impact topic is included in the EA.

4.2.8 SOCIO-ECONOMICS

NEPA and DO #12 (Conservation Planning, Environmental Impact Analysis, and Decision-making) direct NPS to analyze socio-economic aspects of the proposed action in NEPA planning. Socio-economic considerations related to the project include the local and regional economy, and the availability of Park funding to implement the proposed action.

A substantial portion of the local Stehekin economy is dependent on Park visitor services, such as the Stehekin Valley Road shuttle services, overnight accommodations, bicycle rentals, and drop camp services. The nature and quantity of visitor services needed to provide access and a quality recreation experience for Park visitors would vary depending on the alternative selected. Each of the alternatives would also vary in socioeconomic impacts like the level of expenditures made into the regional economy for construction materials, employment opportunities during construction and rehabilitation, and the NPS funding needed to implement the action. For these reasons, socio-economics is discussed as an impact topic in the EA.

4.2.9 WILDERNESS

The Washington Park Wilderness Act of 1988 (PL 100-668; November 16, 1988) designated the Stephen Mather Wilderness, which encompasses 93 percent of the Complex. The Stephen Mather Wilderness is connected to contiguous wilderness, including the Mount Baker, Pasayten, Noisy-Diosbud, Glacier Peak, Lake Chelan-Sawtooth, and Henry M. Jackson wilderness areas managed by the USDA Forest Service.

The Stehekin Valley Road bisects the Stephen Mather Wilderness within the project area. The Wilderness boundary within the project area is defined as 50 feet from either side of the centerline of the Stehekin Valley Road *as it existed at the time of the bill's passage* (Figure 1). By law, the roadbed and the use of motorized or mechanical conveyances is limited to this 100-foot wide corridor.

One of the proposed alternatives would reconstruct the Stehekin Valley Road within the currently designated Wilderness, and therefore require a new non-Wilderness road corridor and a legislative change to the Wilderness boundary. Congress has passed some bills for minor, boundary changes. For example, the boundary of a national forest Wilderness in Utah was adjusted to exclude an active gypsum mine that was within the designated Wilderness (Egger pers. comm. 2005). All of the alternatives would have varying short or long-term beneficial or adverse impacts to the character of the Wilderness and/or require congressional changes in designated Wilderness boundaries within the project area. For the above reasons, Wilderness is addressed as an impact topic in this EA.

4.2.10 PACIFIC CREST TRAIL

The project area contains a very short segment (~three miles) of the PCT, a nationally designated scenic trail that extends for 2,655 miles from Mexico to Canada (USFS 2005a). The PCT is classified as a non-motorized, non-mechanized trail, so bicycles, vehicles, and snowmobiles are not allowed on the trail. The portion of the PCT that lies within the project area is a constructed, blazed trail authorized for hiking, stock, and cross-country ski use.

One of the proposed alternatives would reroute the Stehekin Valley Road to the current location of the PCT, and move the PCT to a new location. For this reason, the PCT is included as an impact topic in the EA.

4.2.11 WILD AND SCENIC RIVERS

Under the 1968 WSR Act (16 USC 1271-1287), "...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 free-flowing condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations." The entire length of the Stehekin River is eligible for potential inclusion in the National WSR System based on its free-flowing condition and Outstandingly Remarkable Values (ORVs) (NPS 2002). ORVs along the river include wildlife, fish, prehistoric resources, historic resources, geology, scenic resources, and recreation. Segment 2 of the river, from High Bridge to Cottonwood Camp (MP 11.2 to 22.8) is eligible with a "Scenic" classification because it has limited access by roads and minimal evidence of human activity.

Eligible rivers must be managed in a manner so as not to impair their suitability for inclusion in the National WSR System. If the Stehekin River were designated by Congress as a WSR, a ¼-mile corridor on either side of the river would be designated to preserve the Wild and Scenic values of the river. The project area lies entirely within this ¼-mile corridor. Some components of the alternatives under consideration could affect the floodplain of the river, the riverbank, stream flow, scenic quality, and other ORVs. The river was found eligible with existing developments (including the Stehekin Valley Road) in place; however, at least one proposed alternative would require substantial modification of the riverbank and would require an ACOE 404(d) stream channel alteration permit and a Washington Department of Fish and Wildlife (WDFW) Hydraulic project authorization (HPA). This alternative may affect the river's current flow pattern, scenic quality, other ORVs, and possibly its eligibility under a scenic classification. Because each of the five alternatives would have varying adverse or beneficial affects to the river's scenic and other ORVs, WSR is included as an impact topic in this EA.

4.2.12 AIR QUALITY

The CAA of 1963 (42 U.S.C. 7401 *et seq.*) was established to promote the public health and welfare by protecting and enhancing the Nation's air quality. The Act establishes specific programs that provide special protection for air resources and air quality-related values associated with NPS units. Section 118 of the CAA requires a park unit to meet all federal, state, and local air quality standards. Further, the CAA provides that federal land managers have an affirmative responsibility to protect air quality related values (including visibility, plants, animals, soils, water quality, cultural resources, and visitor health) from adverse pollution impacts (EPA 2000).

The Complex is located in an attainment area for all ambient air quality standards (Ecology 2002). Air quality in the Complex is very good, but can be locally affected by emissions within the

Complex or in the surrounding area, and by weather conditions (such as temperature inversions). The project area is designated as a Class I airshed.

Construction activities associated with some of the proposed alternatives may result in temporary, localized air quality impacts within the project area, such as an increase in exhaust emissions and dust. The proposed reconstruction or reroute of the Stehekin Valley Road would have minor air quality impacts related to ongoing vehicle use. For these reasons, air quality is included in the EA.

4.3 Impact Topics Dismissed from Further Analysis

Impact topics were identified through scoping, or require consideration according to federal laws, policies, or EOs. Some impact topics were dropped from further analysis because they are not relevant to this project. The following section includes a brief justification for why certain impact topics were dismissed from further analysis in the EA.

4.3.1 NATURAL LIGHTSCAPES

NPS will preserve to the greatest extent possible the natural darkness of the Complex. The project would not introduce or increase artificial light sources into the environment beyond current or historic levels, and would preserve the ability to see the natural features that are visible on clear nights. Therefore, this topic was dismissed from the EA.

4.3.2 VISUAL/SCENIC RESOURCES

The NPS Organic Act, NPS Management Policies, and the LACH GMP provide direction to conserve scenery in the Complex and leave it unimpaired for public enjoyment. Visitors to the Stehekin Valley can experience a broad array of scenic treasures, including breathtaking views of rugged mountains, ice fields, and glaciers; tranquil scenes of wildlife and wildflowers; and the grandeur of mature forests flanking the Stehekin River. Visual resources within the project area receive protection through three designations: eligible WSR status, National Scenic Trail designation, and Wilderness designation.

The entire Stehekin River is eligible for inclusion in the National WSR System, and must be managed in a manner so as not to impair its suitability for designation as a WSR (NPS 2002). The river was found eligible for WSR designation because of its free-flowing character and ORVs, which include scenic resources. The WSR management corridor extends ¼-mile on either side of the river, and thus includes the entire project area. The Stehekin River watershed retains the beauty of a natural landscape, having undergone little human activity in the past. Most signs of human development are along the lower 11 miles of the river, south of the project area.

A 2.2-mile long segment of the PCT lies within the WSR corridor. This National Scenic Trail was established in 1968 to traverse and protect scenic landscapes and maintain the wilderness character of those landscapes. This scenic and wilderness character is also protected through a third designation, the Stephen Mather Wilderness, which encompasses 93 percent of the Complex. The Stehekin Valley Road bisects this otherwise contiguous Wilderness.

The PCT designation, Wilderness designation, and WSR eligibility finding all occurred with an existing visual intrusion, the Stehekin Valley Road, in place. The Wilderness boundary lies outside the road (50 feet on either side of the road centerline), and the remainder of the project area is managed to protect wilderness values, including visual resources. Although several trails in the area, including the PCT have occasional views of the Stehekin Valley Road, the road has a rural character and is used infrequently.

WSR, the PCT, and Wilderness are addressed as separate impact topics in this EA. Because these special designations are based in whole or in part upon scenic resources, visual resources are dismissed as a separate impact topic.

4.3.3 ENVIRONMENTAL JUSTICE

EO 12898 Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations requires each federal agency to make achieving environmental justice part of its mission by identifying and addressing any disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minorities and low-income populations or communities. The alternatives under consideration are not expected to have an effect (either beneficial or adverse) on low-income or minority populations. Thus, this topic was dismissed from further analysis in the EA.

4.3.4 PRIME AND UNIQUE AGRICULTURAL LANDS

The Farmland Protection Policy Act was implemented to preserve and protect the dwindling supply of farmland in the nation. In 1980, the Council on Environmental Quality (CEQ) directed that federal agencies must assess the effects of their actions on farmlands classified by the USDA Natural Resources Conservation Service as prime or unique. USDA defines these lands as having soils that are best suited for producing food, feed, forage, fiber, or oilseed crops. Use of land for farming or the type of farmland soils are considered in determining prime and unique farmland.

None of the project area is used for farming, since it is entirely within the Stephen Mather Wilderness and farming is not an authorized use in the Wilderness. The soils in the project area are not prime farmland soils; much of the land base is within a rocky river canyon, steep, riparian, or forested. Because the project area does not contain prime or unique farmlands, this impact topic was dismissed from analysis in the EA.

4.3.5 MUSEUM COLLECTIONS

NEPA, NHPA, NPS Management Policies, DO #28, and Cultural Resource Management Guidelines require the consideration of impacts on museum collections. There are no museum collection items currently stored or exhibited in the project area. Therefore, this topic was dismissed from the EA.

4.3.6 ARCHAEOLOGICAL AND HISTORICAL RESOURCES, HISTORIC STRUCTURES

NEPA, NHPA, EO 11593, the Archaeological and Historic Preservation Act (APHA), the 1916 NPS Organic Act, NPS Management Policies, and the Secretary of the Interior's Standards and Guidelines for Archaeological and Historic Preservation require the consideration of impacts on archaeological resources either listed in, or eligible to be listed in the NHRP. NEPA, NHPA, AHPA, EO 11593, NPS Management Policies, the Secretary of the Interior's Standard's and Guidelines for Archaeological and Historic Preservation, and the Programmatic Memorandum of Agreement among the NPS, ACHP, and the National Council of SHPO set policies and guidelines for the identification and preservation of historic structures.

The Old Wagon Road section of the PCT is eligible for listing as a National Historic Trail under the NHPA. However, the section of the Old Wagon Road that would be impacted by rerouting the Stehekin Valley Road to the PCT (Alternative D) is not culturally significant.

Bridge Creek has two structures listed on the NRHP. Bridge Creek Cabin-Ranger Station and Bridge Creek Shelter. There are also two candidate Cultural Landscapes. Bridge Creek Ranger

Station and Campground, and Bridge Creek Sawmill Site. Bridge Creek Camp has facilities for stock, and all of the alternatives would provide either motorized or non-motorized access to Bridge Creek. Since the 2003 flood damage, permittees are offering or proposing to offer food and overnight accommodations (hostel-style cabin tents) to hikers and stock users at Bridge Creek.

The Black Warrior Mine approximately 3.4 miles beyond Cottonwood Camp is listed on the NHRP. The mine is a popular destination for local residents and visitors via the Stehekin Valley Road.

Sixteen prehistoric sites have been documented in the LACH, including a Bridge Creek site, and there is potential for more prehistoric sites in the project area. These resources and the historic resources are part of the Stehekin River WSR ORVs.

Although the project area contains historic sites, historic structures, and prehistoric sites, the mitigation measures defined for the proposed action and alternatives would ensure that no impacts would occur to archeological and historical resources and historic structures. All the prehistoric and historic resources in the WSR corridor (1/4-mile wide on either side of the river) are addressed under the WSR impact topic. For these reasons, these impact topics are dismissed from further discussion in the EA.

4.3.7 ETHNOGRAPHIC RESOURCES

DO #28 defines ethnographic resources as any "...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." It is known that several Tribes traditionally used the Stehekin River Valley for hunting and foraging subsistence and occupation, and that the Complex holds many resources that are important to the Tribes such as plants, wildlife, fish, and water. No specific ethnographic resources such as human remains, funerary objects, sacred objects, or cultural patrimony objects have been identified in the project area in consultation with the Tribes. Even so, NPS would continue to consult and coordinate the proposed action with affected Tribes. If the Tribes identify any ethnographic resources or ethnographic resources are discovered during construction, appropriate mitigation measures would be taken including consultation with the Tribes and the SHPO.

4.3.8 LAND USE

NPS Management Policies provide direction for protection of lands and resources within park units, acquisition of non-federal lands that are within park units, and cooperation with agencies, tribes, and private property owners to provide appropriate protection measures. The LACH GMP provides the framework for the types of land uses allowed within the project area. Since the alternatives under consideration would not affect the existing land uses or the protection of land use in the Stehekin Valley, this topic was dismissed from further analysis in the EA.

4.3.9 SOUNDSCAPES

Intrusive sounds are of concern to the NPS because they sometimes impede the Service's ability to accomplish its mission. Intrusive sounds are also a matter of concern to park visitors. As was reported to the U.S. Congress in the Report on *Effects of Aircraft Overflights on the National Park System* (NPS 1995c), a system-wide survey of park visitors revealed that nearly as many visitors come to national parks to enjoy the natural soundscape (91 percent) as come to view the scenery (93 percent). Noise can also distract visitors from the resources and purposes of cultural areas - the

tranquility of historic settings and the solemnity of memorials, battlefields, prehistoric ruins, and sacred sites.

Increasingly, even those parks that appear as they did in historical context do not sound like they once did. Natural sounds are being masked or obscured by a wide variety of human activities. In some parks, natural sounds are disappearing at such a rate that some may be gone before their existence can even be documented. Thus, soundscape preservation and noise management is one more dimension of the complex problem of achieving the NPS mission of preserving park resources unimpaired for the enjoyment of present and future generations.

In accordance with NPS Management Policies and DO #47 Sound Preservation and Noise Management, an important part of the NPS mission is preservation of natural soundscapes associated with National Park units. Natural soundscapes exist in the absence of human-caused sound. The natural ambient soundscape is the aggregate of all the natural sounds that occur in park units, together with the physical capacity for transmitting natural sounds. Natural sounds occur within and beyond the range that humans can perceive and can be transmitted through air, water, or solid materials.

The frequency, magnitude, and duration of human-caused sound considered acceptable varies among NPS units, being generally greater in developed areas and less in undeveloped areas. Park purposes are defined in enabling legislation or proclamations, and through a comprehensive public planning process. Park purposes may be highly varied, in the same way that activities appropriate to each park's purpose may be highly varied. Park activities may include transportation systems, visitor centers, maintenance activities, recreational activities, weapons-firing demonstrations, cultural events, and many others. These activities are often found to be appropriate even though they generate elevated sound levels for areas within the Parks. However, when activities (whether inside or outside a park) generate excessive levels of noise, they can jeopardize the natural soundscape resource and/or the purposes for which the Park was created.

The Stehekin Valley Road and the PCT near the project area have a long-term altered soundscape that includes noise impacts from private vehicles, permittee shuttle buses, bikers, hikers and stock. Potential adverse impacts to the soundscape from the proposed alternatives include short-term noise impacts from construction activities associated with road/trail reconstruction or new road/trail construction such as excavation, clearing, grading, fill hauling, and the operation of heavy equipment and vehicles. Heavy equipment/construction noise would be largely short-term and localized, but could potentially affect other topics of concern. So, the potential impacts of noise on wildlife species of concern and visitor experience are addressed under those respective impact topics. Therefore, soundscapes have been dismissed as a separate impact topic in the EA.

CHAPTER 5. ALTERNATIVES

5.1 Alternative A. No Action

5.1.1 SUMMARY OF ALTERNATIVE A (NO ACTION)

The No Action Alternative provides a basis for comparing the existing condition with the four action alternatives and their anticipated environmental consequences. If the No Action Alternative were selected, the NPS would respond to future needs and conditions without major actions or changes in the present course.

Alternative A (No Action) represents the current condition and management of the roads, trails, and recreation sites within the project area, including the current trail reroutes, the washed-out and impassable sections of the Stehekin Valley Road between Car Wash Falls (MP 12.9) and Cottonwood Camp (MP 22.8), and existing backcountry Dolly Varden and Shady camps (Figure 1; Appendix A1 & A2).

The *Coon Run Project* restored vehicle access to the parking area/turnaround at Car Wash Falls in the fall of 2005 (Appendix A5). Car Wash Falls to MP 15.3 is impassable to vehicles, cyclists, and stock and unsafe for hikers at high flows. There is challenging but safe passage for experienced hikers to walk and pack their gear around the washed out sections at low flow times of the year. There is no reroute around the landslide at MP 15 (Appendix A2), and no easy access to do so. Hikers and stock users can also use the PCT to access other park trails and the Wilderness.

Dolly Varden Camp (MP 13) was badly damaged by the 2003 flood, and there is only one campsite remaining. Shady Camp (MP 14.6) did not have any significant flood damage in 2003; there was some sediment and debris deposition in the single-site campground.

The 2003 flood also left the road between Bridge Creek (MP 15.9) and Glory (MP 20.1) impassable to motorized vehicles.

A ½-mile long section of the 2.5-mile long road between Glory and Cottonwood Camp (MP 20.1 to MP 22.8) washed out in the 1995 flood. Since 1995, the NPS built a non-motorized, non-mechanized trail around the wash out and converted the remaining 2 miles of road to a 6-foot wide trail (Figure 1; Appendix 4).

The No Action Alternative would not include any reconstruction, future maintenance, active rehabilitation, or closure of the Stehekin Valley Road between Car Wash Falls and Cottonwood Camp, or of Dolly Varden and Shady camps. The road would continue to be signed “impassable” and “closed” for motorized vehicles and cyclists above MP 12.9. The road between Car Wash Falls and MP 15.3 (near Bridge Creek) would be allowed to continue deteriorating and “closing itself” as the result of periodic flooding and/or mass wasting, and only experienced hikers could continue to use this section of the road.

Hikers, stock users, and cross-country skiers could continue to use the road between MP 15.3 and Glory, the PCT, and the designated trail reroute between Glory and Cottonwood Camp (Figure 1). The road between MP 15.3 and Glory, and the trail between Glory and Cottonwood would receive routine maintenance for these non-motorized uses, but no reconstruction.

5.1.2 DETAILED DESCRIPTION OF ALTERNATIVE A (NO ACTION)

5.1.2.1 Car Wash Falls (MP 12.9) to MP 15.3

The road between Car Wash Falls and MP 15.3 is non-existent in places and there is a large landslide at MP 15 (Figure 1; Appendix A1 & A2). This section of the road is impassable to vehicles, stock users, and cyclists, and is not recommended for hikers. Hikers must use extreme caution, as there are slippery rocks and steep washouts. Some sections require rock climbing to avoid the river at high flows.

The road would naturally revert to wilderness character. Prior developments would not be removed or rehabilitated, and there would be no future maintenance. Developments such as a block of concrete and steel that was part of the energy dissipater at Car Wash Falls; three 4-foot diameter culverts; one 3-foot diameter culvert; two 18 to 24-inch diameter culverts; and the bolts used to secure the subgrade rock to bedrock and boulders would be left in place.

5.1.2.2 PCT

Hikers and stock users could continue to use the PCT to travel between Car Wash Falls and MP 15.3 (Figure 1). The PCT is accessible from High Bridge Historic District (MP 11.2) via Coon Lake Trail, or from the Stehekin Valley Road via a spur trail located a short distance (0.2 miles) downstream of the Car Wash Falls parking area at MP 12.7 (Appendix 5). The PCT would continue to receive periodic maintenance.

The PCT is within the Stephen Mather Wilderness, where mechanized and motorized use is not allowed. Therefore, these uses would end at the Car Wash Falls parking area.

5.1.2.3 MP 15.3 to Glory (MP 20.1)

Hikers, stock users, and cross-country skiers could continue to use the Stehekin Valley roadbed between MP 15.3 (0.6 miles south of Bridge Creek) and Glory (Figure 1). This section of the Stehekin Valley Road has flood damage, but is passable to these users.

There would be no reconstruction or future maintenance of the road to allow vehicle travel on this section, but it would be periodically maintained to allow hiking, stock, and cross-country ski use to continue. Bicycle or snowmobile use would not be allowed on this section of the Stehekin Valley Road due to lack of non-Wilderness access.

5.1.2.4 Glory to Cottonwood Camp (MP 20.1 to MP 22.8)

The Stehekin Valley Road between Glory and Cottonwood Camp has not been accessible to vehicles since the November 1995 flood (Figure 1; Appendix 4). The upper road area has been monitored annually as per the Flat Creek to Cottonwood Camp EA (NPS 1997), and could have been reconstructed if the river had abandoned the roadbed.

There is an existing hiking and stock trail reroute that was built in 1996, following the 1995 flood. The trail includes a ½-mile long section upslope of the flooded roadbed between MP 20.3 to MP 20.8 and approximately 2 miles of the old roadbed between MP 20.8 and Cottonwood Camp (MP 22.8) (Appendix 4).

There is no bicycle access to Cottonwood Camp because the trail reroute is partly in the Wilderness. The Glory to Cottonwood Camp trail would be maintained for hikers, stock, and cross-country skiers only, and visitors would have to check for local trail conditions prior to use.

5.1.2.5 Dolly Varden Camp (MP 13)

The Dolly Varden Camp, approximately 0.1 mile upstream of the Car Wash Falls parking area at MP 13, suffered extensive damage during the 2003 flood. Only one of the two original campsites, the bear-proof food storage box, signs, and outhouse remain.

Dolly Varden Camp would no longer be accessible for car camping, but would be available to hikers. Parking would be at the end of Stehekin Valley Road, Car Wash Falls Parking Area (MP 12.9) (Appendix 5).

5.1.2.6 Shady Camp (MP 14.6)

Prior to the 2003 flood, Shady Camp was accessible to vehicles, hikers, and cyclists via the Stehekin Valley Road. There are no stock facilities at Shady Camp.

Since the flood damage, Shady Camp is no longer accessible to car campers or cyclists. Hikers could still reach Shady Camp from the Stehekin Road approximately 1.3 miles south of Bridge Creek (Figure 1).

There would be no costs associated with implementation of the No Action Alternative.

5.2 Alternative B. Permanently Close the Stehekin Valley Road Above Car Wash Falls

5.2.1 SUMMARY OF ALTERNATIVE B (PREFERRED ALTERNATIVE)

Alternative B is the agency Preferred Alternative and the Environmentally Preferred Alternative to: 1) address the flood damage on the Stehekin Valley Road between Car Wash Falls and Cottonwood Camp, 2) provide visitor access to the Wilderness, and 3) protect natural resources. The Preferred Alternative would *officially* close the Stehekin Valley Road to all motorized and mechanized use at the current physical termination (the washed out section) just downstream of Car Wash Falls (MP 12.9) (Figure 1; Appendix A1), approximately 12.9 miles from the Stehekin Landing on Lake Chelan.

The Stehekin Valley Road above Car Wash Falls (MP 12.9) would be officially removed from the NPS road and trail system. The non-Wilderness road corridor could be congressionally designated as Wilderness in the future.

A turnaround and parking area for approximately six passenger vehicles up to the size of a 12-passenger shuttle van would be provided at the end of the road, near Car Wash Falls (Appendix 5).

Debris and culverts from the former road between Car Wash Falls MP 12.9 and the landslide at MP 15 would be removed. This includes a block of concrete and steel at Car Wash Falls, three 4-foot diameter culverts, one 3-foot diameter culvert, two 18 to 24-inch diameter culverts, and the bolts used to secure the subgrade rock to bedrock and boulders.

A new foot, stock, and cross-country ski trail that utilizes existing sections of the PCT and the Stehekin Valley Road would be officially designated between Car Wash Falls and Cottonwood Camp (Appendix 4). The new trail would begin at Car Wash Falls trailhead parking area and connect with the PCT at MP 12.7 (0.2 miles south of Car Wash Falls) (Appendix A3).

At Bridge Creek, the new trail would leave the PCT, and follow the old Stehekin Valley Road to Glory (Appendix A3). At Glory, the new trail would join a ½-mile long section of trail that was

built above the 100-year floodplain between MP 20.3 and MP 20.8 after the 1995 flood (Appendix A4). The new trail connects to the remaining 2 miles of road to Cottonwood Camp.

There would be no motorized or mechanized access to Dolly Varden, Shady, Bridge Creek, Park Creek, Flat Creek, Glory, and Cottonwood camps. A 0.1-mile long spur trail would be built between the PCT and Shady Camp to provide hiker access (Appendix A6)

The other camps would be available to hikers and/or stock users as they have been since 2003 or 1995.

5.2.2 DETAILED DESCRIPTION OF ALTERNATIVE B (PREFERRED ALTERNATIVE)

5.2.2.1 Car Wash Falls Parking Area (MP 12.9)

A closure sign, a vehicle turnaround, and head-in parking for approximately six passenger vehicles would be provided at the end of the road, just downstream of Car Wash Falls (Appendix A5). The largest vehicle that could be accommodated at this site would be a 12-passenger shuttle van. The estimated cost of parking area improvements would be \$3,500 (Table 1).

Hikers, stock users, and cross-country skiers would travel from the parking area to MP 12.7 (0.2 miles south of Car Wash Falls) and use the current spur trail to the PCT (Appendix A5).

Motorized and mechanized conveyances are not allowed on the PCT or other trails within the Wilderness, so these uses would end at the Car Wash Falls parking area.

5.2.2.2 Car Wash Falls (MP 12.9) to MP 15.3

Approximately 1.7 miles (71 percent) of the 2.4 miles of road between Car Wash Falls and MP 15.3 washed out in the 2003 flood (Table 21). This section would be removed from the NPS road and trail system and permanently closed to hikers, cross-country skiers, and stock users. These uses would be directed to the PCT, as they have been since the 2003 flood.

A block of concrete and steel at Car Wash Falls that were part of the energy dissipater, three 4-foot diameter culverts, one 3-foot diameter culvert, two 18 to 24-inch diameter culverts, and the bolts used to secure the subgrade rock to bedrock and boulders would be removed.

5.2.2.3 PCT (MP 12.7) to MP 15.3

Hiking and stock use would continue on the PCT. These users could access the PCT via a spur trail from Stehekin Valley Road at MP 12.7 and reconnect with the old Stehekin Valley Road at MP 15.3 0.6 miles south of Bridge Creek (Figure 1; Table 21; Appendix 5). The NPS would continue to maintain the PCT for hiking and stock use.

5.2.2.4 MP 15.3 to Glory (MP 20.1)

This section of the Stehekin Valley Road has only minor flood damage except at MP 17.4 and MP 17.5 (Park Creek Camp), and is passable to hikers, stock users, and cross-country skiers via the PCT (Figure 1). This section would not be reconstructed for vehicle or bicycle use.

Instead, the 4.8-mile long, 12-foot wide roadbed would be maintained as a 6-foot wide non-motorized, non-mechanized trail (Table 21). Excess road fill would not be removed, and revegetation of the remaining roadbed would be a natural, long-term process.

5.2.2.5 Glory to Cottonwood Camp (MP 20.1 to MP 22.8)

The former road between Glory and Cottonwood Camp (MP 20.1 to 22.8) has not been accessible to vehicles since the 1995 flood. Hikers and stock users would continue to follow the trail from Glory to Cottonwood that has been in use since the 1995 flood (Figure 1; Table 21; Appendix 4).

The 2.7-mile long Glory to Cottonwood Camp trail includes a ½-mile of new trail built between MP 20.3 and MP 20.8 after the 1995 flood. The new trail segment would be brought up to current NPS standards at a cost of \$2 per foot, or \$5,280 (Tables 1 & 21).

At MP 20.8, the new trail follows the old roadbed for approximately 2 miles to Cottonwood Camp (Table 21). The roadbed would need drainage structure maintenance at a cost of \$0.50 per foot, or \$5,280 (Table 1).

The total surface area of the 2.7-mile long Glory to Cottonwood Camp trail is approximately 1.8 acres; the old roadbed was 3.6 acres. Excess road fill would not be removed and revegetation of the remaining roadbed would be a long-term, natural process.

There would be no bicycle access to Cottonwood Camp because sections of the trail are within the Wilderness.

The MP 20.1 to MP 22.8 road segment would be removed from the NPS road system and officially designated as a hiking and stock trail in the *Federal Register*.

5.2.2.6 Backcountry Camps

There would be no motorized or mechanized access to Dolly Varden, Shady, Bridge Creek, Park Creek, Flat Creek, Glory, and Cottonwood camps.

Dolly Varden Camp (MP 13) near Car Wash Falls suffered extensive damage during the 2003 flood. Only one of the two original campsites, the bear-proof box, signs, and outhouse remain. Dolly Varden Camp would no longer be accessible for car camping, but could continue to be available to hikers. Parking would be available at the end of Stehekin Valley Road, Car Wash Falls parking area (MP 12.9). The NPS could construct a new campsite to replace the site lost in the 2003 flood, if there is reasonable site potential. If this were impractical, consideration would be given to constructing a single campsite at Bridge Creek Camp so there is no net loss of backcountry campsite capacity.

Shady Camp (MP 14.6) would need some post-flood maintenance, and would no longer be accessible for car camping. A new foot trail, approximately 0.1-mile long would be constructed to access Shady Camp (Appendix A6). The new trail would originate at the PCT. There are no stock facilities at Shady Camp, so the single site camp would be available to hikers only. The estimated cost of Shady Camp trail construction would be \$5,280 (Table 1).

The other backcountry camps would be available to hikers and/or stock users as they have been since 2003 or 1995.

Table 1. Preferred Alternative Estimated Implementation Costs

Location	Estimated Cost
Enlarge parking area and barrier road at MP 12.9	\$3,500
Build 0.1-mile long trail from PCT to Shady Camp (\$10 per ft)	\$5,280
Build ½-mile long trail from MP 20.3 to MP 20.8 (\$2 per ft)	\$5,280
Drainage repair MP 20.8 to Cottonwood Camp (MP 22.8) (\$0.50 per ft)	\$5,280
Total	\$19,340

The total estimated cost of implementing the Preferred Alternative is \$19,340 (Table 2). The estimated cost of implementing the Preferred Alternative does not include:

- Construction of a tent site at Dolly Varden Camp or Bridge Creek Camp (optional);
- Post-flood maintenance of Shady Camp;
- Rehabilitation of the old roadbed between Car Wash Falls and MP 15, including culvert, concrete, and bolt removal;
- Signing;
- Administrative costs to change the Wilderness boundary (optional);
- Administration costs to permanently close the road at Car Wash Falls;
- Administrative costs to designate the new trail system; and
- Routine trail maintenance.

Implementation of the Preferred Alternative could begin in 2006, and could be completed within a single season.

5.2.3 ALTERNATIVE B (PREFERRED ALTERNATIVE) CONSTRUCTION SPECIFICATIONS

Head-in parking for approximately six vehicles, including a 12-passenger shuttle van would be built adjacent to the existing road at MP 12.9.

The current loop turnaround at MP 12.9 is expected to be sufficient with little or no additional construction. Some grading and a small amount of fill would be needed to build the roadside parking area. The future parking area is adjacent to the existing road and very little vegetation and no trees would be removed to build the parking area.

Potable water, overnight camping, and stock facilities would *not* be available at the parking area. However, the NPS would install a vault toilet.

The former road would be signed and blocked at MP 12.9.

Dolly Varden Camp could be restored to its former capacity of a two car camping site if there is reasonable site potential to do so, or a single site could be built at Bridge Creek Camp to replace the Dolly Varden campsite lost in 2003.

The concrete slab that was part of the energy dissipater at Car Wash Falls would be winched over rock at low river flow to the end of the road.

The culverts between MP 12.9 and MP 15 would be cut into manageable sections with a cutting torch, crushed, and either sling-loaded or packed out of the area.

The areas where culverts are removed would be recontoured to achieve a natural appearance, and woody debris or rock would be used to minimize further erosion.

The remaining road fill would not be removed.

5.2.4 ALTERNATIVE B (PREFERRED ALTERNATIVE) BMPs AND MITIGATION MEASURES

The following Best Management Practices (BMPs) and mitigation measures would be used to minimize any potentially adverse impacts that could result from implementation of The Preferred Alternative.

- Prior to clearing and grading in the MP 12.9 parking area, the areas to be cleared would be clearly marked on the ground to minimize soil disturbance. Only those areas necessary for construction would be cleared and grubbed, and ground-disturbing activities would be restricted to non-saturated soil areas.
- The culverts along the old Stehekin Valley Road would be cut into manageable sections with a cutting torch, crushed, and either sling-loaded by helicopter or packed out of the area.
- Construction would occur during low flow, between mid to late July and October 1, to protect potential bull trout and westslope cutthroat trout habitat.
- The areas where culverts are removed would be recontoured to achieve a natural appearance, and streambeds would be restored to natural grade to prevent erosion.
- Revegetation, mulching, woody debris, or rock would be used on the side slopes to minimize fill erosion following culvert removal. Disturbed areas would be seeded or replanted with a mixture of NPS approved native grasses, forbs, and/or shrubs suitable for the site to meet erosion control needs and other management objectives such as riparian or wetland habitat restoration. Certified weed-free mulch could be used to retain soil and moisture, and facilitate seed germination and survival.
- The concrete slab at Car Wash Falls would be winched over rock at low river flow to the end of the road at Car Wash Falls and trucked out of the area.
- The NPS would conduct threatened, endangered, and sensitive plant surveys prior to project implementation. Populations or individual threatened, endangered, or sensitive plants would be flagged and avoided.
- The herbicides that are approved for use on NPS public lands may be used to control noxious weeds and invasive species. Herbicide treatments would be applied in accordance with Washington State pesticide application guidelines, conform to NPS policy, and follow federal label instructions, specifications, and precautions. In instances where herbicide labels and federal or state stipulations overlap, the more restrictive criteria would apply.
- Application of any herbicides to treat noxious weeds would be performed or directly supervised by a state or federally licensed applicator.
- Pre- and post-herbicide treatment would be implemented along access roads, landings, skid trails, and other disturbed areas to control noxious weeds and invasive species establishment and proliferation. The best time to survey the post-project area for weeds is when regrowth begins, and as plants begin to grow in the first spring following site disturbance.
- No herbicide spraying would occur when wind velocity exceeds ten miles per hour.

- Dyes (e.g. Insight, Hilite) may be used to obtain uniform coverage. This would help prevent under or over treatment/application and help with detection of drift. It would also reduce the risk of treating non-target species.
- Any previously surveyed archaeological and historical sites would be flagged and avoided.
- In the event that inadvertent discoveries of archaeological or historical resources are made during project implementation, all activities would cease until the NPS archaeologist can evaluate the finding and determine whether or not activities could continue. If significant properties are discovered, consultation with the SHPO would be conducted and clearance received prior to project implementation.
- Public information and education materials describing the project's effects and benefits would be prepared. A public information program to warn of construction related closures, delays, and hazards would be implemented.
- Rehabilitation work would be limited to daylight hours.
- Soundscape mitigation would be used to minimize or eliminate the impacts of noise, if needed.
- Work crews would receive "Leave No Trace" training, including instruction on minimum impact techniques.
- Sanitation facilities would be provided for work crews.

5.3 Alternative C. Reconstruct the Stehekin Valley Road from Car Wash Falls to Glory

5.3.1 SUMMARY OF ALTERNATIVE C (ROAD RECONSTRUCTION)

Alternative C (Road Reconstruction) would rebuild the Stehekin Valley Road from Car Wash Falls (MP 12.9) to Glory (MP 20.1) in approximately the same location and to 100-year flood specifications as it was prior to the 2003 flood (Figure 1; Table 21). The road would accommodate high clearance, public and private passenger vehicles as large as a 12-passenger van.

The 2.7-mile long section of road between Glory and Cottonwood Camp (MP 22.8) that was damaged in the 1995 flood would not be rebuilt (Table 21). Motorized and mechanized access would not be reestablished between Glory and Cottonwood Camp.

Monitoring of the old roadbed between Glory and Cottonwood Camp as per the Flat Creek to Cottonwood Camp EA (NPS 1997) would cease. There would be no further consideration of reestablishing this section of road.

Motorized or mechanized access to Dolly Varden, Shady, Bridge Creek, Park Creek, and Flat Creek camps would be reestablished. Shady Camp (MP 14.6) would need some post-flood maintenance.

The NPS could reconstruct Dolly Varden Camp to its former two campsite capacity, if there is reasonable site potential. If this were impractical, consideration would be given to expansion of the Bridge Creek Camp so there is no net loss of backcountry campsite capacity.

Vehicle and bicycle access to the Glory turnaround and Cascade Pass Trailhead would be restored.

Hikers and stock users would continue to use the current trail between Glory and Cottonwood Camp, as in the No Action Alternative. Only hikers and stock users would be able to access to Cottonwood Camp, as they have since 1995.

5.3.2 DETAILED DESCRIPTION OF ALTERNATIVE C (ROAD RECONSTRUCTION)

The road would be rebuilt in the same location and to 100-year flood specifications as it was prior to the 2003 flood. Over time, flood damage would occur and result in periodic road closures for public safety and emergency road repairs, as it did prior to 2003.

5.3.2.1 Car Wash Falls (MP 12.9) to MP 15.3

This section of the road was reconstructed in 1996, after the 1995 100-year flood. The road was built with the largest Federal Highway Administration (FHA) rock class of riprap (Class 6), bolted to existing bedrock and boulders. The record 2003 500-year flood tore the riprap from the bolts.

The extensive 2003 flood damage between Car Wash Falls and MP 14.5 (~1.6 miles) would require importing approximately 40,000 yd³ of oversized riprap and 1,835 yd³ of surface rock (6 inches deep by 12-feet wide by 1.6 miles long). In a 2003 report revised in June 2004, the FHA estimated the cost to repair this section would be \$2,480,925 (Table 2).

In 2003, the FHA estimated 31,100 yd³ of oversized riprap (12-feet wide by 140 feet high by 600-feet long) and 150 yd³ of surface rock (12-feet wide by 6 inches deep by 600-feet long) would be needed to rebuild the road at the MP 15 landslide. The FHA estimated it would cost \$1,718,750 to repair this section (Table 2). The landslide has enlarged since 2003 (Appendix A2), and more fill material would be needed than was originally estimated. A major channel realignment would be needed to achieve a 1:1 slope and stabilize the landslide. Access to the river would be very difficult, and construction access would further undermine the existing slope.

5.3.2.2 MP 15.3 to Glory (MP 20.1)

In 1996, a vehicle turnaround was constructed at Glory to access a new Cascade Pass Trailhead. The official Cascade Pass Trailhead was at Cottonwood Camp prior to the 1995 flood. Vehicle and bicycle access to the turnaround and trailhead would be restored.

Most of this section of the road is essentially undamaged by the floods. However, at MP 17.4 there is a large hole in the road (20-feet wide by 20-feet long by 10 feet deep), and below Park Creek Camp (MP 17.5) the road was washed down to aggregate rock. In 2003, the FHA estimated it would take 320 yd³ of fill, 110 yd³ of Class 5 riprap, and 100 yd³ of surfacing rock to repair these sites. The FHA estimated it would cost \$23,900 to repair these sites (Table 2).

Park staff temporarily repaired the Park Creek Bridge (MP 18) abutments in 2004. If the repairs fail, a new, longer bridge would probably be necessary and would be analyzed as a separate project proposal.

Approximately 1,100 yd³ of large rock and debris from an unnamed tributary would be removed from the road at Glory (MP 20.1). The road would be resurfaced with approximately 20 yd³ of surfacing rock. A 48-inch by 32-foot long culvert would be installed to divert water flowing from the tributary over the debris. In 2003, the FHA estimated it would cost \$31,180 to repair this site (Table 2).

5.3.2.3 Glory to Cottonwood Camp (MP 20.1 to MP 22.8)

Hikers, stock users, and cross-country skiers could continue to use the 2.7-mile long trail between Glory and Cottonwood Camp that was designated after the 1995 flood (Appendix A4). A ½-mile of new trail built was between MP 20.3 and MP 20.8 in 1996. The new trail segment would be brought up to current NPS standards at a cost of \$2 per foot, or \$5,280 (Tables 2 & 21).

At MP 20.8, the new trail follows the old roadbed for approximately 2 miles to Cottonwood Camp. The roadbed would need drainage structure repair at a cost of \$0.50 per foot, or \$5,280 (Table 2).

The total surface area of the Glory to Cottonwood Camp trail is approximately 1.8 acres; the old roadbed was 3.6 acres. Excess road fill would not be removed and revegetation of the remaining roadbed would be a long-term, natural process.

5.3.2.4 Dolly Varden Camp (MP 13)

The Dolly Varden Camp near Car Wash Falls suffered extensive damage during the 2003 flood, and only one of the original two campsites, the bear-proof box, signs, and outhouse remain. Dolly Varden Camp would be accessible for car camping again, and would be available to hikers, cyclists, and stock users.

The NPS could construct a new campsite to replace the site lost in the 2003 flood, if there is reasonable site potential. If this were impractical, consideration would be given to constructing a single campsite at Bridge Creek Camp so there is no net loss of backcountry campsite capacity.

5.3.2.5 Shady Camp (MP 14.6)

Shady Camp would be accessible to car camping again, and would continue to be available to hikers and cyclists; there are no stock facilities. The camp would need some post-flood maintenance.

Table 2. Alternative C Estimated Implementation Costs

Location	Estimated Cost
Reconstruct 1.6 miles of road between MP 12.9 and MP 14.5	\$2,480,925
Stabilize landslide and reconstruct road at MP 15	> \$1,718,750 ¹
Reconstruct 0.1 mile of road at MP 17.4 and MP 17.5	\$23,900
Repair road at Glory (MP 20.1)	\$31,180
Subtotal	\$4,254,755
Mobilization -10%	\$425,476
Preliminary and Construction Engineering - 44%	\$1,884,588
Subtotal	\$6,564,819
Build ½-mile long trail from MP 20.3 to MP 20.8 (\$2 per ft)	\$5,280
Drainage repair MP 20.8 to Cottonwood Camp (MP 22.8) (\$0.50 per ft)	\$5,280
Total	> \$ 6,575,379¹

¹Based on FHA 2003 estimate; actual cost would be higher due to increased size of the landslide

5.3.2.6 Alternative C (Road Reconstruction) Total Cost Estimate

The total FHA estimate to complete the Car Wash Falls to MP 15.3 road reconstruction (including the landslide) was approximately 6.6 million dollars (Table 2). Because the landslide has enlarged since 2003 (Appendix A2), the actual cost would be more than the initial estimate.

The engineering costs for this alternative reflect the substantial engineering challenges associated with rebuilding a road within the floodplain of the Stehekin River and through the MP 15 landslide.

The estimated cost of implementing Alternative C does not include:

- Construction of a tent site at Dolly Varden Camp or Bridge Creek Camp (optional);

- Post-flood maintenance of Shady Camp;
- Routine road maintenance; and
- Future emergency road reconstruction.

5.3.2.7 Alternative C (Road Reconstruction) Implementation Schedule

Implementation of Alternative C would be funding-dependent, and construction could possibly begin in 2006. Seasonal high water would limit construction to 2 or 2½ months annually, between mid to late July and October 1. To mitigate visitor impacts, there would be no construction traffic on holidays or weekends. Therefore, approximately 42 to 53 days would be available for fill hauling and other construction activities, annually.

Construction traffic would be constrained by one-way road access to the project area. Five to ten dump trucks would haul fill in a “train” from the staging area at Company Creek Pit to the project area. Each truck would be able to haul 8 to 10 yd³ of material per trip (large diameter rock has less capacity per load). The 5 to 10 trucks could make four roundtrips of 160 to 400 yd³ per day. Therefore, it would take a minimum of 183 days and a maximum of 459 days to complete hauling approximately 73,365 yd³ of fill and oversized rock; or nearly 3½ to 11 years, given the physical limitations and mitigations.

5.3.3 ALTERNATIVE C (ROAD RECONSTRUCTION) CONSTRUCTION SPECIFICATIONS

The reconstructed road would be a single lane, 12-feet wide that would accommodate heavy-duty, high clearance public and private passenger vehicles. Occasional turnouts would be built as needed. Turnouts would not be built in draws, riparian areas, and wetlands, or on slopes that would require extensive cut and fill.

The road would be rebuilt to 100-year flood specifications, as it was prior to 2003.

Some rock blasting and concrete work would be required to rebuild the road.

Material from the former roadbed such as concrete, culverts, and fill would be salvaged and used for reconstruction, or removed.

Dolly Varden Camp could be restored to its former capacity of a two car camping site if there is reasonable site potential to do so, or a single site could be built at Bridge Creek Camp to replace the Dolly Varden campsite lost in 2003.

Road reconstruction would require an ACOE 404(d) stream channel alteration permit and a WDFW HPA.

Reconstruction would require barging in more than 73,085 yd³ of oversized rock and surface rock from a certified weed-free source outside the Stehekin area.

Five to ten dump trucks would haul fill in a “train” from the staging area at Company Creek Pit to the project area. Most of the fill would be need at Car Wash Falls and the MP 15 landslide.

Construction traffic or activity would not occur on weekends or holidays.

Construction traffic would occur only during daylight hours for visitor safety.

5.3.4 ALTERNATIVE C BMPs AND MITIGATIONS MEASURES

The following BMPs and mitigation measures to minimize potential adverse impacts that could occur if Alternative C (Road Reconstruction) is implemented.

5.3.4.1 Soils

- Construction would likely occur during the dry summer and fall months to minimize impacts to soils, vegetation, wetlands, and creeks.
- Temporary erosion and sediment controls such as watering areas of exposed soils, matting, plastic sheeting, or straw would be used to control surface erosion during the work period.
- All disturbed areas would be protected from erosion prior to October 1 using vegetation or other means. Disturbed soil exposure to rainfall would be minimized.
- Areas to be cleared and graded would be clearly marked on the ground to minimize soil disturbance. Only those areas necessary for construction would be cleared and grubbed.
- Access to work sites would be allowed only on existing roads. Travel would cease when damage to the road surface would result, or is occurring.
- No operation of off-road equipment would be permitted during wet weather conditions.
- Disturbance of the organic soil horizon would be limited, and no ground-disturbing activities would occur in areas of saturated soil.
- Handwork would be required where machinery would cause undue soil disturbance.
- Hand-scattered, low slash and small brush would be left to slow surface runoff, protect soil, return soil nutrients, provide small mammal habitat, and shade for conifer seedlings. Lop the slash to less than or equal to four inches in diameter and four feet in length and hand-scatter to protect soils.
- Site preparation equipment that produces irregular surfaces would be used to minimize or eliminate vertical patterns (i.e. up and down the slope) during scarification. Soil would be scarified only to the extent necessary to meet the revegetation objective of the site. Brush piling and scarification would be implemented when soils are frozen or dry enough to minimize compaction and displacement. The soil surfaces would be left with a rough, corrugated surface to help anchor seed. If the slopes were tracked, the tracks would be perpendicular to the slope contour.
- Disturbed areas would be seeded with a mixture of NPS approved native grasses, forbs, and/or shrubs suitable for the site to meet erosion control needs and other management objectives such as riparian or wetland habitat restoration.
- Certified weed-free mulch could be used to retain soil and moisture, and to facilitate seed germination and survival.
- Topsoil would be stockpiled and used to rehabilitate disturbed sites.

5.3.4.2 Hydrology, Channel Morphology, Floodplains

In addition to the list of Soil BMPs and mitigation measures, the following BMPs would be used to minimize or eliminate the impacts of erosion, sediment delivery, and increased peakflow that could occur if Alternative C (Road Reconstruction) were implemented.

- Stream crossing structures would be sized for the 100-year interval storm, and any fill associated with the project would be protected from erosion to the 100-year interval.
- All stream crossing structures would be installed perpendicular to stream flow and at existing grade, if applicable.
- Disturbance of the streambed and streambanks would be limited to the amount necessary to place culverts and any required channel modifications.

- Removal of existing structures would be accomplished so that the structure and associated material do not enter the waterways.
- Any culvert installation or other instream work would be conducted under dry conditions in isolation from stream flow by the installation of a bypass flume or culvert, or by pumping the stream flow around the work area, unless siltation and turbidity can be sufficiently reduced.
- Any necessary excavation would be outside the ordinary high water (OHW) mark unless the construction site is separated from water by use of an approved dike, coffer dam, or similar structure.
- Standard bio-engineering techniques such as willow wattling, whole tree bank revetment, large woody debris, rock, and woody plantings would be used to reduce sediment delivery and the affects of peakflows and flood flows at actively or potentially eroding river or creek banks, cut and fill slopes, stream crossings, and the large landslide at MP 15.

5.3.4.3 Water Quality

In addition to the list of Soil BMPs and mitigation measures, the following BMPs would be used to minimize or eliminate the impacts of erosion, sediment delivery, and fuel spills that could occur if Alternative C (Road Reconstruction) were implemented.

- Erosion containment controls such as silt fencing and sediment traps would be used to contain sediment on site and prevent sediment delivery to waterways.
- Temporary diversion devices such as culverts, sand trenches, or French drains would be used to direct surface water away from exposed soil, and direct storm water from disturbed areas into temporary settling basins or onto low gradient, vegetated areas.
- Disturbed soil or soil stockpiles would be covered with plastic sheeting, jute matting, erosion netting, straw, or other suitable cover material prior to storms.
- Undercutting the cutslope at the edge of the road prism during blading and shaping of existing road sections would be avoided.
- Wastewater from project dewatering activities would be routed to an area outside the OHW mark to allow removal of fine sediment and other contaminants.
- Concrete would be sufficiently cured prior to contact with water to avoid leaching.
- Areas outside of the 100-year floodplain would be designated as refueling and equipment maintenance areas.

5.3.4.4 Fisheries and Aquatic Habitat

In addition to the list of BMPs and mitigation measures in Soils, Hydrology, Channel Morphology, and Floodplains, and Water Quality (above) the following BMPs and mitigations would be used to minimize or eliminate the impacts of erosion, sediment delivery, water quality, increased peakflow, fish passage barriers, and riparian alteration that could occur if Alternative C (Road Reconstruction) were implemented.

- Construction would occur during low flow, between mid to late July and October 1, to protect potential bull trout and westslope cutthroat trout habitat.
- Water for dust abatement would be drafted at a rate that would not decrease the wetted width of the channel; would have an intake flow of less than one foot per second; and drafting hoses would be required to have 3/32-inch mesh screens to prevent entrainment of juvenile fishes.

- Streams would not be dammed for dust abatement, and water drafting sites would be approved by the NPS fisheries biologist.
- Any dewatered stream segments would be limited to the minimum length required to complete the project, and any fish stranded in the dewatered channel shall be safely herded out of the area without contact, or removed with plastic-lined nets to reduce scaling and other sublethal injuries.
- Bottomless arches or channel-spanning bridges would be installed on fish-bearing streams to prevent fish passage barriers, when new stream crossing structures are required.
- Culverts would be installed at a grade to avoid inlet scouring and prevent erosion of streambanks downstream of the project.

5.3.4.5 Vegetation (Common Native, Special Status, Riparian, Wetland, Noxious/Invasive)

In addition to the list of Soil BMPs and mitigation measures, the following BMPs would be used to minimize or eliminate the impacts of lost soil productivity and vegetative community alteration that could occur if Alternative C (Road Reconstruction) were implemented.

- The NPS would conduct threatened, endangered, and sensitive plant surveys prior to project implementation.
- Populations or individual threatened, endangered, or sensitive plants would be flagged and avoided.
- Disturbed areas would be seeded with a mixture of NPS approved native grasses, forbs, and/or shrubs suitable for the site to meet erosion control needs and other management objectives such as riparian or wetland habitat restoration.
- Material for road reconstruction, including base course for the road subbase, aggregate material, and rock riprap would be barged into Stehekin in accordance with the LACH GMP. Any material would be brought in from an approved site that has been evaluated for the presence of exotic plants and noxious weeds. All quarry material would be covered while being transported into the Park.
- Material for routine road maintenance would come from the Company Creek Pit in Stehekin.
- Any stored soil, fill, or rock would be covered to prevent exposure to weed seeds.
- Salvaged soil known to contain weed seeds would be stored, covered, and separated from weed-free soil. This material could be used for subsurface fill or treated with appropriate herbicides.
- The herbicides that are approved for use on NPS public lands may be used to control noxious weeds and invasive species. Herbicide treatments would be applied in accordance with Washington State pesticide application guidelines, conform to NPS policy, and follow federal label instructions, specifications, and precautions. In instances where herbicide labels and federal or state stipulations overlap, the more restrictive criteria would apply.
- Application of any herbicides to treat noxious weeds would be performed or directly supervised by a state or federally licensed applicator.
- Pre- and post-herbicide treatment would be implemented along access roads, landings, skid trails, and other disturbed areas to control noxious weeds and invasive species establishment and proliferation. The best time to survey the post-project area for weeds is when regrowth begins, and as plants begin to grow in the first spring following site disturbance.
- No herbicide spraying would occur when wind velocity exceeds ten miles per hour.

- Dyes (e.g. Insight, Hilite) may be used to obtain uniform coverage. This would help prevent under or over treatment/application and help with detection of drift. It would also reduce the risk of treating non-target species.
- Herbicide applications would be coordinated with permit holders within the project areas, as appropriate.
- All weed abatement procedures would be stipulated in the implementation contracts.
- All equipment, materials, personal vehicles, sanitary facilities, and staging areas would be confined to a limited number of specified locations to decrease the chance of incidental disturbance and spread of weeds.
- Prior to entering relatively weed-free areas or transporting weed-free materials, vehicles and construction equipment would be cleaned of all mud, dirt, and plant parts using a pressure washer or forced air. Vehicle parts to be cleaned would include radiators, air intakes on the equipment, and the underbody and tracks of the vehicles or construction equipment.
- Vehicle and equipment wash sites would be in a relatively flat area, away from live water to prevent weed seed from being transported downstream and prevent any antifreeze or oil, potentially washed off this equipment, from entering live water.
- Vehicles and equipment would be cleaned and inspected prior to entering the project area and all vehicles and equipment would be cleaned before leaving the project area when operating in areas of weed infestations.

5.3.4.6 Terrestrial and Amphibious Wildlife

- Construction would be limited to a 2 to 3 year period to prevent potential disturbance during sequential reproductive seasons.
- Construction would be timed to avoid affecting the breeding and nesting periods for special status species, such as the northern spotted owl.
- No project related activities would take place within one mile of gray wolf rendezvous or den sites.
- No project related activities would take place within one mile of known Canada lynx denning sites or where kittens are present.
- All garbage would be taken off-site at the end of each working day.
- The project area would be surveyed for northern spotted owl prior to construction activities.
- If an active northern spotted owl nest(s) is found prior to construction activities.
 - a. An Action Area would be delineated around active nest trees. The Action Area would have a radius of 1,000 feet extending out from in all directions during the nesting season (March 1 to September 6) (USFWS 2005). No construction activities would take place within the Action Area between the beginning of the northern spotted owl nesting season (March 1) and September 6, depending on the age of the fledglings. Work could begin on or after September 6, or after at least 4 weeks have passed since fledging of the northern spotted owl(s). This determination would be done by an NPS wildlife biologist.
 - b. Construction activities would be carried out only during daylight hours to minimize effects to northern spotted owls.
 - c. No pullouts would be constructed within line-of-sight of the area along the road that is immediately adjacent to an active northern spotted owl nest tree.

- d. Project implementation would be monitored to ensure compliance with the conservation measures listed above, especially the seasonal timing restrictions and the final placement of the road relative to any northern spotted owl nest(s). Results of the monitoring would be reported to the USFWS. A NPS biologist would monitor any northern spotted owl nest(s) to determine whether any young were produced during the year(s) of project implementation. The NPS biologist would determine whether northern spotted owl nests are occupied or have moved. If young were discovered, then the biologist would estimate the age of the fledgling(s) as part of the timing restrictions described above.
- The NPS would report the progress of the proposed action and its impacts on federally threatened and endangered species, particularly northern spotted owls if any, to the USFWS in accordance with 50 CFR §13.45 and §18.27.
- Any dead or injured federally listed species found in the Action Area shall be reported within 24 hours to a special agent of the USFWS, Division of Law Enforcement at (360) 753-7764, or to the USFWS Western Washington Fish and Wildlife office at (360) 753-9440. In addition, the USFWS would be notified in writing within 3 working days of the accidental death of, or injury to, a northern spotted owl or of the finding of any that are dead or injured during implementation of the proposed federal action. Notification must include the date, time, and location of the incident or discovery of a dead or injured northern spotted owl, as well as any pertinent information on circumstances surround the incident or discovery. The USFWS contact for this written information is the Manager of the Western Washington USFWS office.

5.3.4.7 Archaeological and Historical Resources, Historic Structures

- Previously surveyed archaeological and historical sites would be flagged and avoided. The SHPO would be consulted regarding any potential adverse impacts.
- In the event that inadvertent discoveries of archaeological or historical resources are made during project implementation, all activities would cease until the NPS archaeologist can evaluate the finding and determine whether or not activities could continue.
- If significant properties are discovered, consultation with the SHPO would be conducted and clearance received prior to project implementation.

5.3.4.8 Visitor Access, Experience, and Park Operations

- Public information and education materials describing the project's effects and benefits would be prepared.
- A public information program to warn of construction related road closures, delays, and road hazards would be implemented. This program would help to aid in mitigating any impacts on visitors' expectations and experiences.
- In addition to this project, other Stehekin Valley Road projects may be implemented simultaneously. Throughout the course of the project, additional information would be made available to the public regarding the progress of the project and any future plans.
- Vehicle traffic would be managed within the construction zone and contractor hauling of materials, supplies, and equipment would be controlled to minimize disruptions in visitor traffic.
- A safety plan would be developed prior to the initiation of construction to ensure the safety of park visitors, workers, residents, and staff.

- Soundscape mitigation would be used to minimize or eliminate the impacts of construction noise (e.g. equipment noise and rock blasting), as appropriate.
- Equipment would not be left idling when not in use.
- Mufflers and sound attenuation devices would be installed and maintained on all equipment.
- Only well maintained and properly functioning equipment would be used.
- Portable noise screens would be used around particularly noisy equipment.
- Signs would be placed at appropriate intersections alerting motorists of the presence of construction traffic.
- Construction traffic and activities would not occur on weekends or federal holidays.
- Construction traffic and activities would occur only during daylight hours for visitor safety.
- Public notices, the local newspaper, radio announcements, the NPS website, and visitor centers would inform the public when road closures would occur.
- Emergency vehicle access would be provided through the construction area at all times.
- Construction workers would be informed about the special sensitivity of park values and regulations.
- Park resource specialists would be involved in inspections and monitoring, and provide recommendations during construction.

5.3.4.9 Wilderness, PCT, Wild and Scenic Rivers

- Construction crews would receive “Leave No Trace” training, including instruction on minimum impact techniques.
- Sanitation facilities would be provided for work crews.

5.3.4.10 Air Quality

- Soil disturbance would be minimized; water would be used for dust abatement; and disturbed soil would be stabilized with slash, mulch, and/or vegetation as soon as practical following construction to reduce fugitive dust.
- Chemicals would *not* be used to control dust.
- Speed restrictions would be implemented in construction zones to reduce dust.

5.4 Alternative D. Reroute the Stehekin Valley Road from Car Wash Falls to Bridge Creek and from Glory to Cottonwood Camp

5.4.1 SUMMARY OF ALTERNATIVE D (ROAD REROUTE)

Alternative D would reroute the Stehekin Valley Road in two locations to avoid two washed out sections and allow heavy duty, high clearance public and private vehicle access from MP 12.7 (0.2 miles south of Car Wash Falls) to Cottonwood Camp (MP 22.8) (Table 21; Appendix A3 & A4). A NPS or permittee shuttle service could be operated as far as Cottonwood Camp in the future.

From MP 12.7 to MP 15.3 (0.6 miles south of Bridge Creek) the road would follow the approximate location of the current PCT (Appendix A3). The PCT would be rerouted downslope of the road (closer to the river), out of sight distance of the road wherever practical (Appendix A3). The new 12-foot wide road would be approximately 0.2 miles shorter than the segment it would replace (2.2

vs. 2.4 miles; 3.2 vs. 3.5 acres). The road reroute would require congressional legislation to designate a new non-Wilderness road corridor in the Stephen Mather Wilderness.

From MP 15.3 to MP 20.1 the road was essentially undamaged by the 2003 flood, however, there was some damage at MP 17.4, MP 17.5 (Park Creek Camp), and Glory (MP 20.1) near Cascade Pass Trailhead (Table 21; Appendix A3). These sites would need to be reconstructed or repaired as needed.

The 2.7-miles of road between Glory and Cottonwood Camp (MP 22.8) have been closed to motorized and mechanized travel since the 1995 flood; this section would be rerouted to allow vehicle access (Table 21; Appendix A4). Approximately 2 miles of the road between MP 20.8 and 22.8 (Cottonwood Camp) is intact but would need drainage structure repairs. Approximately a ½-mile between MP 20.3 and 20.8 would need to be rerouted out of the 100-year floodplain. The ½-mile road reroute would be 12-feet wide or approximately 0.8 acres, and would fall within the current Wilderness. Therefore, congressional legislation would be required to designate a new non-Wilderness road corridor in the Stephen Mather Wilderness.

The new road and trail system would be designated with a notice in the *Federal Register* and Park signs.

The former Stehekin Valley Road between Car Wash Falls (MP 12.9) and MP 15.3 would be removed from the NPS road and trail system. The non-Wilderness road corridor could be congressionally designated as Wilderness in the future.

5.4.2 DETAILED DESCRIPTION OF ALTERNATIVE D (ROAD REROUTE)

5.4.2.1 Car Wash Falls (MP 12.9) to MP 15.3

This 2.4-mile long section would be permanently closed to all users and partially rehabilitated (see Car Wash Falls MP 12.9 to MP 15.3: Section 5.1.2.1). Debris and culverts from the former road between Car Wash Falls (MP 12.9) and the landslide at MP 15 would be removed. This includes a block of concrete and steel at Car Wash Falls, three 4-foot diameter culverts, one 3-foot diameter culvert, two 18 to 24-inch diameter culverts, and the bolts used to secure the subgrade rock to bedrock and boulders.

5.4.2.2 MP 12.7 to MP 15.3

At MP 12.7 on the Stehekin Valley Road, the new 2.2-mile long road reroute would leave the former road and follow the route of the Old Wagon Road/PCT (Table 21; Appendix A4). The new road would start approximately 0.2 miles south of Car Wash Falls at MP 12.7, and rejoin the old road at MP 15.3 (0.6 miles south of Bridge Creek) (Appendix A3). Approximately 1,100 yd³ of fill and 2,000 yd³ of surface gravel would be needed for the new road. The estimated cost of the basic road construction is \$708,576 (Table 3).

The road reroute would cross McGregor, Buzzard, and Canim creeks and other small drainages that are parallel or perpendicular to the existing PCT, and an old growth western redcedar wetland. The crossings would require bridges, bottomless arches, and/or culverts that could accommodate 100-year floods and provide fish passage if needed. The larger crossings and approaches at Canim, Buzzard, and McGregor creeks could cost an additional \$30,000 per crossing (Table 3).

The new road reroute would fall within the Stephen Mather Wilderness, so that congressional legislation would be needed to change the Wilderness boundary. The road would be available for motorized and mechanized use.

5.4.2.3 PCT

The current PCT would be moved to a location adjacent to and out of sight distance from the new road wherever practical (Table 21; Appendix A3). The most likely location for the PCT would be downslope from the new road location (i.e. closer to the river). The new PCT would be of similar length, approximately 2.2 miles, or slightly longer than the existing route, and would continue to be available for hikers, stock, and cross-country skiers. The estimated cost of the PCT reroute would be \$116,160 (Table 3).

5.4.2.4 MP 15.3 to Glory (MP 20.1)

Most of this section is essentially undamaged by the floods. However, at MP 17.4, there is a large hole in the road (20-feet wide by 20-feet long by 10 feet deep) and below Park Creek Camp (MP 17.5), the road was washed down to aggregate rock (Table 21). In 2003, the FHA estimated it would take 320 yd³ of fill, 110 yd³ of Class 5 riprap, and 100 yd³ of surfacing rock to repair these sites. The FHA estimated it would cost \$23,900 to repair these sites (Table 3).

Park staff temporarily repaired the Park Creek Bridge (MP 18) abutments in 2004. If the repairs fail, a new, longer bridge would probably be necessary and would be analyzed as a separate project proposal.

Approximately 1,100 yd³ of large rock and debris from an unnamed tributary would be removed from the road at Glory (MP 20.1). The road would be resurfaced with approximately 20 yd³ of surfacing rock. A 48-inch by 32-foot long culvert would be installed to divert water flowing from the tributary over the debris. In 2003, the FHA estimated it would cost \$31,180 to repair this site (Table 3).

5.4.2.5 Glory to Cottonwood Camp (MP 20.1 to MP 22.8)

Approximately ½-mile of road between MP 20.3 and 20.8 would be rerouted out of the 100-year floodplain onto the existing trail reroute to reestablish motorized and mechanized access to Cottonwood Camp (Table 21; Appendix A4). Approximately 2,000 yd³ of fill and 500 yd³ of gravel would be needed for the ½-mile of new road.

The rest of the road from MP 20.8 to MP 22.8 was not badly damaged by the 1995 flood, and would not be reconstructed or relocated but the drainage structures would need to be repaired.

The estimated cost to relocate and reconstruct the road between Glory and Cottonwood Camp is \$161,040 (Table 3).

The new road reroute would fall within the Stephen Mather Wilderness, so that congressional legislation would be needed to change the Wilderness boundary and establish a 100-foot wide non-Wilderness road corridor if Alternative D (Road Reroute) is implemented.

5.4.2.6 Dolly Varden Camp (MP 13)

The Dolly Varden Camp near Car Wash Falls suffered extensive damage during the 2003 flood and only one of the original two campsites, the bear-proof box, signs, and outhouse remain. Dolly

Varden Camp would no longer be accessible for car camping, but would continue to be available to hikers.

The NPS could construct a new campsite to replace the site lost in the 2003 flood, if there is reasonable site potential. If this were impractical, consideration would be given to constructing a single campsite at Bridge Creek Camp so there is no net loss of backcountry campsite capacity.

5.4.2.7 Shady Camp (MP 14.6)

Shady Camp would no longer be accessible for car camping. A new foot trail, approximately 0.1-mile long would be constructed to access Shady Camp, and the camp would need post-flood maintenance (Table 21; Appendix A6). There are no stock facilities at Shady Camp, so the single site camp would be available to hikers only. The estimated cost to build this trail is \$5,280 (Table 3).

Table 3. Alternative D Estimated Implementation Costs

Location	Estimated Cost
Reroute 2.2 miles of road between MP 12.7 and MP 15.3 (\$61 per foot)	\$708,576
Canim, Buzzard, McGregor stream crossings - \$30,000 each	\$90,000
Reconstruct 0.1 mile of road at MP 17.4 and MP 17.5	\$23,900
Repair road at Glory (MP 20.1)	\$31,180
Reconstruct ½-mile of road between MP 20.3 and MP 20.8	\$161,040
Subtotal	\$1,014,696
Mobilization - 10%	\$101,470
Preliminary and Construction Engineering - 10%	\$101,470
Subtotal	\$1,217,635
Reroute 2.2 miles of the PCT (\$10 per foot)	\$116,160
Build 0.1-mile long trail from PCT to Shady Camp (\$10 per foot)	\$5,280
Subtotal	\$121,440
TOTAL	\$1,339,075

5.4.2.8 Alternative D (Road Reconstruction) Total Cost Estimate

The total estimated cost of implementing this alternative is \$1,339,075 (Table 3). The cost estimates in Table 3 are from the FHA road reports and NPS estimates. The number of stream crossings and the type of stream crossings that would be needed to implement the road and trail reroutes are unknown, but the NPS estimated the cost of the larger stream crossings (Canim, Buzzard, and McGregor creeks) could be \$30,000 each.

The estimated cost of implementing Alternative D does not include:

- Construction of a tent site at Dolly Varden Camp or Bridge Creek Camp (optional);
- Post-flood maintenance of Shady Camp;
- Rehabilitation of the old road between MP 12.9 and MP 15.3, including removal of the concrete, culverts, and bolts;
- Signing;
- Administrative costs to change the Wilderness boundary;

- Administration costs to permanently close the road at Car Wash Falls;
- Routine road and trail maintenance; and
- Future emergency road reconstruction.

5.4.2.9 Alternative D (Road Reconstruction) Implementation Schedule

Implementation of Alternative D would be funding-dependent, and construction could possibly begin in 2006. Construction would begin as soon as possible after peak runoff and when soil conditions allow (approximately July 1), and continue to October 1. To mitigate visitor impacts, there would be no construction traffic on holidays or weekends. Therefore, approximately 61 days would be available for fill hauling and other construction activities, annually.

Construction traffic would be constrained by one-way road access to the project area. If 5 to 10 dump trucks hauled four loads of fill and gravel (10 yd³ per truck) from a staging area in Company Creek Pit per day, it would take approximately 8 to 16 days to complete hauling 3,100 yd³ for the MP 12.7 to MP 15.3 road reroute.

Another 420 yd³ of fill (10 yd³ per truck) and 110 yd³ of oversized rock (8 yd³ per truck) would be needed to repair the roadbed between MP 15.3 and Glory. It would take approximately 1 to 3 days to complete hauling this material.

At Glory (MP 20.1), there is approximately 1,100 yd³ of rock and debris on the road that would be removed. Once the debris is cleared, the road would need approximately 20 yd³ of surface rock. The trucks hauling material to MP 17.4 and MP 17.5 could carry some of the slide material on the return trips, or the material may be used for road construction. If the debris has to be hauled off-site, it could take up to 2 to 4 more days to complete hauling.

Approximately 2,000 yd³ of fill and 500 yd³ of gravel would be needed to build the road reroute out of the 100-year floodplain between MP 20.3 and MP 20.8. At a rate of 10 yd³ per truck, it would take approximately 6 to 13 days to complete hauling this material.

There is a high likelihood that an active northern spotted owl nest may be found in the project area prior to construction. If so, no construction activities could take place within a radius of 1,000 feet from the tree until after September 6, or at least 4 weeks after fledging. An active owl nest could limit construction activities to approximately 17 days between September 6 and October 1, depending on the location of the nest tree.

The approximate number of days needed to haul the material for all phases of Alternative D would be 17 to 36 days. So whether or not there is an active spotted owl nest in the area, construction could be completed within 2 to 3 years.

5.4.3 ALTERNATIVE D (ROAD REROUTE) CONSTRUCTION SPECIFICATIONS

The former road would be signed and blocked at MP 12.9.

The new road segments would be single lane, approximately 12 feet-wide with occasional 18-feet wide by 30 to 35-feet long turnouts for two-way traffic, generally not more than 500 feet apart.

Turnouts would not be constructed in draws, riparian areas, and wetlands, or on slopes that would require extensive cut and fill.

The river road and stream crossings would be built to 100-year flood specifications.

Bottomless arches or channel-spanning bridges would be used for fish-bearing stream crossings.

The culverts along the old Stehekin Valley Road between MP 12.9 and MP 15 would be cut into manageable sections with a cutting torch, crushed, and either sling-loaded by helicopter or packed out of the area.

The areas where culverts were removed would be recontoured to achieve a natural appearance, and revegetation, mulching, woody debris, or rock would be used to minimize further erosion.

The concrete slab at Car Wash Falls would be winched over rock at low river flow to the end of the road at Car Wash Falls and trucked out of the area.

The new trail to Shady Camp would originate at the PCT.

Approximately 1,100 yd³ of pit-run fill (500 yd³ x 2.2 miles) would be needed to build a new road on top of the Old Wagon Road/PCT. Another 2,000 yd³ of crushed gravel would be needed for the road surface.

In 2003, the FHA estimated it would take 320 yd³ of fill, 110 yd³ of Class 5 riprap, and 100 yd³ of surfacing rock to repair the roadbed at MP 17.4 and MP 17.5.

Park staff temporarily repaired the Park Creek Bridge (MP 18) abutments in 2004. If the repairs fail, a new, longer bridge would probably be necessary and would be analyzed as a separate project proposal.

Approximately 1,100 yd³ of large rock and debris on the road at Glory (MP 20.1) would need to be removed, and the road would need to be resurfaced with approximately 20 yd³ of surface rock. Some of the material in the debris slide may be used for construction. A 48-inch by 32-foot long culvert would be installed to divert water flowing over the debris.

Approximately 2,000 yd³ of fill and 500 yd³ of surface gravel would be needed to reroute the road out of the 100-year floodplain between MP 20.3 and 20.8.

Five to ten dump trucks would haul fill in a "train" from a staging area at Company Creek Pit to the project area.

Some rock blasting and concrete work may be required to rebuild the road.

Material from the former roadbed such as concrete, culverts, and fill would be salvaged and used for reconstruction, or removed.

Road reconstruction would require an ACOE 404(d) stream channel alteration permit and a WDFW HPA.

5.4.4 ALTERNATIVE D BMPs AND MITIGATION MEASURES

The following BMPs and mitigation measures to minimize potential adverse impacts that could occur if Alternative D (Road Reroute) were implemented.

5.4.4.1 Soils

- Construction would likely occur during the dry summer and fall months to minimize impacts to soils, vegetation, wetlands, and creeks.
- Temporary erosion and sediment controls such as watering areas of exposed soils, matting, plastic sheeting, or straw would be used to control surface erosion during the work period.
- All disturbed areas would be protected from erosion prior to October 1 using vegetation or other means. Disturbed soil exposure to rainfall would be minimized.

- Areas to be cleared and graded would be clearly marked on the ground to minimize soil disturbance. Only those areas necessary for construction would be cleared and grubbed.
- Work site access would be on existing roads only; travel would cease when damage to the road surface would result or is occurring.
- No operation of off-road equipment would be permitted during wet weather conditions.
- Disturbance of the organic soil horizon would be limited, and no ground-disturbing activities would occur in areas of saturated soil.
- Handwork would be required where machinery would cause undue soil disturbance.
- Trees removed for road construction (including whole trees and slash) would be used for soil protection and site rehabilitation.
- Hand-scattered, low slash and small brush would be left to slow surface runoff, protect soil, return soil nutrients, provide small mammal habitat, and shade for conifer seedlings. Slash generated from tree removal would be lopped to less than or equal to four inches in diameter and four feet in length and hand-scattered to protect soils.
- Site preparation equipment that produces irregular surfaces would be used to minimize or eliminate vertical patterns (i.e. up and down the slope) during scarification. Soil would be scarified only to the extent necessary to meet the revegetation objective of the site. Brush piling and scarification would be implemented when soils are frozen or dry enough to minimize compaction and displacement. The soil surfaces would be left with a rough, corrugated surface to help anchor seed. If the slopes were tracked, the tracks would be perpendicular to the slope contour.
- Disturbed areas would be seeded with a mixture of NPS approved native grasses, forbs, and/or shrubs suitable for the site to meet erosion control needs and other management objectives such as riparian or wetland habitat restoration.
- Certified weed-free mulch could be used to retain soil and moisture, and to facilitate seed germination and survival.
- Topsoil would be stockpiled and used to rehabilitate disturbed sites.

5.4.4.2 Hydrology, Channel Morphology, Floodplains

In addition to the list of Soil BMPs and mitigation measures, the following BMPs would be used to minimize or eliminate the impacts of erosion, sediment delivery, and increased peakflow that could occur if Alternative D (Road Reroute) were implemented.

- Stream crossing structures would be sized for the 100-year interval storm, and any fill associated with the project would be protected from erosion to the 100-year interval.
- All stream crossing structures would be installed perpendicular to stream flow and at existing grade, if applicable.
- Disturbance of the streambed and streambanks would be limited to the amount necessary to place culverts and any required channel modifications.
- Removal of existing structures would be accomplished so that the structure and associated material do not enter the water course.
- Any culvert installation or other instream work would be conducted under dry conditions in isolation from stream flow by the installation of a bypass flume or culvert, or by pumping the stream flow around the work area, unless siltation and turbidity can be sufficiently reduced.

- Any necessary excavation would be outside the OHW mark unless the construction site is separated from water by use of an approved dike, coffer dam, or similar structure.
- Standard bio-engineering techniques such as willow wattling, whole tree bank revetment, large woody debris, rock, and woody plantings would be used to reduce sediment delivery and the effects of peakflows and flood flows at actively or potentially eroding creek banks, and cut and fill slopes around stream crossings.

5.4.4.3 Water Quality

In addition to the list of Soil BMPs and mitigation measures, the following BMPs would be used to minimize or eliminate the impacts of erosion, sediment delivery, and fuel spills that could occur if Alternative D (Road Reroute) were implemented.

- Erosion containment controls such as silt fencing and sediment traps would be used to contain sediment on site and prevent sediment delivery to waterways.
- Temporary diversion devices such as culverts, sand trenches, or French drains would be used to direct surface water away from exposed soil, and direct storm water from disturbed areas into temporary settling basins or onto low gradient, vegetated areas.
- Disturbed soil or soil stockpiles would be covered with plastic sheeting, jute matting, erosion netting, straw, or other suitable cover material prior to storms.
- Wastewater from project dewatering activities would be routed to an area outside the OHW mark to allow removal of fine sediment and other contaminants.
- Concrete would be sufficiently cured prior to contact with water to avoid leaching.
- Areas outside of the 100-year floodplain would be designated as refueling and equipment maintenance areas.

5.4.4.4 Fisheries and Aquatic Habitat

In addition to the list of BMPs and mitigation measures in Soils, Water Quality, and Hydrology, Channel Morphology, and Floodplains (above) the following BMPs and mitigations would be used to minimize or eliminate the impacts of erosion, sediment delivery, water quality, increased peakflow, fish passage barriers, and riparian alteration that could occur if Alternative D (Road Reroute) were implemented.

- All perennial and intermittent streams would be surveyed for the presence or absence of fish prior to implementation. Bottomless arches or channel-spanning bridges would be used for fish-bearing stream crossings.
- Construction would occur during low flow, between mid to late July and October 1, to protect potential bull trout and westslope cutthroat trout habitat.
- Riparian buffer strips would be designated to protect fisheries habitat, riparian habitat, and water quality within the project area.
- Water for dust abatement would be drafted at a rate that would not decrease the wetted width of the channel; would have an intake flow of less than one foot per second; and drafting hoses would be required to have 3/32-inch mesh screens to prevent entrainment of juvenile fishes.
- Streams would not be dammed for dust abatement, and water drafting sites would be approved by the NPS fisheries biologist.

- Any dewatered stream segments would be limited to the minimum length required to complete the project, and any fish stranded in the dewatered channel shall be safely herded out of the area without contact, or removed with plastic-lined nets to reduce scaling and other sublethal injuries.
- Culverts would be installed at grade level to allow fish passage, and avoid inlet scouring and prevent erosion of streambanks downstream of the project.

5.4.4.5 Vegetation (Common Native, Special Status, Riparian, Wetland, Noxious/Invasive)

In addition to the list of Soil BMPs and mitigation measures, the following BMPs and mitigations measures would be used to minimize or eliminate the impacts of lost soil productivity and vegetative community alteration that could occur if Alternative D (Road Reroute) were implemented.

- The NPS would conduct threatened, endangered, and sensitive plant surveys prior to project implementation.
- Populations or individual threatened, endangered, or sensitive plants would be flagged and avoided.
- Disturbed areas would be seeded with a mixture of NPS approved native grasses, forbs, and/or shrubs suitable for the site to meet erosion control needs and other management objectives such as riparian or wetland habitat restoration.
- Material for new road construction, including base course for the road subbase, aggregate material, and rock riprap would be barged into Stehekin in accordance with the LACH GMP. Any material would be brought in from an approved site that has been evaluated for the presence of exotic plants and noxious weeds. All quarry material would be covered while being transported into the Park.
- Material for routine road maintenance would come from the Company Creek Pit in Stehekin.
- Any stored soil, fill, or rock would be covered to prevent exposure to weed seeds.
- Salvaged soil known to contain weed seeds would be stored, covered, and separated from weed-free soil. This material could be used for subsurface fill or treated with appropriate herbicides.
- The herbicides that are approved for use on NPS public lands may be used to control noxious weeds and invasive species. Herbicide treatments would be applied in accordance with Washington State pesticide application guidelines, conform to NPS policy, and follow federal label instructions, specifications, and precautions. In instances where herbicide labels and federal or state stipulations overlap, the more restrictive criteria would apply.
- Application of any herbicides to treat noxious weeds would be performed or directly supervised by a state or federally licensed applicator.
- Pre- and post-herbicide treatment would be implemented along access roads, landings, skid trails, and other disturbed areas to control noxious weeds and invasive species establishment and proliferation. The best time to survey the post-project area for weeds is when regrowth begins, and as plants begin to grow in the first spring following site disturbance.
- No herbicide spraying would occur when wind velocity exceeds ten miles per hour.
- Dyes (e.g. Insight, Hilite) may be used to obtain uniform coverage. This would help prevent under or over treatment/application and help with detection of drift. It would also reduce the risk of treating non-target species.

- Herbicide applications would be coordinated with permit holders within the project areas, as appropriate.
- All weed abatement procedures would be stipulated in the implementation contracts.
- All equipment, materials, personal vehicles, sanitary facilities, and staging areas would be confined to a limited number of specified locations to decrease the chance of incidental disturbance and spread of weeds.
- Prior to entering relatively weed-free areas or transporting weed-free materials, vehicles and construction equipment would be cleaned of all mud, dirt, and plant parts using a pressure washer or forced air. Vehicle parts to be cleaned would include radiators, air intakes on the equipment, and the underbody and tracks of the vehicles or construction equipment.
- Vehicle and equipment wash sites would be in a relatively flat area, away from live water to prevent weed seed from being transported downstream and prevent any antifreeze or oil, potentially washed off this equipment, from entering live water.
- Vehicles and equipment would be cleaned and inspected prior to entering the project area and all vehicles and equipment would be cleaned before leaving the project area when operating in areas of weed infestations.

5.4.4.6 Terrestrial and Amphibious Wildlife

- Construction would be limited to a 2 to 3 year period to prevent potential disturbance during sequential reproductive seasons.
- Construction would be timed to avoid affecting the breeding and nesting periods for special status species, such as northern spotted owl.
- Trees would not be cut until after the annual reproductive season for species of concern (e.g. northern spotted owl) to make sure young-of-the-year have fledged.
- No project related activities would take place within one mile of gray wolf rendezvous or den sites.
- All trees within 100 feet of caves or cave-like structures would be retained to protect potential bat habitat.
- No project related activities would take place within one mile of known Canada lynx denning sites or where kittens are present.
- All garbage would be taken off-site at the end of each working day.
- The project area would be surveyed for northern spotted owl prior to construction activities.
- If an active northern spotted owl nest(s) is found prior to construction activities.
 - a. An Action Area would be delineated around active nest trees. The Action Area would have a radius of 1,000 feet extending out from in all directions during the nesting season (March 1 to September 6) (USFWS 2005). No construction activities would take place within the Action Area between the beginning of the northern spotted owl nesting season (March 1) and September 6, depending on the age of the fledglings. Work could begin on or after September 6, or after at least 4 weeks have passed since fledging of the northern spotted owl(s). This determination would be done by the Park wildlife biologist.
 - b. Construction activities would be carried out only during daylight hours to minimize effects to northern spotted owls.

- c. No pullouts would be constructed within line-of-sight of the area along the road that is immediately adjacent to an active northern spotted owl nest tree.
- d. Project implementation would be monitored to ensure compliance with the conservation measures listed above, especially the seasonal timing restrictions and the final placement of the road relative to any northern spotted owl nest(s). Results of the monitoring would be reported to the USFWS. A NPS biologist would monitor any northern spotted owl nest(s) to determine if any young were produced during the year(s) of project implementation. The NPS biologist would also determine whether the northern spotted owl nests are occupied or empty. If young were discovered, then the biologist would estimate the age of the fledgling(s) as part of the timing restrictions described above.
- The NPS would report the progress of the proposed action and its impacts on federally threatened and endangered species, particularly northern spotted owls if any, to the USFWS in accordance with 50 CFR §13.45 and §18.27.
- Any dead or injured federally listed species found in the Action Area shall be reported within 24 hours to a special agent of the USFWS, Division of Law Enforcement at (360) 753-7764, or to the USFWS Western Washington Fish and Wildlife office at (360) 753-9440. In addition, the USFWS would be notified in writing within 3 working days of the accidental death of, or injury to, a northern spotted owl or of the finding of any that are dead or injured during implementation of the proposed federal action. Notification must include the date, time, and location of the incident or discovery of a dead or injured northern spotted owl, as well as any pertinent information on circumstances surround the incident or discovery. The USFWS contact for this written information is the Manager of the Western Washington USFWS office.

5.4.4.7 Archaeological and Historical Resources, Historic Structures

- Previously surveyed archaeological and historical sites would be flagged and avoided. The SHPO would be consulted regarding any potential adverse impacts.
- In the event that inadvertent discoveries of archaeological or historical resources are made during project implementation, all activities would cease until the NPS archaeologist can evaluate the finding and determine whether or not activities could continue.
- If significant properties are discovered, consultation with the SHPO would be conducted and clearance received prior to project implementation.

5.4.4.8 Visitor Access, Experience, and Park Operations

- Public information and education materials describing the project's effects and benefits would be prepared.
- A public information program to warn of construction related road closures, delays, and road hazards would be implemented. This program would help to aid in mitigating any impacts on visitors' expectations and experiences.
- In addition to this project, other Stehekin Valley Road projects may be implemented simultaneously. Throughout the course of the project, additional information would be made available to the public regarding the progress of the project and any future plans.
- Vehicle traffic would be managed within the construction zone and contractor hauling of materials, supplies, and equipment would be controlled to minimize disruptions in visitor traffic.

- A safety plan would be developed prior to the initiation of construction to ensure the safety of park visitors, workers, residents, and staff.
- Soundscape mitigation would be used to minimize or eliminate the impacts of construction noise (e.g. equipment noise and rock blasting), as appropriate.
- Equipment would not be left idling when not in use.
- Mufflers and sound attenuation devices would be installed and maintained on all equipment.
- Only well maintained and properly functioning equipment would be used.
- Portable noise screens would be used around particularly noisy equipment.
- Signs would be placed at appropriate intersections alerting motorists of the presence of construction traffic.
- Construction traffic and activities would not occur on weekends or federal holidays.
- Construction traffic would occur only during daylight hours for visitor safety.
- Public notices, the local newspaper, radio announcements, the NPS website, and visitor centers would inform the public when road closures would occur.
- Emergency vehicle access would be provided through the construction area at all times.
- Construction workers would be informed about the special sensitivity of park values and regulations.
- Park resource specialists would be involved in inspections and monitoring, and provide recommendations during the road rehabilitation work.
- Construction activities would be limited to a 2 to 3 year period to prevent potentially adverse economic impacts on park visitors.

5.4.4.9 Socio-economics

- Construction activities would be limited to a 2 to 3 year period to prevent potentially adverse economic impacts on park permittees and the community of Stehekin.

5.4.4.10 Wilderness and PCT

- Construction crews would receive “Leave No Trace” training, including instruction on minimum impact techniques.
- Sanitation facilities would be provided for work crews.
- Temporary boundaries along the new road and PCT reroutes would be delineated with flexible construction fence to avoid impacts outside authorized areas.
- Wilderness corridor boundaries would be designated with materials that are visually unobtrusive to minimize impacts to wilderness character.

5.4.4.11 Wild and Scenic Rivers

- Irregular boundaries and feathering of boundaries would be used to help blend treatment areas into the surrounding natural landscape patterns when clearing is required.
- All stumps would be cut flush in areas viewed as foreground from trails and recreation sites.

5.4.4.12 Air Quality

- Soil disturbance would be minimized; water would be used for dust abatement; and disturbed soil would be stabilized with slash, mulch, and/or vegetation as soon as practical following construction to reduce fugitive dust.
- Chemicals would *not* be used to control dust.
- Speed restrictions would be implemented in construction zones to reduce dust.

5.5 The Environmentally Preferred Alternative

The CEQ defines the Environmentally Preferred Alternative as "... the alternative that will promote the national environmental policy as expressed in NEPA Section 101." Section 101 states that "...it is the continuing responsibility of the federal government to:

- Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;
- Assure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings;
- Attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences;
- Preserve important historic, cultural and natural aspects of our national heritage and maintaining, wherever possible, an environment that supports diversity and variety of individual choice;
- Achieve a balance between population and resource use that will permit high standards of living and a wide sharing of life's amenities; and
- Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources."

Simply put, the Environmentally Preferred Alternative is the alternative that causes the least damage to the biological and physical environment. It is also the alternative which best protects, preserves, and enhances historic, cultural, and natural resources.

The selection of the Environmentally Preferred Alternative was based on analyses that balanced physical impacts on various aspects of the environment, mitigation measures to deal with these impacts, and other factors including the statutory mission of the NPS and the purpose and need of the project. The comparison of alternatives in Table 4 displays the results of these analyses by impact topic. Based on these analyses, the Preferred Alternative is also the Environmentally Preferred Alternative because it would best preserve the biological resources, natural aspects, soundscape, and visual resources of the Stehekin River and the Park, and protect aquatic habitat, water quality, and ESA listed species by:

- Eliminating the risk of sediment delivery due to project implementation or future floods and road erosion;
- Preserving the channel morphology and floodplain function of the Stehekin River;
- Preserving aquatic, riparian, and fisheries habitat;
- Preserving potential bull trout and northern spotted owl habitat; and
- Preserving wilderness quality and designated Wilderness.

The other alternatives would cause various adverse impacts to the biological and physical environment that would exceed those impacts identified for the Preferred Alternative (Alternative B) (Table 1). For example, no management action (Alternative A) would leave remnants of the former road infrastructure in place. The abandoned culverts would not be maintained and would cause adverse impacts to the floodplain and fisheries habitat over time.

Rebuilding the road in its former location (Alternative C) would result in adverse impacts to water quality, bull trout, and fisheries habitat during construction. Following construction, there would be a high probability of future flood damage and further adverse affects to ESA listed bull trout.

Relocating the road away from the floodplain (Alternative D) would cause adverse impacts to wildlife, riparian, and wetland habitats, including adverse affects to ESA listed northern spotted owls.

5.6 Alternatives Considered but Dismissed

The following alternatives were considered but dismissed from further analysis. The alternatives were eliminated based on one or more of the following factors:

- Lack of technical feasibility;
- Inability to meet the project's purpose and need;
- Duplication with other less environmentally damaging or less expensive alternatives;
- Conflict with an up-to-date park plan, statement of purpose and significance, or other policy;
- Severe environmental impact; or
- As a secondary, supporting reason, economic infeasibility.

5.6.1 CLOSE STEHEKIN VALLEY ROAD AT CAR WASH FALLS (MP 12.9) AND PROVIDE ALL TERRAIN VEHICLE ACCESS TO GLORY (MP 20.1)

This alternative was proposed as a result public scoping. The proponent suggested constructing a 60-inch tread trail from Car Wash Falls to Bridge Creek that could accommodate a narrow gauge "train" of cars with large, pneumatic tires pulled by a tractor that could carry up to 10 guests and their packs.

An All Terrain Vehicle (ATV) trail would require substantial rockwork and some blasting, similar to new road construction. All fill material would need to be barged into Stehekin from a certified, weed-free source. The estimated cost of ATV trail construction is \$4,950,000, or 75 percent of the road reconstruction estimate in Alternative C (Road Reconstruction) (Table 2). Maintenance costs of an ATV trail would be similar to the cost of maintaining a road.

Current use patterns indicate that most visitors who use the Stehekin Road travel to the High Bridge Historic District (MP 11.2) by vehicle or bicycle before returning to Stehekin. Use of the proposed ATV trail would be limited, and would primarily benefit local permittees who would transport tourists or rent ATVs to the recreating public.

A designated ATV trail would also be open to hikers, stock, and bicycles. In a number of places, the 60-inch wide trail would have to be located against a rock face over the river, and serious safety issues could arise between motorized and non-motorized users.

The aquatic habitat impacts of this alternative would be similar to Alternative C, “Likely to Adversely Affect” bull trout if they were present in the Stehekin Watershed, and to adversely impact fisheries and aquatic habitat.

The ATV trail could affect air quality (fugitive dust, exhaust) and the natural soundscape of the Wilderness and the PCT due to close proximity.

Building an ATV trail within the non-Wilderness boundary near MP 15 would be a short-term solution because the landslide mass wasting potential extends beyond the non-Wilderness road corridor established for the Stehekin Valley Road (Appendix A2). As of June 2005, the MP 15 landslide had eliminated a section of the roadbed, and the slide was still expanding (Appendix A2). In fact, the area of the slide may already exceed the non-Wilderness road corridor. Therefore, a new non-Wilderness road corridor would need to be designated by congressional legislation to establish a long-term, safe ATV, hikers, stock, and bicycle trail.

Based on this preliminary evaluation, this alternative was considered but dismissed from further analysis.

5.6.2 CLOSE STEHEKIN VALLEY ROAD AT CAR WASH FALLS (MP 12.9) AND PROVIDE BICYCLE ACCESS TO GLORY (MP 20.1)

This alternative would permanently close the Stehekin Valley Road to motorized use between Car Wash Falls and Cottonwood Camp. In addition, this alternative would make improvements to the Stehekin Valley Road between Car Wash Falls and MP 15.3 to provide hiker and cyclist access as far as Glory if the bicycle route could be accommodated and maintained within the non-Wilderness road corridor.

The Washington Park Wilderness Act of 1988 (PL 100-668) defines the Wilderness boundary as 50 feet from either side of the centerline of the road *as it existed at the time of the bill’s passage*. By law, the use of mechanical or motorized conveyances is limited to this 100-foot wide corridor.

Building a foot and bicycle trail within the non-Wilderness boundary near MP 15 would be a short-term solution because the landslide mass wasting potential extends beyond the non-Wilderness road corridor established for the Stehekin Valley Road. As of June 2005, the MP 15 landslide had eliminated a section of the roadbed, and the slide was still expanding (Appendix A2). In fact, the area of the slide may already exceed the non-Wilderness road corridor. Therefore, a new non-Wilderness road corridor would need to be designated by congressional legislation to establish a long-term, safe bicycle trail.

Based on this preliminary evaluation, this alternative was considered but dismissed from further analysis.

5.7 SUMMARY OF ALTERNATIVE CONSEQUENCES AND IMPACTS

Table 4 is a summary of the potential consequences by impact topic of each alternative for comparison purposes.

Table 4. Summary of Alternative Consequences and Impacts

Impact Topic	No Action (Alternative A)	Preferred Alternative (Alternative B)	Alternative C (Road Reconstruction)	Alternative D (Road Reroute)
Soils	4.2 acres of passive road reclamation 9.8 acres of road converted to trail	4.2 acres of road reclamation 9.8 acres of road converted to trail 0.5 acres of new trail	0.7 acres of road reclamation 3.2 acres of road converted to trail 0.4 acres of new trail 10.5 acres of road reconstruction	4.2 acres of road reclamation 0.1 acre of road reconstruction 4 acres new road construction 1.7 acres of new trail construction
Hydrology, Channel Morphology, Floodplains, and Water Quality	2.4 miles of passive road reclamation 7 miles of road converted to trail	2.4 miles of active road reclamation including culvert removal 7 miles of road converted to trail ½-mile of trail brought up to standard	½-mile of road reclamation 2.2 miles of road converted to trail ½-mile of trail brought up to standard 7.2 miles of road reconstruction More than 73,365 yd ³ of fill, riprap, gravel Resumption of road maintenance and emergency road repairs	2.9 miles of road reclamation including culvert removal 0.2 miles of road reconstruction 2.7 miles of new road construction 2.3 miles of new trail construction 6,150 yd ³ of fill, riprap, gravel New crossings over Canim, Buzzard, and McGregor creeks Resumption of road maintenance and emergency road repairs
Fisheries and Aquatic Habitat	Major beneficial impacts to fisheries and aquatic habitat. “No Effect” or a major beneficial affect on bull trout. Would not contribute to future listing of westslope cutthroat trout or their essential habitat.	Major beneficial impacts to fisheries and aquatic habitat. “No Effect” or a major beneficial affect on bull trout. Would not contribute to future listing of westslope cutthroat trout or their essential habitat.	Major, short-term adverse impacts to fisheries and aquatic habitat during the 3½ to 11 year construction period. Major, long-term adverse impacts to fisheries and aquatic habitat after construction. “Likely to Adversely Affect” bull trout. Would not contribute to future listing of westslope cutthroat trout or their essential habitat.	Moderate, short-term adverse impacts to fisheries and aquatic habitat during the 2-3 year construction period. Moderate, long-term adverse impacts to fisheries and aquatic habitat after construction. “Not Likely to Adversely Affect” bull trout. Would not contribute to future listing of westslope cutthroat trout or their essential habitat.

Table 4 continued

Impact Topic	No Action (Alternative A)	Preferred Alternative (Alternative B)	Alternative C (Road Reconstruction)	Alternative D (Road Reroute)
Vegetation	<p>9.1 acres of natural revegetation in the Stehekin River floodplain and riparian areas.</p> <p>Fewer mechanisms to spread weeds upstream of Car Wash Falls (MP 12.9).</p> <p>“No Effect” on federally listed and other special status species.</p>	<p>9.1 acres of natural revegetation in the Stehekin River floodplain and riparian areas.</p> <p>Fewer mechanisms to spread weeds upstream of Car Wash Falls (MP 12.9).</p> <p>“No Effect” on federally listed and other special status species.</p>	<p>2.3 acres of natural revegetation and 10.5 acres of long-term vegetation removal in the Stehekin River floodplain and riparian areas.</p> <p>Fewer mechanisms to spread weeds upstream of Glory (MP 20.1).</p> <p>“No Effect” on federally listed and other special status species.</p>	<p>4.2 acres of natural revegetation and 10.5 acres of long-term vegetation removal in the Stehekin River floodplain and riparian areas.</p> <p>4.9 acres of long-term vegetation removal in the current Wilderness.</p> <p>Stehekin River floodplain and riparian areas.</p> <p>Short-term disturbance of additional acres during construction.</p> <p>New routes and more mechanisms to spread weeds.</p> <p>Major, short- and long-term adverse impacts on the 1-acre western redcedar wetland.</p> <p>“No Effect” on federally listed and other special status species.</p>
Terrestrial and Amphibious Wildlife	<p>“No Effect” or minor beneficial affects for ESA listed species.</p> <p>Minor to moderate, long-term beneficial impacts for common and other special status species.</p>	<p>“No Effect” or minor beneficial affects for ESA listed species.</p> <p>Minor to moderate, long-term beneficial impacts for common and other special status species.</p>	<p>“Not Likely to Adversely Affect” ESA listed species, including northern spotted owl.</p> <p>Moderate to major adverse impacts for Townsend’s big-eared bat during the 3½ to 11 year construction period.</p> <p>Would not impact other special status species due to lack of suitable habitat.</p> <p>Minor to moderate adverse impacts for common species that may occur or habitat in the project area, particularly during the 3½ to 11 year construction period.</p>	<p>“Likely to Adversely Affect” northern spotted owl post-construction.</p> <p>“Not Likely to Adversely Affect” the other ESA listed species.</p> <p>Minor to moderate adverse impacts for the other special status and common species that may occur or habitat in the project area, particularly during the 2 to 3 year construction period.</p>

Table 4 continued

Impact Topic	No Action (Alternative A)	Preferred Alternative (Alternative B)	Alternative C (Road Reconstruction)	Alternative D (Road Reroute)
Visitor Access and Experience	9.9 miles of effective road closure. Increased wilderness character.	9.9 miles of official road closure. Increased wilderness character.	7.2 miles of restored vehicle and bicycle access. Decreased wilderness character. Increased access to backcountry camps. Optional shuttle service restoration. Major adverse impact on all user groups during the 3½ to 11 year construction period.	9.7 miles of restored vehicle and bicycle access. Decreased wilderness character. Increased access to backcountry camps. Optional shuttle service restoration. Major adverse impact on all user groups during the 2-3 year construction period.
Park Operations	Decreased motorized access for trail and facilities maintenance, fire suppression, emergency services, and weed control. Decreased need for maintenance and weed control.	Decreased motorized access for trail and facilities maintenance, fire suppression, emergency services, and weed control. Decreased need for maintenance and weed control.	Increased motorized access for trail and facilities maintenance, fire suppression, emergency services, and weed control. Decreased need for maintenance and weed control.	Increased motorized access for trail and facilities maintenance, fire suppression, emergency services, and weed control. Decreased need for maintenance and weed control.
Socio-economic	\$0 implementation costs. Variable minor to moderate beneficial or adverse impacts for local businesses. \$0 routine road maintenance. \$4,125 annual routine trail maintenance for 7.5 miles of road converted to trail. No emergency road repairs. No NPS subsidized shuttle service above MP 12.9.	\$19,340 implementation costs. Variable minor to moderate beneficial or adverse impacts for local businesses. \$0 routine road maintenance. \$4,125 annual routine trail maintenance for 7.5 miles of road converted to trail. \$55 annual routine trail maintenance for Shady Camp Trail. No emergency road repairs. No NPS subsidized shuttle service above MP 12.9.	\$6.6+ million implementation costs. Variable minor to moderate beneficial affects for local businesses. \$10,397 annual routine road maintenance (7.2 miles). \$1,485 annual routine trail maintenance for 2.8 miles of road converted to trail. High likelihood of large-scale emergency road repairs due to flood damage. Optional NPS subsidized shuttle service above MP 12.9. Major beneficial affects for local businesses during the 3½ to 11 year construction period.	\$1,339,075 implementation costs. Variable minor to moderate beneficial affects for local businesses. \$14,007 annual routine road maintenance (9.7 miles). \$0 annual routine trail maintenance for road converted to trail. \$55 annual routine trail maintenance for Shady Camp Trail. Low likelihood of large-scale emergency road repairs due to flood damage. Optional NPS subsidized shuttle service above MP 12.9. Major, short-term beneficial affects for local businesses during the 2-3 year construction period.

Table 4 continued

Impact Topic	No Action (Alternative A)	Preferred Alternative (Alternative B)	Alternative C (Road Reconstruction)	Alternative D (Road Reroute)
Stephen Mather Wilderness	Increased wilderness character above MP 12.9. Option to include the non-Wilderness road corridor between MP 12.9 and MP 22.8 in the Wilderness.	Increased wilderness character above MP 12.9. Option to include the non-Wilderness road corridor between MP 12.9 and MP 22.8 in the Wilderness.	Minor to moderate increase in wilderness character above MP 20.1. Major adverse impact on all user groups during the 3½ to 11 year construction period. Increased motorized and bicycle access to Wilderness facilities. No affect on Wilderness designation.	Increased wilderness character between MP 12.9 and MP 15.3. Decreased wilderness character on the PCT. Major adverse impact on all user groups during the 2-3 year construction period. Increased motorized and bicycle access to Wilderness facilities. Road reroute would require congressional change in Wilderness boundary.
Pacific Crest Trail	No affect or negligible affect on visitor access and trail condition. Minor to moderate adverse impact on backcountry campsite availability and visitor use.	No affect or negligible affect on visitor access and trail condition. Minor to moderate adverse impact on backcountry campsite availability and visitor use.	No affect or negligible affect on trail condition or visitor use. Minor to moderate beneficial affect on visitor access and backcountry campsite availability.	No affect or negligible affect on visitor use. Minor to moderate beneficial affect on visitor access, trail condition, and backcountry campsite availability.
Wild and Scenic Rivers	Maintain Scenic eligibility of River Segment 2. Improve Wild and Scenic characteristics.	Maintain Scenic eligibility of River Segment 2. Improve Wild and Scenic characteristics.	Maintain Scenic eligibility of River Segment 2. Degrade Wild & Scenic characteristics.	Maintain Scenic eligibility of River Segment 2. Degrade Wild and Scenic characteristics.
Air Quality	Maintain Class I airshed standards.	Maintain Class I airshed standards.	Maintain Class I airshed standards. Minor, short-term degradation during periods of motorized use. Moderate to major, short-term degradation during construction, maintenance, and reconstruction.	Maintain Class I airshed standards. Minor, short-term degradation during periods of motorized use. Moderate to major, short-term degradation during construction, maintenance, and reconstruction.
Compliance with Laws and Policy	Not Applicable.	Not Applicable.	Requires an ACOE 404(d) permit. Requires a WDFW HPA. Requires bull trout and northern spotted owl ESA consultation with USFWS.	Requires an ACOE 404(d) permit. Requires a WDFW HPA. Requires bull trout and northern spotted owl ESA consultation with USFWS. Requires a congressional change in

Table 4 continued

Impact Topic	No Action (Alternative A)	Preferred Alternative (Alternative B)	Alternative C (Road Reconstruction)	Alternative D (Road Reroute)
				the designated Wilderness boundary.

CHAPTER 6. AFFECTED ENVIRONMENT

This chapter describes the physical, biological, and human environments that are most likely to be affected by the proposed action, in terms of the relevant impact topics in Section 4.2.

6.1 Soils

The northern Cascade Range is one of the youngest mountain ranges in the world, with dramatic geologic events continuing to occur such as active carving and shaping of the landscape by ice, water, and gravity (NPS 2001). Spider Glacier, the crevassed hanging glacier clinging to the side of Spider Mountain in the upper Stehekin Valley, is typical of the more than 700 glaciers found in the North Cascades. Perched on a precipitous slope, the glacier receives copious amounts of snow each winter.

Glaciers erode bedrock and soils, and deposit massive quantities of material such as sand, rock, and gravel. The Stehekin River Valley is narrow throughout the project area, and the riverbed is bounded by high old river terraces, debris cones from turbulent streams, and valley walls. Local relief measures over 6,000 feet, and rises from 1,200 feet on the valley floor to over 8,000 feet at mountain summits. The steep valley walls are covered with varying amounts of till, talus, bare rock, and colluvial soils. The riverbed is composed of cobblestones and large boulders.

Topography and geology are represented by steep valley walls gouged by glacier activity, erosion and rocks weakened by the grinding action of fault zones that surround the project area. The river flows and erodes its valley along the easiest path. Young soils developed from riverine and glacial parent material are more susceptible to extreme compaction and erosion potential due to low organic matter and fine texture.

The Stehekin Valley is a U-shape typical of glaciated valleys, with a wide, flat floor bounded by steep valley walls. The valley is deeply down cut in resistant bedrock composed mainly of gneiss with steep walls composed of rock, colluvium, and glacial deposits. The valley floor is composed of a wide range of landform and material types deposited by running water. Low elevation river terraces, old river channels, and floodplain features dominate the landscape in the upper Stehekin River Valley.

The Stehekin River is largely responsible for the development of the coarse-grained soils, which lack cohesion, and are prone to rapid rates of erosion, but are resistant to compaction. Generally, the soils of the Stehekin Valley are young, shallow, weakly developed entisols and inceptisols and more variable due to an influence of the Stehekin River, glacial activity, geologic events, and active weathering of parent material, including fine sediment deposited in inactive channels and wetlands (NPS 2005a). Entisols are capable of supporting plant growth, but may show little or no formation of horizons. Inceptisols have some subsoil development, but lack indicators that represent mature soil types. These soils are typically non-cohesive, subject to rapid rates of erosion, low in organic matter, and may retain a close resemblance to their parent material. Andisols are also important, and form in volcanic ash parent material. Andisols are fine grained and prone to very rapid erosion.

Slickensides occur along the last large roadcut before Shady Camp. Slickensides are produced by friction along a fault line; the rocks are weakened by the grinding action of the fault zone and more easily eroded than other rocks (NPS 2001). This illuminates the reason the river has formed a valley here; water will flow and erode a valley along the easiest path.

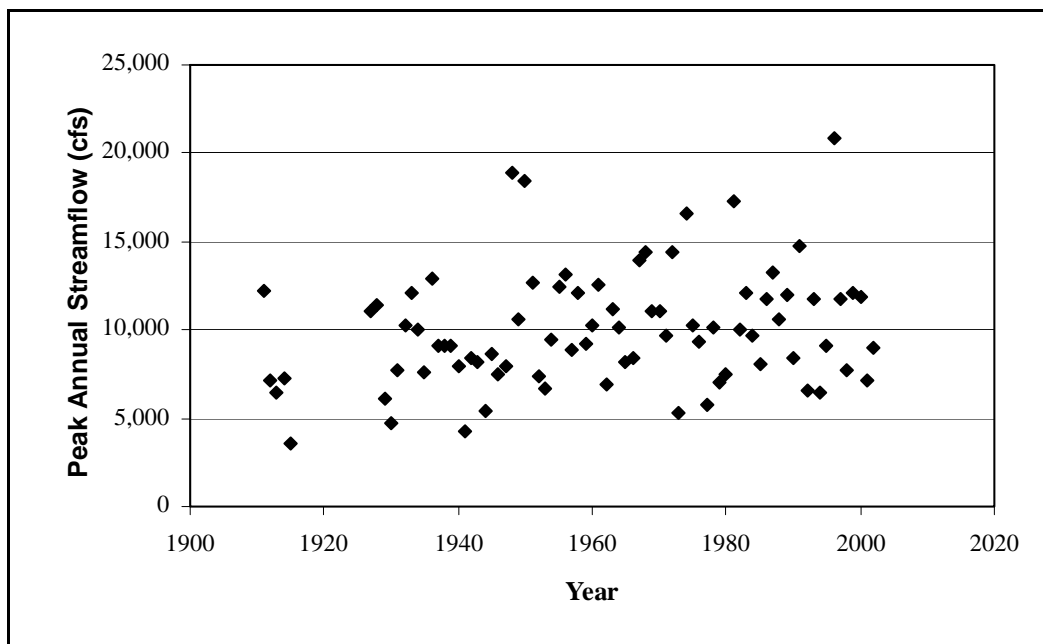
Between Shady Camp and Bridge Creek Trailhead, the Stehekin Valley Road ascends sharply then traverses at an even grade well above the roar of the river (NPS 2001). The reason for this is apparent from viewpoints on the Goode Ridge Trail. The Stehekin Valley upstream of High Bridge contains broad benches on the northeast side of the river, remnants of an ancient, glacially carved valley floor into which the river has cut an inner gorge. The landslide at MP 15 formed on unconsolidated, glacial till where erosion by the river removed the toe of the slope.

6.2 Hydrology, Channel Morphology, Floodplains

Hydrology. The Stehekin River has a drainage area of about 321 square miles. The drainage is almost entirely undeveloped, and most of the watershed is congressionally designated Wilderness. The United States Geological Survey (USGS) has maintained a gauge (#12451000) on the Stehekin River since 1911; no information was collected between 1917 and 1926 (Figure 2). The gauge is located 1.3 miles upstream from the head of Lake Chelan. This long record of measurement can be used to predict the discharge and frequency of large magnitude floods.

Peakflows can vary greatly from year to year; annual peakflows range from 3,530 cubic feet per second (cfs) in 1915 to an estimated 25,600 cfs in October of 2003 (Figure 2; Table 6). Spring snowmelt peakflows occur in May and June (Figure 2). The average spring peakflow on the Stehekin River from 1950 to 1992 was 8,891 cfs. The mean monthly peakflow for the entire period of record is 4,167 cfs, occurring in June (Figure 3). Larger than average peakflows that result in spring floods occur when the snowpack persists into late May or June and warm spring rains cause rapid snowmelt, and spring peakflows can last longer than a week (NPS 2005a).

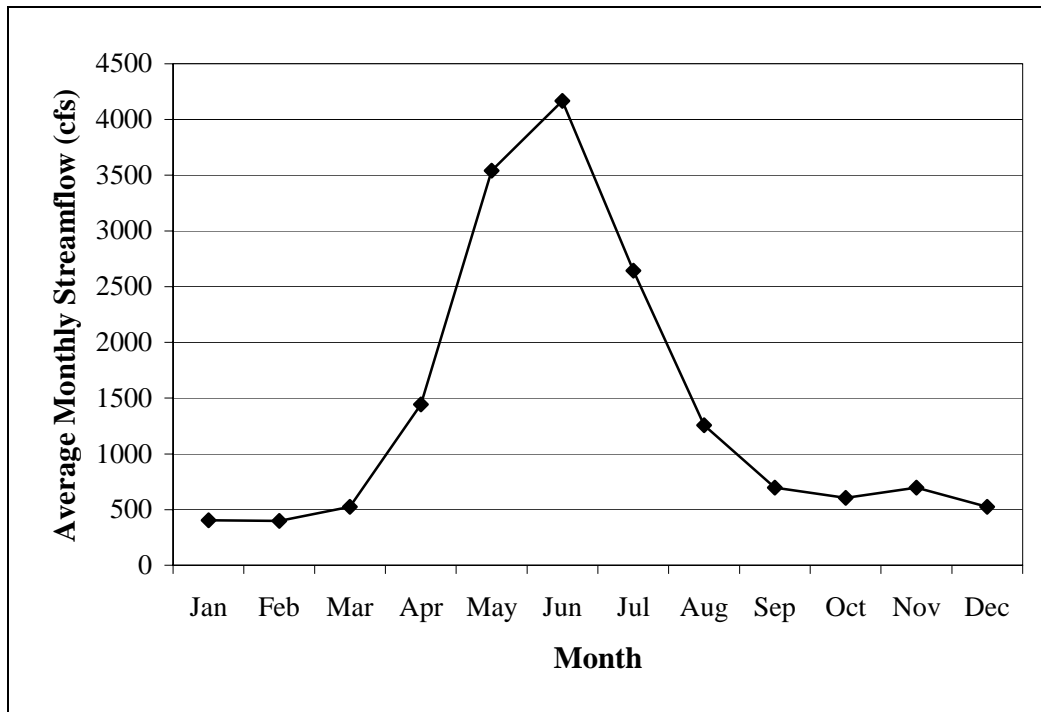
Figure 2. Stehekin River Annual Peakflow 1911 to 2002



Source: USGS stream gauge 12451000

http://nwis.waterdata.usgs.gov/wa/nwis/discharge?site_no=12451000&agency_cd=USGS&format=gif&begin_date=&end_date=&period=

Figure 3. Stehekin River Mean Monthly Stream Flow 1911 to 2002



Source: Source: USGS stream gauge 12451000
http://nwis.waterdata.usgs.gov/wa/nwis/discharge?site_no=12451000&agency_cd=USGS&format=gif&begin_date=&end_date=&period=

After the spring peakflow, flows steadily decline to near baseflow levels by September or October, and generally remain at this level until fall floods (Figure 3). For the same period of record, mean monthly low flows (i.e. baseflows) range from approximately 400 to 600 cfs (Figure 3).

Large magnitude floods have become more frequent in the past decade. For example, in the last 12 years there were ten floods that exceeded 10,000 cfs, compared to only three floods of this magnitude between 1976 and 1986 (Figure 2) (NPS 2005a). Table 5 includes the estimated discharge and frequency of large magnitude floods on the Stehekin River. Discharge values are estimated at the gauge. Frequency estimates are based on log-Pearson Type III analysis by the USGS Water Resources Division (NPS 2005a).

Table 5. Stehekin River USGS Gauge Data 1911 to present

Discharge (cfs)	Recurrence Interval (years)
14,570	10
18,400	50
19,920	100
23,270	500

Source: <http://nwis.waterdata.usgs.gov/wa/nwis/>

The Stehekin River is prone to frequent flooding because of its geographic position and flat valley floor hemmed in by steep, rocky slopes. The headwaters of the Stehekin River are located near Cascade Pass on the crest of the Cascade Range in an area of higher precipitation than is typical of

other eastside streams. Subsequently, there have been six large floods in the Stehekin River over the past 15 years (Figure 2). For example, the November 1995 flood was estimated to be a 100-year flood, and the October 2003 flood was estimated to be a 500-year flood (Tables 5 & 6). In addition to these exceptionally large floods, 10 to 25 year recurrence interval floods occurred in 1989, 1990, 1997, and 1999 (Figure 2).

The Stehekin River is prone to severe flooding during spring and fall each year (Table 6). Five of the eight largest floods on record were spring events, including those in 1948, 1950, and 1974 (Table 6). Spring floods can last for several days to a week or more. Though the mean monthly flow indicates that high flows typically occur in the spring (Figure 3), flooding can also occur in the fall when early winter rain-on-snow floods occur after some snow has accumulated in the mountains. The result is rapidly melting snow that contributes flow to the already rain-filled channels. Fall floods typically have a higher peak discharge, but are of shorter duration than spring floods.

Fall rain-on-snow events primarily affect the upper valley and its tributaries located in the western part of the watershed. These floods are typically larger and more destructive than the spring floods. Fall floods have higher discharge peaks, but are generally 1 to 2 days shorter duration than spring floods. The 1981, 1990, and 1995 floods were fall rain-on-snow events.

Table 6. Stehekin River Largest Floods on Record

Date	Discharge (cfs)
October 20, 2003	25,600
November 29, 1995	21,000
May 29, 1948	18,900
June 20, 1950	18,400
December 26, 1981	17,300
June 16, 1974	16,600
November 24, 1990	14,700
June 2, 1969	14,400
June 10, 1972	14,400

Source: <http://nwis.waterdata.usgs.gov/wa/nwis/>

Flooding has caused large changes in the Stehekin River, and flooding occurs more frequently and at lower flows because of current floodplain and channel-forming processes (NPS 2005a). These processes are influenced by human-made erosion control structures such as the riprapped banks and rock barbs that deflect flow away from the riverbanks below High Bridge Historic District. On October 20, 2003, the Stehekin Valley received over ten inches of rain; the Stehekin River experienced a 100 to 500-year (25,600 cfs) flood (Table 3), and all of the west side drainages flooded over a two-day period. The October 2003 flood, and another 100 to 500-year (21,000 cfs) flood in 1995 (Table 3) caused major changes to the Stehekin River, and resulted in associated damage to the Stehekin Valley Road. Floods of this magnitude and frequency created the need to assess alternative road routes for floodplain protection and motorized access to the upper valley.

Glaciers “buffer” Stehekin River flows during seasonal and inter-annual drought, and provide 10 to 20 percent of summer baseflows.

Channel Morphology and Floodplains. The Stehekin Watershed is a glacial system with a naturally high sediment load; bank erosion contributes additional sediment. The Stehekin River in the project area is a single thread, narrow channel with some wider, braided sections caused by low

gradients and sediment deposition. When the primary channel becomes plugged with wood and sediment, the secondary channel erodes and becomes the primary channel to move water, wood, and sediment.

The floodplain and flood channels make up the majority of the valley, and the Stehekin Valley Road traverses the 100-year floodplain in several places, as well as the 500-year floodplain (NPS 2005a). It is natural for the river to produce flood flows that utilize the active floodplain. Large flood flows, sediment movement, and the presence of semi-stable large woody debris make the channel and floodplain a dynamic and fluid system. As described in the LACH GMP, the floodplain performs several important functions, including: 1) conveying and storing floodwater, 2) storing river sediment, and 3) supporting a variety of vegetation that provides food and habitat to a rich diversity of wildlife species.

Development sites in the Stehekin River Valley are limited due to the steep valley walls and relatively small valley area. Therefore, development and road building have occurred in the 100-year floodplain. As a result, natural river processes threaten private property, some park facilities, and roads. Hazards to these developments are the relatively rapid bank erosion, sediment deposition, periodic channel shifts, and swift water velocities that occur during floods (NPS 2005a). Floods also create safety concerns for people using the Stehekin Valley Road.

6.3 Water Quality

The water quality in the upper Stehekin River is generally excellent, and the river is listed as a Category I waterway that meets the tested standards for clean water (NPS 2005a). However, the river has higher levels of arsenic than the listed standard, and it is included in the 2002/2004 Washington Department of Environmental Quality Section 303(d) list of waters that do not meet federal and state water quality standards under the CWA (NPS 2005a). An analysis of water quality in the Stehekin River showed that there were natural background concentrations of arsenic that exceeded the standard (Johnson and Cassidy 1997; Patmont et al. 1989). Since these are natural conditions, not a violation of the water quality standards, the river was not proposed for listing in the 2002/2004 Section 303(d) list.

The Stehekin River has high, natural levels of sediment loading that include bank erosion and mass wasting caused by floods. Fill from the Stehekin Valley Road has contributed to this sediment load during high flood flows. According the LACH GMP, the Stehekin River contributes approximately 4,120 metric tons of suspended sediment to Lake Chelan each year.

Bank erosion is a natural process, and the introduction of sediment and large woody debris is an important element in the creation of aquatic habitat, including gravel bars and log jams. However, erosion and the resulting sediment cause increased turbidity in the water, which can adversely impact fish and other aquatic organisms in several ways.

- Sediment can fill in the spaces within spawning gravels and adversely impact spawning success;
- Sediment can clog the gills of fish, impairing respiration or causing mortality;
- Erosion can destroy other fish habitat areas such as pools used by fry and juveniles; and
- Sediment can change the chemical components of water quality, such as dissolved oxygen, pH levels, or biological oxygen demand.

6.4 Fisheries and Aquatic Habitat

Aquatic Habitat. The fish-rearing habitat in the Stehekin River is fair, with an adequate number of pools and riffles, but spawning habitat is limited due to the lack of appropriate-sized gravel (FERC 2002). The baseflow, instream cover for fish is primarily large cobbles and boulders.

Large woody debris accumulates on depositional bars, channel margins, and in side channels where it provides rearing habitat and low velocity refugia during high flow. Large woody debris also provides nutrients by depositing and collecting organic matter in the river, and provides erosion control.

There are steeply incised tributaries with cobble, boulder, and large gravel substrate and fair to good channel stability in the watershed (FERC 2002). The perennial tributaries in the project area (e.g. Park, Bridge, Buzzard, Canim, Agnes and Flat creeks) have not been surveyed, and may or may not be fish-bearing.

Bull Trout. Columbia River bull trout is listed as threatened under ESA. The Stehekin River is not designated or proposed bull trout critical habitat.

Historically, bull trout inhabited the Stehekin River and Lake Chelan, but the last confirmed report of bull trout in Lake Chelan was in 1957. It is believed that bull trout are extirpated from the watershed; however, in 1993 there were several unconfirmed reports of bull trout caught in the Stehekin River (FERC 2002).

Bull trout exhibit two distinct life history strategies, resident and migratory. Resident bull trout, which are typically much smaller in physical size than migratory bull trout, spend their entire lives in headwater streams. Migratory populations move upstream into headwater streams to spawn, then after rearing in headwater areas, juveniles migrate downstream to larger rivers, lakes, or the ocean where they mature before returning to spawn (Reiman and McIntyre 1993). Spawning occurs in the fall and emergence is in the spring.

Some remnant bull trout probably reside in several tributaries of Lake Chelan, but verified captures of bull trout from the lake have not occurred in two decades (FERC 2002). Little is known about the historical status of bull trout in Lake Chelan. The floods of 1948-1949 may have wiped out the bull trout's spawning areas and caused their decline. However, it is more reasonable to believe that an exotic pathogen introduced into the lake caused the decline of bull trout (FERC 2002). It is not known why this species did not recover. Regardless, their numbers remain at levels undetectable in creel surveys or tributary production surveys (FERC 2002). The NPS maintains bull trout habitat in the Stehekin River to protect any potential remaining populations and to preserve the option of species restoration.

Optimal habitat is characterized by clear, cold water and gravel-cobble substrates free of fine sediments, abundant instream cover, and deep pools (Reiman and McIntyre 1993). Bull trout exhibit more specialized life history requirements and behavior than other salmonids, and strong bull trout populations are associated with high channel complexity and the coldest stream reaches within a basin (Reiman and McIntyre 1993). Bull trout feed on invertebrates and fish, but are highly piscivorous (fish-eating) as adults.

Identified risks to bull trout include harvest, habitat disruption, introduction of species (particularly brook trout), and population fragmentation (Lee et al. 1997).

Westslope Cutthroat Trout. Native westslope cutthroat trout, a Washington State Species of Concern, occurs throughout the Stehekin River and its tributaries, including Bridge, Park, Canim,

Buzzard, and McGregor creeks in the project area. The population densities in the upper Stehekin River and in Bridge and Park creeks are some of the highest recorded in the continental United States (FERC 2002). The population downstream of Bridge Creek (MP 15.9) is highly impacted from hybridization with rainbow trout (*O. mykiss*), and the Lake Chelan population is depressed (FERC 2002). Therefore, the upper Stehekin Watershed (upstream of MP 15.9) is probably important refugia for this species (FERC 2002).

Westslope cutthroat trout exhibit both resident and migratory life history strategies. Spawning occurs between March and July in low gradient stream reaches that have clean gravel substrate in close proximity to cover (e.g. overhanging streambanks or vegetation) (Behnke 1992; McIntyre and Rieman 1995).

Westslope cutthroat trout fry generally occupy shallow waters near stream banks and other low-velocity areas (e.g. backwaters, side channels); juveniles are most often found in pools and runs (McIntyre and Rieman 1995). Adult westslope cutthroat trout are strongly associated with cold, high gradient reaches that have pools and cover (Shepard et al. 1984; McIntyre and Rieman 1995).

Identified risks to westslope cutthroat trout populations are similar to those of bull trout and include harvest, habitat disruption, and competition and hybridization with introduced species (Lee et al. 1997).

Introduced Fishes. Native American fishing activity in the Chelan Subbasin, including the Stehekin Watershed, suggests that pre-historic use of the river by anadromous fishes was relatively light (USDC draft 2004). Similarly, scientific studies dating to the late nineteenth century found no anadromous fish in the basin. Lack of historical use of Lake Chelan and its tributaries strongly supports the conclusion that a series of chutes, cascades, and falls in the Chelan River are barriers to anadromous fish migration (USDC draft 2004).

All the extant populations of rainbow trout, kokanee (*O. nerka*), and chinook salmon (*O. tshawytscha*) in the Chelan Subbasin are the result of artificial stocking (USDC draft 2004; FERC 2002). Some landlocked chinook established resident, lake populations, and currently spawn in the Stehekin River, Company Creek, and Blackberry Creek (FERC 2002). The landlocked chinook salmon population has remained at low levels in recent years but has been a very popular sport fishery.

Other non-native, introduced fishes include lake trout (*S. namaycush*) and brook trout (*S. fontinalis*). These species compete with and prey on native species.

6.5 Vegetation (Common Native, Special Status, Riparian, Wetland, Noxious/Invasive)

Common Native Vegetation. According to the vegetation study conducted for the LACH GMP, 36 different land cover types occur in the valley (NPS 1995a). The cover types are broken down into five major categories based on soil moisture: 1) Riparian Nutrient-Poor, 2) Riparian Nutrient-Rich, 3) Upland Mesic (moderate moisture), 4) Upland Xeric (dry), and 5) miscellaneous.

Plant species found in the Riparian Nutrient-Poor cover type include red alder (*Alnus rubra*), Sitka willow (*Salix sitchensis*), black cottonwood (*Populus balsamifera* var. *trichocarpa*), and red alder/black cottonwood associations. This is the co-dominant cover type found along the Stehekin River and the former roadbed in the project area.

Communities and individual species represented in the Riparian Nutrient-Rich cover type include mixed deciduous, mixed coniferous, mixed deciduous/coniferous, grand fir (*Abies grandis*), western redcedar (*Thuja plicata*), Douglas-fir (*Pseudotsuga menziesii*), bigleaf maple (*Acer macrophyllum*), black cottonwood, black cottonwood/alder, alder, aspen (*Populus tremuloides*), Scouler's willow (*S. scouleriana*), and emergent vegetation, primarily sedge dominated stands. This is the co-dominant cover type along the Stehekin River and the former roadbed in the project area, and the dominant type in the perennial draws, seeps, and wetlands created by the roadbed or trail.

The Upland Mesic cover type is a non-riparian community that includes mixed deciduous, mixed coniferous, mixed deciduous/coniferous, grand fir, Douglas-fir, ponderosa pine (*Pinus ponderosa*), bigleaf maple, and black cottonwood. This is the predominant cover type along this section of the PCT.

The Upland Xeric and is primarily found on the driest sites, which are located on the valley's steeper slopes. This cover type includes the xeric uplands, active erosion/talus, and slope or talus drainage areas and supports sparse herbaceous plants, some trees, and lichens. The final class is composed of miscellaneous cover types including the following types: sand/gravel/cobble, water, lawn/pasture, orchard/large garden, development, disturbed areas, and roads. Vegetation is absent from developed areas and roads. In the other areas, vegetation types include maintained lawns with ornamental trees and shrubs, fruit trees, and pasture grasses or hay and alfalfa. This is the cover type associated with the rock walls adjacent to the former roadbed and the landslide at MP 15.

Cover subtypes were developed based on species composition (NPS 1995a). The three most common native vegetation cover subtypes in the valley are: 1) Mixed Coniferous, 2) Douglas-fir, and 3) Riparian Mixed Deciduous/Coniferous. Common understory species in these communities are western dogwood (*Cornus sericea occidentalis*), common serviceberry (*Amelanchier arborea*), oceanspray (*Holodiscus discolor*), manzanita (*Arctostaphylos* spp.), Watson's willow-herb (*Epilobium watsonii*), pine grass (*Calamagrostis rubescens*), Lemmon's needlegrass (*Stipa lemonii*), and sword fern (*Macrothelypteris torresiana*). The Mixed Coniferous cover type is predominantly made up of Douglas-fir with ponderosa pine or grand fir subdominant, where as the Douglas-fir cover type includes primarily pure stands of Douglas-fir.

The Riparian Mixed Deciduous/Coniferous cover type includes red alder, black cottonwood, bigleaf maple, Douglas-fir, grand fir, ponderosa pine, and western redcedar. The Riparian Mixed Deciduous/Coniferous is the predominant subtype along this section of the PCT.

Special Status Plants. North Cascades plant life is extremely varied and reflects differences in rock and soil types, exposure, slope, elevation, and rainfall. Over 1,627 vascular plant species have been identified, and estimates of non-vascular and fungal species could more than double this number for total plant species in the North Cascades (NPS 2005c).

Some of these plants are threatened or endangered, and changes such as air pollution and global warming may affect their survival (NPS 2005c). There are no known USFWS or Washington State Department of Natural Resources sensitive, threatened, or endangered plant species in the project area. Park staff conducted a plant survey in the spring of 2005; no special status species were found in the project area.

Riparian. Prior to the 1995 and 2003 floods, the Stehekin Valley Road was located on the bank of the Stehekin River within the active floodplain and riparian zone. There are numerous culverts where the road crossed, or crosses, perennial tributaries at their confluence with the Stehekin River.

The PCT crosses the same perennial tributaries and their associated riparian areas further up the drainage.

Riparian Nutrient-Poor and Riparian Nutrient-Rich cover types are co-dominants along the Stehekin River and the former roadbed in the project area. Riparian Nutrient-Rich cover type is also the dominant type in the perennial draws, seeps, and wetlands created by the roadbed or trail.

Wetlands. There is a small (<1 acre), old growth western redcedar wetland near the junction of the PCT and the old Stehekin Valley Road MP 15.3. Some of the trees were killed by the Shady Fire in August 2005. Western redcedar occurs as a riparian dominance type on toe-slope seepages, moist benches, and wet bottoms adjacent to streams (Tesky 1992).

The PCT winds through the wetland, close to the largest, oldest trees. A number of special status wildlife species are associated with this type of habitat, including northern spotted owl, Townsend's big-eared bat (*Corynorhinus townsendii*), northern goshawk (*Accipiter gentiles*), Vaux's swift (*Chaetura vauxi*), and pileated woodpecker (*Dryocopus pileatus*). Western toad (*Bufo boreas*) and Columbia spotted frog (*Rana luteiventris*) may use this habitat on a seasonal basis.

Noxious/Invasive Plants. Exotic plants are those species that have been relatively recently introduced to the region. Noxious and invasive species are plants that have the undesirable traits of excluding native plants, spreading rapidly, and that are difficult to eradicate or control. Noxious and invasive species within the project area are generally limited to road corridors, campsites, trailheads, other NPS facilities, and private development sites. Roads and other disturbed sites provide habitat characteristics that are favorable to many exotics and noxious weeds, such as poor droughty soils, exposed mineral soil, and open canopy conditions. In addition, roads and trails are corridors by which people unknowingly transport and spread seeds of exotic and noxious weed species via vehicles, bicycles, and stock use.

Common noxious and invasive plants that may be found in the project area are: diffuse knapweed, orchard grass, bulbous bluegrass, oxeye daisy (*Leucanthemum vulgare*), Dalmatian toadflax (*Linaria genistifolia dalmatic*), rush skeletonweed (*Chondrilla juncea*), common mullein (*Verbascum thapsus*), Canada thistle (*Cirsium arvense*), Japanese knotweed (*Polygonum cuspidate*), Scotch broom (*Cytisus scoparius*), baby's breath (*Gypsophila paniculata*), Himalayan blackberry (*Rubus discolor*), tansy (*Senecio jacobaea*), yellow salsify (*Tragopogon dubius*), bull thistle (*Cirsium vulgare*), and foxglove (*Digitalis purpurea*) (NPS 1995a).

Diffuse knapweed is not established in the project area; however, pockets of knapweed occur along the Stehekin Valley Road, particularly on the bank between the former roadbed and the river. High use areas and the areas frequented by livestock such as the facilities at Bridge Creek have diffuse knapweed. These sites also have populations of invasive orchard grass, bulbous bluegrass, oxeye daisy, yellow salsify, white clover (*Trifolium repens*), and sheeps sorrel (*Rumex acetosella*).

6.6 Terrestrial and Amphibious Wildlife

6.6.1 COMMON TERRESTRIAL AND AMPHIBIOUS WILDLIFE

NPS staff has documented 40 species of mammals, 96 species of birds, 2 species of lizard, 5 species of snakes, and 5 species of amphibians in the Stehekin Valley over the past 20 years (Kuntz and Glesne 1993). These include common mammals such as black bear (*Ursus americanus*), Columbia black-tailed deer (*Odocoileus hemionus columbianus*), raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), and snowshoe hare (*Lepus americanus*).

Common bird species include gray jay (*Perisoreus canadensis*), dark-eyed junco (*Junco hyemalis*), black-capped chickadee (*Poecile atricapilla*), blue grouse (*Dendragapus obscurus*), common raven (*Corvus corvus*), red-tailed hawk (*Buteo jamaicensis*), and American kestrel (*Falco sparverius*).

Common amphibians, lizards, and snakes include the northwestern salamander (*Ambystoma gracile*), rough-skinned newt (*Taricha granulose*), northern alligator lizard (*Gerhonotus coeruleus*), common garter snake (*Thamnophis sirtalis*), and western terrestrial garter snake (*Thamnophis elegans*).

6.6.2 SPECIAL STATUS TERRESTRIAL AND AMPHIBIOUS WILDLIFE

This section focuses on federal and/or state special status species listed as threatened, endangered, candidate, or species of concern by either the USFWS or the WDFW. Table 7 lists the special status terrestrial and amphibious wildlife species that are known to occur or may occur in the project area. There is no proposed or designated critical habitat for any of these species within the Park.

Table 7. Special Status Terrestrial and Amphibious Wildlife

Common Name	Scientific Name	Federal Status ¹	State Status ¹
Mammals			
Gray wolf	<i>Canus lupus</i>	E	E
Grizzly bear	<i>Ursus arctos</i>	T	E
Canada lynx	<i>Lynx canadensis</i>	T	T
Fisher	<i>Martes pennanti</i>	C	E
Wolverine	<i>Gulo gulo</i>	SC	C
Western gray squirrel	<i>Sciurus griseus griseus</i>	SC	T
Townsend's big-eared bat	<i>Corynorhinus townsendii</i>	SC	C
Birds			
Bald eagle	<i>Haliaeetus leucocephalus</i>	T	T
Northern spotted owl	<i>Strix occidentalis caurina</i>	T	E
Northern goshawk	<i>Accipiter gentiles</i>	SC	C
American peregrine falcon	<i>Falco peregrinus anatum</i>	SC	C
Yellow-billed cuckoo	<i>Coccyzus americanus</i>	C	C
Golden eagle	<i>Aquila chrysaetos</i>	-	C
Merlin	<i>Falco columbarius</i>	-	C
Flammulated owl	<i>Otus flammeolus</i>	-	C
Vaux's swift	<i>Chaetura vauxi</i>	-	C
Lewis' woodpecker	<i>Melanerpes lewis</i>	-	C
Black-backed woodpecker	<i>Picoides albolarvatus</i>	-	C
Pileated woodpecker	<i>Dryocopus pileatus</i>	-	C
Amphibians			
Western toad	<i>Bufo boreas</i>	SC	C
Columbia spotted frog	<i>Rana luteiventris</i>	SC	C

¹T = Threatened Species, E = Endangered Species, C = Candidate for ESA Listing, SC = Species of Concern

Source: USFWS July 1, 2005

6.6.2.1 Potentially Affected ESA and State Listed Species

The following ESA and state listed, terrestrial and amphibious species have habitat and ranges within the project area (Table 7). There is potential for these species to be affected by project activities.

Gray Wolf. Gray wolf is an ESA listed endangered species and a state endangered species (Table 7). There is currently no USFWS recovery plan for wolves in the North Cascades.

Gray wolf is a highly social animal with large home ranges that include a variety of habitat types. Key components of wolf habitat include: 1) sufficient, year-round prey base of ungulates and alternate prey (e.g. beaver and smaller mammals), 2) suitable and somewhat secluded denning and rendezvous sites, and 3) sufficient space with minimal exposure to humans (USFWS 1987). Wolf distribution is largely influenced by distance from human activity, and wolves are highly susceptible to human-caused mortality.

Wolves were extirpated from the North Cascades, but in the past 20 years, the animals have been seen roaming near Ross Lake (NPS 2005b). Locations of other sightings in the North Cascades include the Pasayten Wilderness, Twisp River drainage of the Okanogan National Forest, and Glacier Peak Wilderness. Gray wolves have not been seen in the Stehekin Valley below High Bridge in the past 10 years, although suitable habitat exists.

Grizzly Bear. Grizzly bear is an ESA listed threatened species and a state endangered species (Table 7). Grizzly bear is a habitat generalist whose key habitat requirements are the availability of food and isolation from humans (USFS 1989). Grizzly bears usually move along an elevation gradient to take advantage of seasonal foods. Grizzlies commonly use low-elevation riparian areas and wet meadows during spring and higher elevation meadows, ridges, and open brush fields during summer. Forests become a more important habitat component during late summer and fall.

According to the USFWS (USFWS 2005), the North Cascades region contains habitat that is capable of supporting a self-sustaining population of grizzly bears. However, only a remnant population, incapable of enduring without active recovery efforts, remains. Grizzly bears have not been seen in the project area in the past 10 years, although suitable habitat exists.

A *Grizzly Bear Recovery Plan* for the North Cascades was approved in 1997, but has not been implemented due to lack of funds. The NPS and the USFS have agreed to an interim policy of no net loss of core areas in the North Cascades ecosystem. Under this agreement, construction of roads or high-use trails in a core area (more than 1,640 feet from roads or high-use trails) requires closure of a road and/or trail of similar size, use level, and habitat within the GBMU where the loss occurs. The project area is within the 95,000-acre Upper Stehekin River GBMU.

Canada Lynx. Canada lynx is an ESA listed threatened species and a state threatened species (Table 7). Canada lynx is associated with subalpine and boreal forests throughout their range (Aubry et al. 1999; Witmer et al. 1998). The species requires a mosaic of forest seral stages connected by stands suitable for travel cover. Lynx use late-seral forests for denning and rearing young and early-seral forests for foraging (Aubry et al. 1999). Their primary prey is snowshoe hare, although lynx will take other prey, particularly when hare density declines.

A vertebrate inventory conducted in 1990 and 1991 documented snowshoe hare in the Stehekin Valley (Kuntz and Glesne 1993). There have been at least four unconfirmed sightings of lynx in the lower valley (below High Bridge) between 1975 and 2000. If any of these sightings were lynx and not bobcats, it is likely that the animals were passing through the area and not residents, as the lower

valley is not typical lynx habitat. Lynx generally use higher elevation (above 3,000-4,000 feet) lodgepole pine (*Pinus contorta*), subalpine fir (*Abies lasiocarpa*), and/or Engelmann spruce (*Picea engelmannii*) forests.

Bald Eagle. Bald eagle is an ESA listed threatened species and a state threatened species (Table 7). Bald eagle is associated with riparian and open water habitats (rivers, lakes, and bays) with large trees and adequate prey (fish and waterfowl) concentrations. Nests are generally in the tallest tree in a stand, and nest sites are usually within a ¼-mile of large bodies of water (MBEWG 1991). In most areas, absence of intense human activity is also an important factor in nest site selection (Stinson et al. 2001).

Important habitat components for wintering eagles include concentrations of prey in areas with tall trees that provide suitable perch and roost sites (Stalmaster 1987; Stinson et al. 2001). The level of human disturbance also influences wintering habitat quality.

The nearest known bald eagle nest is located over 13 miles from the project area, near the head of Lake Chelan. The nest was identified in 2001 and has been active ever since. Based on incidental observations, eagles occasionally use portions of the river adjacent to the Stehekin Valley Road downstream of the project area (Kuntz 2004). Bald eagles are occasionally seen perched in large trees at the head of Lake Chelan during the fall and winter.

Northern Spotted Owl. Northern spotted owl is an ESA listed threatened species and a state endangered species (Table 7). Stehekin River Watershed is a Designated Conservation Area (DCAs) managed for threatened northern spotted owl recovery. It is a Category 2 DCA, which means it can support fewer owl pairs than a Category 1 DCA due to natural habitat limitations (USFWS 2005). The Stehekin DCA is not recommended for critical habitat designation since the area is already within a national park service area.

Northern spotted owls prefer mature or old growth forests that are structurally complex including: 1) trees of several species, sizes and ages, 2) standing and down dead trees, and 3) multi-storied canopies. The project area contains suitable nesting and foraging habitat. Active owl nests have been found in the project area in recent years (NPS data). The NPS surveyed the project area for northern spotted owl in the spring of 2004; no owls were found. NPS surveyed the area again in April 2005; a single male was present.

The USFWS has established an Action Area for the northern spotted owl (USFWS 2005). No construction work can occur within a radius of 1,000 feet extending out from the nest tree in all directions during the nesting season (March 1 to September 6). This limitation may extend beyond September 6; depending on the age of any young owls (see Alternative C (Road Reconstruction) and Alternative D (Road Reroute), BMPs and Mitigation Measures: Sections 5.3.4.6 and 5.4.4.6, respectively).

6.6.2.2 Other Potentially Affected Federal and/Or State Species of Concern

Townsend's Big-eared Bat. Townsend's big-eared bat is a federal species of concern and a state candidate for ESA listing (Table 7). The Stehekin project area vicinity contains potential habitat for Townsend's big-eared bat, a Washington state species of concern. This bat occurs in coniferous forests, and the availability of roosting areas (for resting, maternal sites, and hibernation) is an important habitat component. Roost sites range from cavities and loose bark in large trees and snags to abandoned buildings, caves, and crevices in rock cliffs (Nagorsen and Brigham 1993). Older forests generally provide higher quality roost sites than younger forests (Christy and West 1993).

Most roosting bats are extremely sensitive to human disturbance. The rock cliffs along the Stehekin River; the numerous snags, large mixed conifers, and old growth western redcedars along the PCT; and the low human activity levels in the project area would provide high-quality bat habitat.

Western Gray Squirrel. Western gray squirrel is a federal species of concern and a state threatened species (Table 7). In most portions of their range, western gray squirrel is associated with mixed oak and conifer areas (Gilman 1986; Foster 1992; Ryan and Carey 1995a). Oak provides food (i.e. acorns), maternal nest sites, and seasonal cover and travel corridors; conifers provide year-round cover, travel corridors, nests sites, and cone seeds (Ryan and Carey 1995a and 1995b; Linders 2000). Pines are also important sources of hard mast (nuts accumulated on the ground). In areas occupied by western gray squirrels that lack oak trees, such as the Stehekin Valley, ponderosa pine generally replaces oak as the primary hard mast producing species. Western gray squirrels also use hardwood trees other than oak, and studies generally indicate that western gray squirrels prefer stands with a greater diversity of trees to stands with fewer tree species (Gilman 1986; Ryan and Carey 1995a). Western gray squirrels are known to occur in the Stehekin Valley, and are expected to be most abundant in mixed conifer-hardwood forests that provide a diversity of food sources (Hamer et al. 2005).

Northern Goshawk. Northern goshawk is a federal species of concern and a state candidate for ESA listing (Table 7). Northern goshawk uses large tracts of mature and old growth forest where they can maneuver in and below the canopy to forage, and where large trees are available for nesting (Squires and Reynolds 1997). Foraging areas for this species typically include a greater diversity of forest age classes and structural characteristics such as snag and woody debris, than the nesting areas (Squires and Reynolds 1997).

Kuntz and Glesne (1993) documented the occurrence of northern goshawks in upland mesic coniferous forests and in deciduous riparian forests within the Stehekin Valley. Goshawk nests were seen on the east side of Lake Chelan. Recently, fledged goshawks were seen above High Bridge. Evidence of old nests suggests these areas have been used for many years. Suitable nesting and foraging habitats are available along the PCT within the project area.

Vaux's Swift. Vaux's swift is a state candidate for ESA listing (Table 7). Vaux's swift requires large, hollow snags or cavities in the broken tops of live trees for nesting and night roosting. Bull and Cooper (1991) documented 21 Vaux's swift nests in a study in northeastern Oregon. All 21 nests were in large grand fir trees with mean diameter at breast height (dbh) of 26.4 inches that were hollowed out by a fungus and had an entrance excavated by pileated woodpeckers. The nest trees were mainly in old growth stands.

In a second study in northeastern Oregon, Bull and Hohmann (1993) found considerably more Vaux's swift nests in old growth stands than in stands that had been logged in some manner. The occurrence of swifts appeared to be related to the number of dead grand fir trees of 20 inches dbh or greater (Bull and Hohmann 1993). Interestingly, swift nests were found in harvested areas if hollow trees were retained (Bull and Hohmann 1993). Bull and Beckwith (1993) reported that Vaux's swift shows a strong preference for foraging over open water.

NPS studies documented this species as regularly occurring in the Stehekin Valley from May through September (Kuntz and Glesne 1993). The mature and old growth stands along the PCT provide nesting habitat and the Stehekin River provides foraging habitat within the project area.

Pileated Woodpecker. Pileated woodpecker is a state candidate for ESA listing (Table 7). Pileated woodpecker nesting habitat consists of mature and old growth forests, as well as previously

harvested stands that contain remnant large trees and snags. Dead trees are preferred over live trees for nesting and roosting, and nest trees are usually over 25 inches dbh in stands with at least 60 percent canopy cover (Bull et al. 1990; Bull and Holthausen 1993). Most foraging occurs in logs and dead trees at least 6 inches dbh, although dead wood greater than 12 inches dbh is used most frequently (Bull et al. 1990). Pileated woodpecker uses a wider variety of forest conditions for foraging than for nesting; the availability of nesting habitat is considered a limiting factor for the species.

Kuntz and Glesne (1993) estimate there are three to four pairs of resident pileated woodpeckers in the lower Stehekin Valley. The mature and old growth stands along the PCT provide nesting and foraging habitat within the project area.

Lewis' Woodpecker. Lewis' woodpecker is a state candidate for ESA listing (Table 7). Lewis' woodpecker inhabits open woodlands and forests, often in burned areas (Lewis et al. 2002). There is one unconfirmed record of a Lewis' woodpecker at the head of Lake Chelan in May 1971 (NOCA wildlife observation database). The dense forests that characterize most of the project area do not provide suitable habitat. The Shady Fire of August 2005 may have created suitable habitat in the project area.

Black-backed Woodpecker. Black-backed woodpecker is a state candidate for ESA listing (Table 7). The black-backed woodpecker occurs in burned areas with abundant snags within Montane and pine forests (Dixon and Saab 2000; USFS 1992). Recent burns provide outbreaks of bark beetles, which are the main prey for this woodpecker (Dixon and Saab 2000). Most studies indicate that the species prefers to forage on dead trees rather than live trees, and in the absence of recent burns, the woodpecker will forage in areas with diseased trees (Dixon and Saab 2000).

There are three observation records of these birds in the lower Stehekin Valley between 1984 and 2001 (NOCA wildlife observation database). These observations probably represent post-breeding movements. Black-backed woodpecker is not expected to occur in most the project area on a regular basis due to a lack of high-intensity burned areas or diseased areas with abundant snags. The Shady Fire of August 2005 may have created suitable habitat in the project area.

Western Toad. Western toad is a federal species of concern and a state candidate for ESA listing (Table 7). Western toad breeds in marshes, small lakes, and slow-moving streams (Leonard et al. 1993). Adults live underground and can be found adjacent to their breeding habitat or in upland brush, grass, or forests, particularly near seeps outside of the breeding season (Corkran and Thoms 1996). Western toad is the most frequently observed amphibian in the Stehekin Valley. Kuntz and Glesne (1993) documented western toad in a variety of moist habitats in the Stehekin River Valley. The low velocity, side channels of perennial streams, seeps, and wetlands provide toad habitat in the project area.

Columbia Spotted Frog. Columbia spotted frog is a federal species of concern and a state candidate for ESA listing (Table 7). Columbia spotted frog generally occurs along shallow, marshy edges of ponds, lakes, and slow-moving streams (Nussbaum et al. 1983; Leonard et al. 1993). A survey, conducted in 1991, documented Columbia spotted frog in a variety of moist habitats in the valley (Kuntz and Glesne 1993). The low velocity, side channels of perennial streams and wetlands along the PCT may provide spotted frog habitat.

6.6.2.3 Special Status Species Dismissed from Further Consideration

Several of the special status terrestrial and amphibious wildlife in Table 7 are dismissed from further consideration because none of the alternatives is expected to have any affect on these species. The following is a brief description of these species, their habitat requirements, and the rationale for dismissing them from further consideration.

Fisher. Fisher is a federal candidate for ESA listing and a state endangered species (Table 7). Fisher is generally associated with late-successional, coniferous forests, frequently along riparian corridors (Ruggiero et al. 1994). Large snags and logs that provide denning and resting sites are important habitat components (Heinemeyer and Jones 1994; Johnson and Cassidy 1997). Fisher may use a wider variety of forest successional stages (i.e. both younger and late successional forests) for foraging. Core habitat zones on the east slope of the Cascades include subalpine fir forests, although fisher has also been detected in mid-elevation forests (Johnson and Cassidy 1997).

Recent inventories (DES 2000; Kuntz and Glesne 1993) did not document the presence of fisher in the Stehekin Valley, and ongoing surveys by the NPS have not documented the species in the area (Christopherson and Kuntz 2004). Consequently, none of the alternatives would have an affect on fisher.

Wolverine. Wolverine is a federal species of concern and a state candidate for ESA listing (Table 7). Wolverine occurs in a wide variety of vegetation types within remote, mountainous areas. The availability of adequate year-round food sources (i.e. ungulates and small mammals) may be the most important habitat factor for wolverine in these environments (Ruggiero et al. 1994). The importance of specific vegetation components is not well understood.

In Washington, wolverines are most common in subalpine and alpine zones, and the animals occasionally descend into valleys during winter, when ungulate concentrations provide a food source (Johnson and Cassidy 1997). There are two records of unconfirmed wolverine observations in the Stehekin Valley in January 1974 and June 1983 (NOCA wildlife observation database). Because none of the alternative actions would be implemented during the winter months and visitor use of the proposed trail and road reroutes is sparse in winter (the only time period that wolverines may occasionally use the project area) none of the alternatives would have an effect on wolverine. In addition, loss of small amounts of vegetation would not affect wolverine wintering habitat or their ungulate prey.

American Peregrine Falcon. American peregrine falcon is a federal species of concern and a state candidate for ESA listing (Table 7). Peregrine falcon usually nests on high cliffs and buttes, near water where avian prey species are most common (Johnsgard 1990). The falcon forages on a large variety of birds, and birds that regularly fly high in a way that exposes them to the peregrine's typical diving attack, namely highly mobile, flocking, and colonial-nesting species such as waterfowl and shorebirds, are particularly valuable prey (Johnsgard 1990).

The rock cliffs along the Stehekin River are suitable nesting and foraging habitat for peregrine falcons. Peregrine falcons were not detected in the project area during previous inventories (DES 2000; Kuntz and Glesne 1993).

Yellow-billed Cuckoo. Yellow-billed cuckoo is a federal candidate for ESA listing and a state candidate for ESA listing (Table 7). Yellow-billed cuckoo occurs in large blocks of riparian woodlands (i.e. 25 acres or more), particularly those dominated by cottonwood and willow stands (USFWS 2001). The last confirmed breeding records for the species in Washington were in the 1930s; the species may be extirpated from the state (USFWS 2001).

Yellow-billed cuckoo has not been detected in the Stehekin Valley, and the project area does not contain large patches of mature cottonwood camps and other deciduous trees that are characteristic of yellow-billed cuckoo habitat. Consequently, none of the alternatives would have an effect on yellow-billed cuckoo.

Golden Eagle. Golden eagle is a state candidate for ESA listing (Table 7). Golden eagle is most commonly associated with open country, such as shrub-steppe, grasslands, open ponderosa pine forest, and large clearcuts (Watson and Whalen 2003). They nest on cliff ledges and in large trees. Mid-sized mammals, particularly rabbits, ground squirrels, and marmots (*Marmota caligata*), are their principal prey. Golden eagles forage along the lower portion of the Stehekin River near the head of Lake Chelan during the winter. However, the project area does not have suitable golden eagle habitat, and none of the alternatives would have an effect on golden eagles.

Merlin. Merlin is a state candidate for ESA listing (Table 7). Merlin is generally associated with open country, similar to golden eagle (Sodhi et al. 1993). Primary prey includes small, open-country birds such as larks, swallows, and finches. Small mammals and insects are also eaten occasionally. There are three records of merlin in the Stehekin Valley - June 1986, May 1993, September 1995 (NOCA wildlife observation database). These records probably represent birds migrating through the valley because the dense forests characteristic of the valley are not merlin habitat. Therefore, none of the alternatives would have an effect on merlin.

Flammulated Owl. Flammulated owl is a state candidate for ESA listing (Table 7). Flammulated owl generally occurs in open, mature, and old growth conifer forests containing yellow pines (Hayward and Verner 1994; McCallum 1994). Thickets of younger, denser trees appear important for roosting. Flammulated owls nest in cavities excavated by woodpeckers (Powers et al. 1996; Hayward and Verner 1994; McCallum 1994). Limiting factors for the owls are probably the availability of nesting cavities and invertebrate prey (Hayward and Verner 1994). There may be suitable flammulated owl habitat in the project area; however, there are no records of the owl's occurrence in the Park. Therefore, it is unlikely that flammulated owl occurs in the project area, and none of the alternatives would have an effect on this species.

6.7 Visitor Access, Experience, and Park Operations

The north end of Lake Chelan (Stehekin Landing), the village of Stehekin, and the Stehekin Valley Road serve as a gateway to the interior of the LACH, Stephen Mather Wilderness, and NOCA. The Stehekin Valley Road is the primary access route for recreation in this area.

In 2003, over 35,500 people visited the LACH. This figure is down from a visitation level of 52,000 in 2000. The drop may be due to fires in eastern Washington. Over 70 percent of the 2003 visitation occurred during the summer season, between June and September.

Visitor facilities including overnight lodging, a restaurant, a general store, and a marina that sells fuel are clustered around the Stehekin Landing. Located farther from the landing are a bakery and the Stehekin Valley Ranch, which provides lodging and guided backpacking, bicycle rentals, and horseback tours. Many of the visitor facilities only operate on a seasonal basis, during the summer months. Other facilities operate year-round to accommodate visitors and the approximately 100 year-round Stehekin residents.

Visitor activities include traveling by passenger ferry, floatplane, or trail into Stehekin. In the Stehekin Valley, visitors can enjoy recreational activities such as hiking, backpacking, camping, horseback and bicycle riding, whitewater rafting, guided shuttle tours, snowshoeing, nature viewing,

and sightseeing. The project area contains several overnight backcountry camps (Dolly Varden, Shady, Bridge Creek, Park Creek, Flat Creek, and Cottonwood) and a network of maintained hiking and horseback riding trails. The backcountry experience level of park visitors ranges from PCT through-hikers to visitors who have limited backcountry experience and rent equipment from permittees for one-day or longer excursions.

Prior to the 1995 and 2003 floods, the project area had vehicle access to Cottonwood Camp (22.8). The road has been closed at Glory (MP 20.1) since the 1995 flood. The road was closed at MP 9.5 near the Stehekin Valley Ranch after the 2003 flood. Implementation of the *Coon Run Project* in the fall of 2005 restored motorized access to Car Wash Falls (MP 12.9).

Motorists, cyclists, hikers, stock users, and snowmobilers are authorized to use the Stehekin Valley Road. Motorized use within the Stephen Mather Wilderness is restricted to the non-Wilderness road corridor (i.e. 50 feet either side of the Stehekin Valley Road centerline). Hikers, stock users, and cross-country skiers may also use the PCT.

Park Operations activities including road and trail maintenance, noxious and invasive weed control, search and rescue, emergency services, fire suppression, and facilities maintenance are also interdependent on the road and trail system.

6.7.1 CURRENT CONDITIONS FOR MOTORIZED ACCESS

The following narrative describes the current condition and suitability of the Stehekin Valley Road to provide motorized access within the project area (from Car Wash Falls to Cottonwood Camp) (Figure 1).

The road between *Car Wash Falls (MP 12.9) and MP 15.3* (near Bridge Creek) is non-existent in places (Appendix A3). Sections of the road are impassable to stock, cross-country skiers, and cyclists. This section is not recommended for hikers, and extreme caution must be used because there are slippery rocks and steep washouts. For example, on June 1, 2005 at a flow of approximately 1,800 cfs, several sections of the old roadbed were under water (median flow for that date is approximately 3,850 cfs). Hiking the old roadbed on that date required crossing under Car Wash Falls and using handholds and footholds to cross three vertical rock faces above the river.

From *Car Wash Falls (MP 12.9) to above Dolly Varden Camp (MP 13.4)*, the road has extensive, intermittent damage and is not passable to vehicles or snowmobiles beyond Car Wash Falls. *At MP 12.9*, the road has lost all the bolted riprap that was installed in 1996 and is washed down to bedrock for approximately 300 feet (Appendix A3). The old concrete slab has been torn upright below the falls. To repair the roadbed would require riprap and fill material 20 feet deep by 20-feet wide.

From *MP 13.2 to 13.4* approximately 800 linear feet of the roadbed is eroded down to bedrock, and requires riprap and fill material approximately 3 to 12 feet deep. The next 480 linear feet is eroded down to boulders and requires fill material 2 feet deep.

For several hundred linear feet between *Dolly Varden Camp (MP 13) and Shady Camp (MP 14.7)* there is extensive scouring and washouts (at times down to bedrock). The road is completely gone and inaccessible to vehicles and snowmobiles.

At Dolly Varden Camp (MP 13), the road is intact, but has been deeply scoured by the river (Appendix A2). To repair the roadbed would require a small amount of fill material. The camp

has extensive damage due to bank erosion, and there is only one campsite remaining; the second tent site was washed away in the 2003 flood.

At **MP 13.8**, directly across from the confluence of Arrow Creek and the Stehekin River, the road has completely washed-out to vertical bedrock for approximately 300 feet. This section is impassable and would need complete reconstruction to reestablish vehicle access. The reconstruction would require some rock blasting to gain enough width for the roadbed, and fill would need to be placed in the Stehekin River below the OHW mark.

At **MP 13.9** approximately 600 linear feet of heavy debris was deposited on the roadbed, and there is erosion up to 3 feet deep in the roadbed. Several very large western redcedars fell across the road. There is water running in the roadbed.

At **MP 14** there is a large washout approximately 400-feet wide by 15 feet deep through the fill slope down to the river. A reroute is possible on flat ground, back toward the talus.

At **MP 14.1** approximately 500 linear feet of roadway is covered by sand to a depth of approximately 1 foot, and the formerly swampy area beside the road is filled with sand. The next 450 linear feet is eroded down to rubble and would require fill material to reestablish motorized access.

From **MP 14.1 to MP 14.4**, downstream of Little Car Wash Falls, approximately 150 linear feet is eroded down to bedrock and would require a stable rock base up to 30 feet deep to reestablished motorized access.

The next 640 linear feet alternate between erosion to bench-like bedrock and large boulders. This section would require some armoring and stable fill material to a minimum of 3 feet deep and 15 to 20-feet wide to reestablished motorized access.

The next 485 linear feet is severely undercut and would require construction of a stable rock base for the entire length to hold the road in place. Beyond this point, there is a 40-foot long hole next to solid bedrock that would require stable rock base and fill material 20 feet deep by 20-feet wide to repair the roadbed.

At **Little Car Wash Falls (MP 14.5)** the road is completely washed-out to bedrock for 177 linear feet (only the culvert remains), and would require a stable rock base 10 to 20 feet deep and 20 - feet wide to reestablish motorized access.

At **MP 14.6**, downstream of Shady Camp, 125 linear feet of roadway is washed-out to a depth of 2 feet.

At **Shady Camp (MP 14.6)**, the road is largely intact, although there are some large sand deposits on the roadbed and trees across the road. The single campsite is intact.

At **MP 15**, there is an **Active Landslide** that has removed about 400 feet of the roadbed (Appendix A1). The landslide extends vertically approximately 140 feet above the Stehekin River and is expanding. The slide is unconsolidated glacial till and will not reach a stable angle of repose (a slope of approximately 35°) for some time to come. There is a depositional point bar across from the slide, and the meander bend is at the toe of the slide. The landslide has intercepted the groundwater and there was substantial groundwater flow emerging approximately half-way up the slide face on June 1, 2005, adding to the long-term instability of this site.

Repairing and stabilizing this section of the road to reestablish motorized access would require a major reroute of the river. Construction access to the site would be very difficult, and large

quantities of oversized rock fill would be needed to stabilize the landslide. The 2003 FHA estimate of materials and cost to repair the slide area was 31,100 yds³ and \$1,718,750. Since 2003, the slide area has increased significantly, and more fill material would be needed to rebuild the road in this location.

Between **Bridge Creek (MP 15.9) and Glory (MP 20.1)** most of the road is essentially undamaged by the floods. However, at **MP 17.4**, there is a large hole in the road (20-feet wide by 20-feet long by 10 feet deep) and below **Park Creek Camp (MP 17.5)**, the road is washed down to aggregate rock. These sections are passable to hikers and stock without reconstruction. There is no bicycle access to this section. The 2004 estimate to repair these sections of the road to allow safe vehicle passage was \$23,900.

Park staff temporarily repaired the **Park Creek Bridge (MP 18)** abutments in 2004. A new, longer bridge would probably be necessary if the repairs fail, and would be analyzed as a separate project proposal.

There is a debris torrent on the road at **Glory (MP 20.1) near Cascade Pass Trailhead** and water is flowing over the debris. The road needs to be cleared of debris and resurfaced, and a culvert installed to allow safe vehicle access to Glory. Hikers and stock can pass safely around the debris.

From **Glory (MP 20.1) to Cottonwood Camp (MP 22.8)**, the road has been impassable to vehicles since the 1995 flood. A foot and stock trail has been established by the NPS that essentially parallels the old road for a ½-mile above the 100-year floodplain before connecting to 2 miles of the old roadbed. The trail is partially in the Wilderness so cannot be used by cyclists.

Hikers, stock, and cross-country skiers can use the **PCT to travel to Bridge Creek**. The PCT is accessible from a short spur trail off the Stehekin Valley Road **0.2 miles south of Car Wash Falls at MP 12.7**. The PCT reconnects with the Stehekin Valley Road **above the landslide at MP 15.3**. Bicycles are not allowed on the PCT or other Wilderness trails, and cyclists cannot break down and carry bicycles in the Wilderness.

6.8 Socio-economics

Stehekin has only 100 year-round residents, in contrast to the 35,500 persons who visited the LACH in 2003. Understandably, the local Stehekin economy is closely tied to park visitation and resources. Stehekin businesses provide visitor services such as food, lodging, guided backpacking and horseback trips, and bicycle rentals. Some local businesses have adjusted to the Stehekin Valley Road closure by adding drop camps to their repertoire of visitor services.

Stehekin residents and visitors depend on Lake Chelan area transportation services, since the only entrance into Stehekin is by floatplane, passenger ferry, or trail.

6.9 Wilderness

The Park is an ecosystem primarily untouched by human developments. In 1988, the Washington Park Wilderness Act (PL 100-668) designated 639,840 acres within the Complex as the Stephen Mather Wilderness (NPS 1988) (Figure 1). The Act brought 93 percent of the Complex, including lands in the NOCA and Ross Lake and LACH, under the provisions of the 1964 Wilderness Act (NPS 2004).

The Stephen Mather Wilderness is an area of rugged beauty connected to a large complex of contiguous Wilderness areas, including the Mount Baker, Pasayten, Noisy-Diosbud, Glacier Peak, Lake Chelan-Sawtooth, and Henry M. Jackson managed by the USDA Forest Service.

Activities in the Stephen Mather Wilderness are limited to those that maintain the wilderness character of the landscape (NPS 1988). The NPS is charged with preserving and protecting the lands designated as Wilderness "...for the use and enjoyment of the public in a manner that will leave them unimpaired for future use and enjoyment as Wilderness" (NPS 2003). More specifically, recreation areas in the Wilderness will be administered in a manner that provides for public outdoor recreation benefits and conservation of scenic, scientific, historic, and other values contributing to public enjoyment (GORP 2005).

The Wilderness does not include the Stehekin Valley Road, but surrounds the road and the area immediately adjacent to it. The non-Wilderness road corridor is 50-feet wide on either side of the road centerline, as it existed at the time of Wilderness designation; there is a slightly larger non-Wilderness road corridor around the Bridge Creek historic area and camp (Figure 1). By law, use of motorized or mechanical conveyances is limited to this non-Wilderness road corridor.

Three primitive camps (Shady, Dolly Varden, and Bridge Creek) are located within the non-Wilderness road corridor. Hikers and stock users could access these campsites and the Wilderness trails north of Bridge Creek via the PCT, and motorists and cyclists had access via the Stehekin Valley Road prior to the 2003 flood. Since 2003, the Dolly Varden and Shady campsites are accessible only by hikers via the Stehekin Valley Road. The Bridge Creek campsite is accessible by hikers and stock via the PCT.

The project area has a higher level of development than many other areas of the Stephen Mather Wilderness. When the Stehekin Valley Road was open to vehicles as far as Cottonwood Camp (prior to the 1995 flood), the Wilderness qualities of remoteness, solitude, primitiveness, and naturalness were affected by occasional vehicle traffic, routine road maintenance, and emergency reconstruction. Stehekin Valley Road traffic was historically light since there is no car ferry to Stehekin and the only vehicles are NPS shuttles, Park vehicles, and vehicles owned by Stehekin residents.

6.10 Pacific Crest Trail

The vision of PCT founder Clinton C. Clarke was to establish a border-to-border trail along mountain ranges in California, Oregon, and Washington that traversed the best scenic areas and maintained an absolute wilderness character (USFS 2005b). On October 2, 1968, President Lyndon B. Johnson signed the National Trail Systems Act, naming the Appalachian Trail and PCT as the nation's first national scenic trails. The Act defines National Scenic Trails as "...extended trails so located as to provide for maximum outdoor recreation potential and for the conservation and enjoyment of the nationally significant scenic, historic, natural, or cultural qualities of the areas through which such trails may pass" (USFS 2005b).

The PCT is approximately 3 miles long through the Stephen Mather Wilderness in the project area (Figure 1). This section of the PCT is also called the "Old Wagon Road" because it follows a historic wagon route. The Old Wagon Road is eligible for listing as a National Historic Trail under the NHPA. However, the section of the Old Wagon Road that would be impacted by rerouting the Stehekin Valley Road to the PCT (Alternative D) is not culturally significant.

The PCT follows the contour, with only moderate elevation gain along the MP 12.7 spur trail. This section of the PCT passes through forests that have moderately dense canopies and understory vegetation, and thus does not afford the mountaintop vistas that are found along much of the PCT. The PCT crosses several perennial creeks and an old growth western redcedar wetland before accessing a historic site at Bridge Creek. The trail is designated for use by hikers, stock, and cross-country skiers; it is closed to motorized and mechanized use (vehicles, bicycles, snowmobiles). In order to reduce impacts to the Stephen Mather Wilderness and PCT, trail users must camp at designated sites. Backcountry camps within the project area include the Dolly Varden and Shady tent camping sites, and the Bridge Creek hiker and stock camp. Dolly Varden and Shady camps lie along the Stehekin River and have one tent site each.

The Bridge Creek Camp is designated for group camping, and has a corral and seven campsites adjacent to the Stehekin Valley Road. The Bridge Creek Camp has been used by two local permittees who have provided drop camp and food services, and hostel-style wall tents for through-hikers traveling to Stehekin from Highway 20 through Cascade Pass since 2003. There is a PCT trailhead north of the Bridge Creek Camp (Figure 1).

6.11 Wild and Scenic Rivers

The entire length of the Stehekin River is eligible for potential inclusion in the National WSR System based on its free-flowing condition and ORVs (NPS 2002). Segment 2 of the river (from High Bridge Historic District to Cottonwood Camp) is eligible with a Scenic classification because it has limited access by roads and minimal evidence of human activity. Several tributaries to the Stehekin River are also eligible for WSR status within the project area.

The project area lies entirely within the ¼-mile river corridor that must be managed so as not to impair its suitability for inclusion in the National WSR System. Developments which existed in the project area at the time it was found eligible as a WSR include the Stehekin Valley Road, and the Tumwater, Dolly Varden, Shady, Bridge Creek, Park Creek, Flat Creek, Glory, and Cottonwood camps.

The section of the Stehekin River within the project area has almost no flow restrictions. The river flow in this section is natural, with the exception of several hundred feet of riprap.

The project area contains all of the ORVs identified in the WSR Eligibility Report: fish, wildlife, prehistoric resources, historic resources, geology, scenic resources, and recreation resources.

Fish/Wildlife. The Stehekin River and its riparian area support a great diversity of game and non-game wildlife and fish species, and provide or potentially provide habitat for many special status species including threatened and endangered species. Many of these species are dependent upon the Stehekin River for some or all of their life cycle, and the river and its riparian corridor are important habitat components and migration routes. Thus, fish and wildlife ORVs are associated with the Stehekin River and its riparian area. For further information on the fish and wildlife resources and habitats within the project area, refer to Fisheries and Aquatic Habitat: Section 4.2.4; Vegetation (Common/Native, Special Status, Riparian, Wetland, and Noxious/Invasive): Section 4.2.5; and Special Status Terrestrial and Amphibious Wildlife: Section 4.2.6.

Prehistoric Resources. Where there is evidence of prehistoric resources (occupation or use by Native Americans) in the river or river corridor, and these resources have rare or unusual characteristics or exceptional human interest value, then these constitute an ORV. Sixteen prehistoric sites have been documented in the LACH, including the Bridge Creek site within the

project area, and there is potential for more prehistoric sites in the project area. The abundance and importance of the prehistoric resources in the Stehekin Valley qualify them as an ORV under the WSR Act.

Historic Resources. Historic sites or features generally over 50 years in age that signify an important event, person, or cultural activity are categorized as an ORV under the WSR Act. Historic resources within the project area include Bridge Creek Cabin-Ranger Station, and Bridge Creek Shelter. Additional resources within the project area are candidate cultural landscapes, Bridge Creek Ranger Station and Campground, and Bridge Creek Sawmill Site.

Geology. The geology of the Stehekin River Valley includes excellent, “textbook” examples of glacial features and processes, such as glaciers, ice fields, cirques, spires, hanging valleys, and bedrock box canyons. For these reasons, the geology of the Stehekin Valley is an ORV under the WSR Act.

Scenic Resources. Scenic resources include a landscape dominated by dramatic, glacially sculpted landforms, diverse vegetation, and exceptionally clear, flowing water. Human impacts are few and unobtrusive, allowing the visitor to experience the grandeur of the Wilderness. Though subjective in nature, the quality of the scenery and natural landscape qualify scenic resources as an ORV under the WSR Act.

Recreation Resources. In order for a recreational resource to be considered an ORV, it must be or have the potential to be unique enough to attract visitors from outside of the geographic region to use the river resources for recreational purposes. This is definitely the case for the Stehekin River, as visitors must make a concerted effort to access the Stehekin River Valley. Some of the recreational interests associated with the river include sightseeing, photography, camping, hiking, boating, swimming, and horseback riding.

6.12 Air Quality

“North Cascades National Park lies within one of the most intact Wilderness ecosystems in the continental United States” (NPS no date). NOCA is designated as a Class I Area under the CAA of 1963 because of its special natural, scenic, and historic importance. The goal of the CAA is to prevent significant deterioration of air quality and preserve the ability to see long distances, entire panoramas, and special features within Class I Areas.

Although the Complex is within a pristine area, it lies fewer than 90 miles from the Seattle, Washington and Vancouver, British Columbia metropolitan areas. Prevailing wind patterns can push pollutants such as ozone, sulfur dioxide, nitrogen oxides, metals such as mercury, and particulates toward the Cascade Range, where they are trapped in mountain valleys and concentrated by snowfall in higher elevation areas. Pollution sources from outside the Complex that may affect air quality within the Park include automobiles (ozone, nitrogen oxides), industries such as refineries, smelters, incinerators, and power plants (sulfur dioxide, nitrogen oxides, particulates), home heating units (sulfur dioxide, particulates), and forest fires (particulates). These pollutants can cause impacts such as reduced visibility, acid rain (which in turn may reduce forest productivity, degrade surface water quality, and damage fish and amphibian eggs), and damage to metal and painted surfaces. According to the NPS Air Resources Division’s Fiscal Year 2004 performance assessment of parks throughout the country, NOCA has no trend (either improving or degrading) for sulfate, nitrate, or ammonium in precipitation; insufficient data for visibility; and a degrading trend for ozone. However, the only Air Quality station is at low elevation, and research suggests trends are increasing at higher elevation.

The Complex is currently considered an attainment area for all ambient air quality standards (Ecology 2002) and air quality within the project area is very good although pollution from outside sources occasionally enters the Park. Air quality impacts from pollution sources outside the project area are infrequent and temporary. They usually dissipate rapidly because air stagnation in the Stehekin Valley is rare, except during the winter (when few people visit the Park). Visitor use and routine maintenance of the Stehekin Valley Road historically caused temporary, localized air quality impacts within the project area (exhaust emissions and fugitive dust). These impacts have not occurred since the 2003 flood and landslide, when those natural events effectively closed the road to vehicle travel above Car Wash Falls. The impacts that occurred were negligible in terms of affecting attainment of Class I Area standards.

CHAPTER 7. ENVIRONMENTAL CONSEQUENCES

7.1 Methodology

7.1.1 METHODOLOGY APPLICABLE TO ALL IMPACT TOPICS

The available information on all impact topics within the project area was reviewed including information on the NOCA website, other NOCA reports and project documentation, NPS policy documents, the LACH GMP, resource area maps, the USGS website, NPS field surveys, communication with NPS resource specialists, a site visit, professional expertise, and public scoping responses. Based on the available information, an assessment was made of the potential impacts of the alternatives.

7.1.2 CONTEXT APPLICABLE TO ALL IMPACT TOPICS

The general context of the analysis area is the Stehekin Valley Road, the Stephen Mather Wilderness, the lower 23 miles of the Stehekin River corridor (including the floodplain and riparian areas), the Old Wagon Road/PCT within the project area, and the Stehekin community.

Cumulative impacts analysis considered the cumulative impacts of the lower Stehekin Valley Road construction work (NPS 2005a; 2005b) and the proposed actions.

7.1.3 RESOURCE SPECIFIC IMPACTS, CONTEXT, INTENSITIES, AND DURATION

The resource specific impacts, context, intensities, and duration outlined below were used to compare the potential effects of the No Action and the action alternatives. The current conditions described in the Affected Environment section were used to compare the No Action Alternative to the potential post-project effects of implementing the action alternatives.

7.1.3.1 Soils

The available information on geologic and soil resources within the project area were reviewed including literature, geologic maps, and available soils surveys. Potential adverse impacts to soils include increased impervious surface/decreased infiltration, soil compaction, moisture loss, loss of the organic soil horizon, and erosion that could lead to a loss of soil productivity, plant mortality, noxious/invasive plant proliferation, and sedimentation. The impact qualifiers and descriptors, including context, intensity, and duration for the level of impact to soils are defined in Table 8.

Table 8. Soil Impact Qualifiers and Descriptors

Effect Context, Intensity, and Duration	Description
Context	The impact to soils is addressed within the context of the lower 23 miles of the Stehekin River floodplain and riparian area; the 2.2-mile long section of the PCT within the project area; and the approximately 1 acre redcedar wetland in the project area.
Negligible Effect	The effects to soil resources would be below or at the lower levels of detection. Any effects to soil productivity or fertility would be slight and no long-term effects to soils would occur.
Minor Effect	The effects to soils would be detectable. Effects to soil productivity or fertility would be small, as would the area affected. If mitigation were needed to offset adverse impacts, it would be relatively simple to implement and would likely be successful.
Moderate Effect	The effect on soils would be readily apparent, likely long-term, and result in a change to the

Effect Context, Intensity, and Duration	Description
	character of the resources over a relatively wide area. Mitigation measures would probably be necessary to offset adverse impacts and would likely be successful.
Major Effect	The effect on soils would be readily apparent, long-term, and substantially change the character of the resource in and out of the Park. Extensive mitigation measures to offset adverse impacts would be needed and their success could not be guaranteed.
Beneficial Affect	A beneficial affect would improve the properties of soils when compared with current conditions.
Effect Duration	A short-term effect would recover in less than 3 years. A long-term effect would take more than 3 years to recover.

7.1.3.2 Hydrology, Channel Morphology, Floodplains

This analysis assessed potential effects of the proposed alternatives on changes in hydrology, channel morphology, and floodplain function. The reach and floodplain function analyses were based on methods developed by Rosgen (1996), and Montgomery and Buffington (1993) that use functional combinations of gradient, substrate, channel confinement, and floodplain connectivity to describe geomorphic reach breaks. The impact qualifiers and descriptors, including context, intensity, and duration for the level of impact to hydrology, channel morphology, and floodplains are defined in Table 9.

The analysis of cumulative impacts considers planned improvements of the Stehekin Valley Road downstream of the project area (from MP 4 to MP 10). These improvements would include riprap to stabilize about 400 feet of riverbank and two to four rock stream barbs to redirect stream flow.

Table 9. Hydrology, Channel Morphology, and Floodplains Impact Qualifiers and Descriptors

Effect Context, Intensity, and Duration	Description
Context	The impacts to hydrology, channel morphology, and floodplains are addressed within the context of the lower 23 miles of the Stehekin River and the perennial tributaries on the PCT within the project area where the past, present, and reasonably foreseeable Stehekin Valley Road impacts have occurred or would occur.
Negligible Effect	Alternative D could result in a change in stream flow characteristics including magnitude, frequency, duration, timing, and rate of change of flows, habitat, natural sinuosity changes, and large woody debris, but the change would be so small that it would not be measurable or perceptible. There would be less than 1% modification of the streambanks within the reach. There would be no change in the ability of a floodplain to convey floodwaters, or its values and functions. The alternative would not contribute to flooding.
Minor Effect	The alternative would modify 0-5% of the total streambanks within the reach. Changes in the ability of a floodplain to convey floodwaters, or its values and functions, would be measurable and local, although the changes would be only just be measurable. The alternative would not contribute to flooding. No mitigation would be needed.
Moderate Effect	The alternative would modify 6-15% to the total streambanks within the reach. Changes in the ability of a floodplain to convey floodwaters, or its values and functions, would be measurable and local. Alternative D could contribute to flooding. The impact could be mitigated by modification of proposed facilities in floodplains.

Effect Context, Intensity, and Duration	Description
Major Effect	The alternative would modify greater than 15% of the total streambanks within the reach. There would be changes in the ability of a floodplain to convey floodwaters, or impacts to its values and functions, would be measurable and widespread. The alternative would contribute to flooding. Mitigation measures would be extensive and their success could not be assured.
Beneficial Affect	A beneficial affect would improve hydrology, channel morphology, and floodplain function when compared with current conditions.
Effect Duration	A short-term effect would recover in less than 3 years. A long-term effect would take more than 3 years to recover.

7.1.3.3 Water Quality

Potential adverse impacts to water quality include increased sedimentation and turbidity, which could lead to aquatic habitat degradation. The impact qualifiers and descriptors, including context, intensity, and duration for the level of impact to water quality are defined in Table 10.

Table 10. Water Quality Impact Qualifiers and Descriptors

Effect Context, Intensity, and Duration	Description
Context	The impact to water quality is addressed within the context of the lower 23 miles of the Stehekin River and the perennial tributaries on the PCT within the project area where the past, present, and reasonably foreseeable Stehekin Valley Road impacts have occurred or would occur.
Negligible Effect	Chemical, physical, or biological effects would not be detectable, would be well below water quality standards or criteria, and would be within historic or desired water quality conditions.
Minor Effect	Chemical, physical, or biological effects would be detectable, but would be well below water quality standards or criteria and within historical or desired water quality conditions.
Moderate Effect	Chemical, physical, or biological effects would be detectable but would be at or below water quality standards or criteria; however, historical baseline or desired water quality conditions would be temporarily altered.
Major Effect	Chemical, physical, or biological effects would be detectable and frequently altered from the historical baseline or desired water quality conditions; and/or chemical, physical, or biological water quality standards or criteria would be slightly and singularly exceeded temporarily.
Beneficial Affect	A beneficial affect would improve water quality when compared with current conditions.
Effect Duration	A short-term effect would recover in less than 1 year. A long-term effect would take more than 1 year to recover.

7.1.3.4 Fisheries and Aquatic Habitat

The fisheries and aquatic habitat analysis focuses on special status species listed as threatened, endangered, proposed, candidate, or species of concern by either the USFWS or WDF that are known to occur or may occur in the project area. There is no designated or proposed critical habitat in the project area. The analysis of potential aquatic habitat impacts focused on fish passage, and turbidity and sediment loading as related to soils, water quality, hydrology, channel morphology, and floodplains impacts. The impact qualifiers and descriptors, including context, intensity, and duration for the level of impact to fisheries and aquatic habitat are defined in Table 11.

Table 11. Fisheries and Aquatic Habitat Impact Qualifiers and Descriptors

Effect Context, Intensity, and Duration	Description
Context	The impacts to individuals or populations of special status species and their habitats are addressed within the context of the lower 23 miles of the Stehekin River and the perennial tributaries on the PCT within the project area where the past, present, and reasonably foreseeable Stehekin Valley Road impacts have occurred or would occur.
Negligible Effect	The action could result in a change to a population or individuals of a species or their habitat, but the change would be so small that it would not be of any measurable or perceptible consequence and would be well within natural variability. This impact intensity equates to a USFWS “May Affect, Not Likely to Adversely Affect” determination for listed species.
Minor Effect	The action could result in a change to a population or individuals of a species or their habitat. The change would be measurable, but small and localized and not outside the range of natural variability. Mitigation measures, if needed to offset the adverse impacts, would be simple and successful. This impact intensity equates to a USFWS “May Affect, Not Likely to Adversely Affect” determination for listed species.
Moderate Effect	Moderate impacts on special status species, their habitats, or the natural processes sustaining them would be detectable and occur over a large area. Breeding animals of concern are present; animals are present during particularly vulnerable life-stages such as migration or juvenile stages; mortality or interference with activities necessary for survival could be expected on an occasional basis, but is not expected to threaten the continued existence of the species in NOCA. Mitigation measures, if needed to offset adverse impacts, would be extensive and likely successful. This impact intensity equates to a USFWS “May Affect, Likely to Adversely Affect” determination for listed species.
Major Effect	The action would result in a noticeable effect to viability of a population or individuals of a species or resource. Impacts on a special status species or the natural processes sustaining them would be detectable, both in and out of the Park. Loss of habitat might affect the viability of at least some special status species. Extensive mitigation measures would be needed to offset any adverse impacts and their success could not be guaranteed. This impact intensity equates to a USFWS “May Affect, Likely to Jeopardize the Continued Existence of a Species or Adversely Modify Critical Habitat for a Species” determination for listed species.
Beneficial Affect	A beneficial affect would improve habitat value and function for special status species when compared to existing conditions.
Effect Duration	A short-term effect would recover in less than 1 year. A long-term effect would take more than 1 year to recover.

7.1.3.5 Vegetation (Common Native, Special Status, Riparian, Wetland, Noxious/Invasive)

The vegetation analyses were based on the amount of disturbance (removal or damage to vegetation) from reconstruction, construction, or road operations that would occur compared to current conditions. The analyses also included potential for the project to introduce or spread noxious/invasive plants; potential affects to riparian and redcedar wetland communities; and potential affects to individual and special status plants. The impact qualifiers and descriptors, including context, intensity, and duration for the level of impact to vegetation are defined in Table 12.

Table 12. Vegetation Impact Qualifiers and Descriptors

Effect Context, Intensity, and Duration	Description
Context	The impacts to common native vegetation, special status species, a redcedar wetland, riparian areas, and noxious/invasive plants are addressed within the non-Wilderness road corridor around the existing or proposed Stehekin Valley Road, and along the existing or proposed PCT.
Negligible Effect	No native vegetation would be affected or some individual native plants could be affected, but there would be no effect on native populations. There would be no introductions or increases, or barely detectable increases, in the number of noxious/invasive species and extent of their range. The effects would be short-term, small scale, and immeasurable.
Minor Effect	The alternative would affect some individual plants and a relatively minor segment of that species' population. Mitigation to offset adverse impacts could be required and would be effective. Changes in the extent of noxious/invasive species would be short-term, localized, and measurable to one or more species. Mitigation of effects would be simple and effective.
Moderate Effect	The alternative would affect some individual native plants and a sizeable segment of the species' population in the long-term and over a relatively large area. Changes in the extent of several or more non-native species would be over a relatively long period. Noxious/invasive plants would spread beyond the localized area. Mitigation to offset adverse impacts could be extensive, but would likely be successful, depending on the species of non-native plants involved.
Major Effect	The alternative would have a considerable long-term effect on native plant populations and noxious/invasive plants, and would affect over half of the project area for an extended period. Mitigation measures to offset the adverse impacts would be extensive, and success of the mitigation measures could not be assured.
Beneficial Affect	A beneficial affect would protect or enhance common native vegetation, special status species, wetlands, riparian areas, and reduce the proliferation of noxious/invasive plants when compared with current conditions.
Effect Duration	A short-term effect would recover in less than 1 year. A long-term effect would take more than 1 year to recover.

7.1.3.6 Terrestrial and Amphibious Wildlife

The wildlife analysis focuses on terrestrial and amphibious special status species listed as threatened, endangered, proposed, candidate, or species of concern by either the USFWS or WDF that are known to occur or may occur in the project area. The impact qualifiers and descriptors, including context, intensity, and duration for the level of impact to terrestrial and amphibious wildlife are defined in Table 13.

Table 13. Terrestrial and Amphibious Wildlife Impact Qualifiers and Descriptors

Effect Context, Intensity, and Duration	Description
Context	The impacts to special status species and their habitats are addressed within the context of the project area.
Negligible Effect	The action could result in a change to a population or individuals of a species or their habitat, but the change would be so small that it would not be of any measurable or perceptible consequence and would be well within natural variability. This impact intensity equates to a USFWS "May Affect, Not Likely to Adversely Affect" determination for listed species.

Effect Context, Intensity, and Duration	Description
Minor Effect	The action could result in a change to a population or individuals of a species or habitat. The change would be measurable, but small and localized and not outside the range of natural variability. Mitigation measures, if needed to offset the adverse impacts, would be simple and successful. This impact intensity equates to a USFWS “May Affect, Not Likely to Adversely Affect” determination for listed species.
Moderate Effect	Moderate impacts on special-status species, their habitats, or the natural processes sustaining them would be detectable and occur over a large area. Breeding animals of concern are present; animals are present during particularly vulnerable life-stages such as migration or juvenile stages; mortality or interference with activities necessary for survival can be expected on an occasional basis, but is not expected to threaten the continued existence of the species in NOCA. Mitigation measures, if needed to offset adverse impacts, would be extensive and likely successful. This impact intensity equates to a USFWS “May Affect, Likely to Adversely Affect” determination for listed species.
Major Effect	The action would result in a noticeable effect to viability of a population or individuals of a species or resource. Impacts on a special-status species or the natural processes sustaining them would be detectable, both in and out of the Park. Loss of habitat might affect the viability of at least some special-status species. Extensive mitigation measures would be needed to offset any adverse impacts and their success could not be guaranteed. This impact intensity equates to a USFWS “May Affect, Likely to Jeopardize the Continued Existence of a Species or Adversely Modify Critical Habitat for a Species” determination for listed species.
Beneficial Affect	A beneficial affect would improve habitat value and function for special status species when compared to existing conditions.
Effect Duration	A short-term effect would recover in less than 1 year. A long-term affect would take more than 1 year to recover.

7.1.3.7 Visitor Access, Experience, and Park Operations

Impacts to visitor experience were assessed by considering public scoping comments, NPS staff observations of visitation patterns, conditions that affect visitor experience (e.g. air quality, visual/scenic resources, Wilderness, access, PCT, WSR), and the objectives for visitor use stated in the Park’s statement of significance. Some impacts on visitor experience are subjective, based entirely on the individual visitor. Individual visitors could perceive the same impact as either adverse or beneficial, depending on their point of reference. For example, some people believe that the current situation restricts access and increases hiking time for visitors using Park trails. Others believe that limited access for vehicles improves the visitor experience and recreation activities because there are fewer people and machines near the Wilderness area, thus increasing solitude.

The analyses of visitor access, experience, and park operations assessed each alternative’s capability of providing safe motorized and non-motorized access to recreation features and facilities within the project area; the ability to provide emergency services; and administrative access for road and trail maintenance, fire suppression, noxious weed control, and other park operations, as well as budget.

In 2005-2006, NPS has or will reconstruct sections of the Stehekin Valley Road between MP 4 and MP 10. These projects were considered in the cumulative impacts analysis.

The impact qualifiers and descriptors, including context, intensity, and duration for the level of impact visitor access, experience, and park operations are defined in Table 14.

Table 14. Visitor Access, Experience, and Park Operations Impact Qualifiers

Effect Context, Intensity, and Duration	Description
Context	The impacts to visitor experience and access are addressed within the context of the project area, the Stephen Mather Wilderness, and the Stehekin area.
Negligible Effect	Visitors would not be affected, or changes in visitor experience and/or access would be below or at the level of detection. Any effects would be short-term. The visitor would not likely be aware of the effects associated with the alternative.
Minor Effect	Changes in visitor experience and/or access would be detectable, although the changes would be slight and likely short-term. The visitor would be aware of the effects associated with the alternative, but the effects would be slight.
Moderate Effect	Changes in visitor experience and/or access would be readily apparent and likely long-term. The visitor would be aware of the effects associated with the alternative and would likely be able to express an opinion about the changes.
Major Effect	Changes in visitor experience and/or access would be readily apparent and have substantial long-term consequences. The visitor would be aware of the effects associated with the alternative and would likely express a strong opinion about the changes.
Beneficial Affect	A beneficial affect would improve resources (e.g. air quality, visual/scenic resources, Wilderness, access, PCT, WSR) that affect visitor experience compared to existing (2005) and pre-flood (1995 or 2003) conditions.
Effect Duration	A short-term effect would occur within and last for less than 1 year. A long-term effect would take more than 1 year to occur and continue for the long-term.

7.1.3.8 Socio-economics

This analysis describes the socio-economic impacts of the proposed action and alternatives in terms of the local Stehekin economy (particularly permittees), implementation costs (construction and other measures prescribed in each alternative), and maintenance costs.

It is likely that Stehekin Valley businesses have been affected by the flood of October 2003, although there is no way to predict exactly how changes in upper valley road access have affected Park visits and spending in the valley.

The impact qualifiers and descriptors, including context, intensity, and duration for the level of impact to socio-economics are defined in Table 15.

Table 15. Socio-economic Impact Qualifiers and Descriptors

Effect Context, Intensity, and Duration	Description
Context	Socio-economic impacts are addressed within the context of the local Stehekin community and local Park operations (availability of funding for construction and maintenance activities).
Negligible Effect	Socio-economics would not be affected, or changes would be below or at the level of detection by the Stehekin community or NOCA managers. Any effects would be short-term.
Minor Effect	Changes in socio-economics would be detectable, although the changes would be slight and likely short-term. The Stehekin community or NOCA managers would be aware of the effects associated with the alternative, but the effects would be slight.

Effect Context, Intensity, and Duration	Description
Moderate Effect	Changes in socio-economics would be readily apparent and likely long-term. The Stehekin community would be aware of the effects associated with the alternative and would likely be able to express an opinion about the changes. Park operations and budgets would be noticeably affected in the short or long-term.
Major Effect	Changes in socio-economics would be readily apparent and have substantial long-term consequences. The Stehekin community would be aware of the effects associated with the alternative and would likely express a strong opinion about the changes. Proposed actions and/or routine maintenance may not occur due to funding constraints.
Beneficial Affect	A beneficial affect would improve socio-economics in the Stehekin community or benefit park operations compared to existing conditions.
Effect Duration	A short-term effect would take place within and have an impact for less than 1 year. A long-term effect would take more than 1 year to occur and/or have an ongoing impact.

7.1.3.9 Wilderness

The Stephen Mather Wilderness was designated with some evidence of human use already present within the project area (e.g. Bridge Creek Ranger Station, Stehekin Valley Road). This analysis assesses *changes* to Wilderness designation, access, and character that would result from implementing the proposed action and alternatives. It presumes that actions, which continue the level of visual intrusion and human use that existed at the time of Wilderness designation, have no affect on the Wilderness.

The impact qualifiers and descriptors, including context, intensity, and duration for the level of impact on the wilderness are defined in Table 16.

Table 16. Wilderness Impact Qualifiers and Descriptors

Effect Context, Intensity, and Duration	Description
Context	Changes to Wilderness designation, access, and character would result from implementing the proposed action and alternatives.
Negligible Effect	Wilderness values and experience would not be affected, or changes would be below or at the level of detection by the visitor. Any effects would be short-term.
Minor Effect	Changes in Wilderness values and experience would be detectable, although the changes would be slight and likely short-term. Visitors would be aware of the effects associated with the alternative, but the effects would be slight.
Moderate Effect	Changes in Wilderness values and experience would be readily apparent and likely long-term. Visitors would be aware of the effects associated with the alternative and would likely be able to express an opinion about the changes.
Major Effect	Changes in Wilderness values and experience would be readily apparent and have substantial long-term consequences. Visitors would be aware of the effects associated with the alternative and would likely express a strong opinion about the changes.
Beneficial Affect	A beneficial affect would improve Wilderness values and experience that effect NOCA visitors compared to existing conditions.
Effect Duration	A short-term effect would recover in less than 1 year. A long-term effect would take more than 1 year to recover.

7.1.3.10 Pacific Crest Trail

This analysis evaluates the impacts of the alternatives on the PCT as a component of the road and trail system within the project area and as one very short section of a continent-long national scenic trail. The impact qualifiers and descriptors, including context, intensity, and duration for the level of impact to the PCT are defined in Table 17.

Table 17. PCT Impact Qualifiers and Descriptors

Effect Context, Intensity, and Duration	Description
Context	The impacts to PCT visitor access, PCT trail condition, backcountry campsite availability, and visitor use are addressed within the context of the 2.2-mile long PCT within the project area and the entire 2,655-mile long PCT.
Negligible Effect	PCT visitor access, PCT trail condition, backcountry campsite availability, and visitor use would not be affected, or changes would be below or at the level of detection by the visitor. Any effects would be short-term.
Minor Effect	Changes in PCT visitor access, PCT trail condition, backcountry campsite availability, and visitor use would be detectable, although the changes would be slight and likely short-term. Visitors would be aware of the effects associated with the alternative, but the effects would be slight.
Moderate Effect	Changes in PCT visitor access, PCT trail condition, backcountry campsite availability, and visitor use would be readily apparent and likely long-term. Visitors would be aware of the effects associated with the alternative and would likely be able to express an opinion about the changes.
Major Effect	Changes in PCT visitor access, PCT trail condition, backcountry campsite availability, and visitor use would be readily apparent and have substantial long-term consequences. Visitors would be aware of the effects associated with the alternative and would likely express a strong opinion about the changes.
Beneficial Affect	A beneficial affect would improve PCT visitor access, PCT trail condition, backcountry campsite availability, and visitor use compared to existing conditions.
Effect Duration	A short-term effect would take place within and last for less than 1 year. A long-term effect would take more than 1 year to occur or remain for the long-term.

7.1.3.11 Wild and Scenic Rivers

The WSR analysis assesses the potential effects of the proposed alternatives on the characteristics of the Stehekin River that contribute to the river's eligibility for listing in the National WSR system. These characteristics include the free-flowing nature of the river and the ORVs provided by the river and its immediately surrounding lands, wildlife, fish, prehistoric resources, historic resources, geology, scenic resources, and recreation.

The analysis of cumulative impacts considers the 2005-2006 improvements to the Stehekin Valley Road downstream of the project area (from MP 4 to MP 10). These improvements include riprap to stabilize about 400 feet of riverbank and two to four rock stream barbs to redirect stream flow.

The impact qualifiers and descriptors, including context, intensity, and duration for the level of impact to WSR values are defined in Table 18.

Table 18. WSR Impact Qualifiers and Descriptors

Effect Context, Intensity, and Duration	Description
Context	The impact to WSR values and eligibility is addressed within the context of Segments 1 and 2 of the Stehekin River (Lake Chelan to Cottonwood Campground) where most of the past, present, and reasonably foreseeable Stehekin Valley Road impacts have occurred or would occur.
Negligible Effect	The effect on the values for which the river segment was determined eligible for listing as a WSR would be at the lowest levels of detection; barely measurable with no perceptible consequences, either adverse or beneficial.
Minor Effect	A perceptible effect would occur to the values for which the river segment was determined eligible for listing as a WSR; but the effect would be localized to relatively small areas. Little, if any, loss of value or integrity would occur.
Moderate Effect	A readily apparent effect would occur to the values for which the river segment was determined eligible for listing as a WSR. An adverse impact would diminish some of the values, but not enough to threaten the river's listing in the National WSR system.
Major Effect	A readily apparent effect would occur to the values for which the river segment was determined eligible for listing as a WSR. An adverse impact would be severe enough to threaten the river's listing in the National WSR System.
Beneficial Affect	A beneficial affect would improve WSR values when compared with current conditions.
Effect Duration	A short-term effect would occur within and last no more than 1 year. A long-term effect would take more than one year to occur.

7.1.3.12 Air Quality

The primary factors affecting air quality within the Complex and the project area are outside the control of the Park (e.g. weather patterns, industrial and rural uses in metropolitan areas miles away, forest fires on other federally managed lands). This analysis focuses on the sources of pollution that would be generated within the project area because of the proposed action or alternatives.

The discussion of cumulative impacts to air quality considers a reasonably foreseeable future action that would be implemented within approximately the same timeframe as the proposed action. In 2005-2006, NPS will reconstruct sections of the Stehekin Valley Road between MP 4 and 10. The road construction associated with these projects, *Stehekin Valley Road Improvement Project* and *Coon Run*, would be expected to generate some localized, temporary air quality impacts (i.e. vehicle exhaust, dust) (NPS 2005a; 2005b).

The impact qualifiers and descriptors, including context, intensity, and duration for the level of impact to air quality are defined in Table 19.

Table 19. Air Quality Impact Qualifiers and Descriptors

Effect Context, Intensity, and Duration	Description
Context	Air quality impact focuses on the sources of pollution that would be generated within the project area because of the proposed action or alternatives. All air quality impacts discussed would be localized, occurring within the project area.

Effect Context, Intensity, and Duration	Description
Negligible Effect	The affect on air quality would be at the lowest levels of detection with no perceptible consequences, either adverse or beneficial. Air quality would not be affected, or changes would be below or at the level of detection by the visitor. Any effects would be short-term.
Minor Effect	Changes in air quality would be detectable, although the changes would be slight and likely short-term. Visitors would be aware of the effects associated with the alternative, but the effects would be slight.
Moderate Effect	Changes in air quality would be readily apparent and likely long-term. Visitors would be aware of the effects associated with the alternative and would likely be able to express an opinion about the changes.
Major Effect	Changes in air quality would be readily apparent and have substantial long-term consequences. Visitors would be aware of the effects associated with the alternative and would likely express a strong opinion about the changes.
Beneficial Affect	A beneficial affect would improve air quality that affects PCT users, WSR eligibility, Wilderness values and experience, and NOCA visitors compared to existing conditions.
Effect Duration	A short-term effect would recover in less than 1 year. A long-term effect would take more than 1 year to recover.

7.2 Relevant NPS Policy and Other Regulations

Current NPS Management Policies, LACH, and other regulations require that the following conditions be achieved (Table 20). Compliance with the relevant regulations and management policies was used to compare the action alternatives with the No Action Alternative. The analysis of each impact topic discloses to what extent relevant law, regulation, and management policies would be complied with under a given alternative. A statement of GMP compliance is provided at the end of each alternative's analysis of environmental consequences.

The impact qualifiers and descriptors, including context, intensity, and duration for the level of impact to relevant NPS Management Policies are defined in Table 20.

Table 20. Relevant NPS Management Policies and Other Regulations

Desired Condition	Source
NPS policy is to prevent, or if that is not possible, to minimize adverse, potentially irreversible impacts on soils. This is achieved by minimizing soil excavation, erosion, and compaction during and after construction.	NPS Management Policies 2001
"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."	Lake Chelan NRA GMP 1995
Take all necessary action to maintain or restore the quality of surface or ground waters within the Park consistent with the CWA and other applicable federal, state, and local laws and regulations.	CWA 1977 Washington Hydraulic Code NPS Management Policies 2001
NPS will perpetuate surface waters as integral components of park aquatic and terrestrial ecosystems.	NPS Management Policies 2001
NPS will manage streams to protect stream processes that create habitat features such as floodplains, riparian systems, woody debris accumulations, terraces, gravel bars, riffles, and pools.	NPS Management Policies 2001

Desired Condition	Source
NPS Management Policies recommend setbacks from unstable banks or floodplain areas where possible.	EO 11988 and DO #77-1 Floodplain Management
NPS must evaluate impacts to floodplains, reduce the potential risk involved in placing facilities within floodplains, and protect floodplain values.	EO 11988 and DO #77-1 Floodplain Management
NPS must map locations of 100-year and 500-year floodplains. Preserve floodplain values and minimize potentially hazardous conditions associated with flooding.	EO 11988 and DO #77-1 Floodplain Management
Federal and state listed threatened and endangered species and their habitats must be sustained.	ESA 1973 NEPA 1968 NPS Management Policies 2001
The general NPS principles for managing biological resources are that all components and processes of naturally evolving park ecosystems including the natural abundance, diversity, and ecological integrity of plant communities be maintained.	NPS Management Policies 2001 NPS Organic Act 1916
When NPS management actions remove native vegetation, the NPS will seed to ensure that such removals will not cause unacceptable impacts to native resources, natural processes, or other park resources.	NPS Management Policies 2001
Preserve or restore ecological processes and conditions in wetland, floodplain, shoreline, and riparian areas.	Lake Chelan NRA GMP 1995
Exotic and noxious weeds (non-native species) are not a natural element of the Park ecosystem. Management of populations of non-native plant species up to and including eradication will be undertaken wherever such species threaten park resources or public health when control is prudent and feasible.	DO #77 Natural Resource Protection EO 13112 Invasive Species
Minimize human impacts on native plants, animals, populations, communities, and ecosystems in which they occur.	NPS Management Policies 2001
Preserve and restore the natural abundances, diversities, dynamics, distributions, habitats, and behaviors of native plant and animal populations and the communities and ecosystems in which they occur.	NPS Management Policies 2001
NPS must conserve the scenery and the natural objects in an unimpaired state for future generations.	NPS Organic Act 1916
Park roads will be well constructed, sensitive to natural and cultural resources, reflect the highest principles of park design, and enhance the visitor experience.	NPS Policies 2001
Park roads...are intended to enhance the quality of a visit, while providing for safe and efficient travel, with minimal or no impacts on natural and cultural resources.	NPS Management Policies 2001
Part of the purpose of the LACH is to offer opportunities for recreation, education, inspiration, and enjoyment. Consequently, one of the Park's management goals is to ensure that visitors safely enjoy and are satisfied with the availability, accessibility, diversity, and quality of park facilities, services, and appropriate recreational opportunities.	Lake Chelan NRA GMP 1995
NOCA is charged with preserving and protecting the lands designated as Wilderness "for the use and enjoyment of the public in a manner that will leave them unimpaired for future use and enjoyment as Wilderness".	WA Park Wilderness Act 1988 Public Law 100-668
Recreation areas in the Wilderness are to be administered in a manner that provides for public outdoor recreation benefits and conservation of scenic, scientific, historic, and other values contributing to public enjoyment.	WA Park Wilderness Act 1988 Public Law 100-668

Desired Condition	Source
The PCT must be maintained as "...an extended trail so located as to provide for maximum outdoor recreation potential and for the conservation and enjoyment of the nationally significant scenic, historic, natural, or cultural qualities for the areas through which such trails may pass."	National Trail Systems Act 1968
NPS must conserve the scenery and the natural objects in an unimpaired state for future generations.	NPS Organic Act 1916
NPS must protect the free-flowing condition and ORVs of designated rivers and congressionally authorized study rivers. The Act requires analysis and documentation if there would be any impact on a designated or potential WSR.	1968 WSR Act Section 7
No management actions may be taken that could adversely impact the values that qualify a river for inclusion in the National WSR system.	NPS Management Policies 2001
NPS must protect air quality related values including visibility, plants, animals, soils, water quality, cultural resources, and visitor health.	CAA 1963
NOCA is designated as a Class I Area because of its special natural, scenic, and historic importance, and NPS must prevent significant deterioration of air quality and preserve the ability to see long distances, entire panoramas, and special features within Class I Areas.	CAA 1963

7.3 Impairment of Park Resources or Values

In addition to determining the environmental consequences of the preferred and other alternatives, NPS Management Policies and DO #12 require analysis of potential effects to determine if actions would impair park resources and values. Typically, impacts with the potential for impairment would be determined to be major, or occasionally moderate in intensity in NEPA impact analyses; impacts of a negligible to minor intensity would not have the potential for impairment.

The fundamental purpose of the NPS, established by the 1916 Organic Act and reaffirmed by the General Authorities Act, as amended, begins with a mandate to conserve park resources and values. NPS managers must always seek ways to avoid or minimize to the greatest degree practicable adverse impacts on park and recreation area resources and values. However, the laws do give NPS management discretion to allow impacts to park resources and values when necessary and appropriate to fulfill the purposes of a park, as long as the impact does not constitute impairment of the affected resources and values. Congress has given NPS management discretion to allow certain impacts within parks; that discretion is limited by statutory requirement that the NPS must leave park resources and values unimpaired, unless a particular law directly and specifically provides otherwise.

The prohibited impairment is an impact that, in the professional judgment of the responsible NPS manager, would harm the integrity of park resources or values, including opportunities that otherwise would be present for the enjoyment of those resources or values. An impact to any park resource or value may constitute impairment. However, an impact would more likely constitute impairment to the extent it affects a resource or value whose conservation is:

- Necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the Park;
- Key to the natural or cultural integrity of the Park or to opportunities for enjoyment of the Park; or

- Identified as a goal in the Complex GMP, LACH GMP, or other relevant NPS planning documents.

In this EA, a determination on impairment is made at the end of each alternative analysis and summarized in Table 4.

7.4 Alternative A. No Action

The No Action Alternative provides a basis for comparing the existing condition with the action alternatives and their anticipated environmental consequences (Table 21). If the No Action Alternative were selected, the NPS would respond to future needs and conditions without major actions or changes in the present course.

The No Action Alternative represents the current condition of the Stehekin Valley Road, including the washed out sections that were reclaimed by the 1995 and 2003 floods, and the trail between Glory and Cottonwood Camp that was built by the NPS after the 1995 flood (Figure 1; Table 21). The spur trail between the PCT and Shady Camp would not be built.

Table 21. Comparison of Proposed Road and Trail Changes

Road or Trail Segment	No Action and Preferred Alternatives								Alternative C						Alternative D			
	Pre-Flood		Flood Reclamation		Road Converted to Trail ¹		New Trail		New Road		Road Converted to Trail ¹		New Trail		New Road		New Trail	
	mi	ac	mi	ac	mi	ac	mi	ac	mi	ac	mi	ac	mi	ac	mi	ac	mi	ac
MP 12.9 to 15.3	2.4	3.5	1.7	2.5	-	-	-	-	1.7	2.5	-	-	-	-	-	-	-	-
MP 15.3 to 20.1	4.8	7	0.2	0.1	4.8	3.5	-	-	0.2	0.1	-	-	-	-	0.2	0.1	-	-
MP 20.1 to 22.8	2.7	3.5	0.5	0.7	2.2	1.6	0.5	0.4	-	-	2.2	1.6	0.5	0.4	0.5	0.8	-	-
MP 12.7 to 15.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.2	3.2	-	-
PCT Reroute	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.2	1.6
Shady Trail ²	-	-	-	-	-	-	-	0.1	>0.1	-	-	-	-	-	-	-	0.1	>0.1
Totals	9.9	14	2.4	3.3	7	5	0.6	0.5	1.9	2.6	2.2	1.6	0.5	0.4	2.9	4.1	2.3	1.7

¹ 12-foot wide road converted to 6-foot wide trail

² Preferred Alternative and Alternative D only

7.4.1 ALTERNATIVE A (NO ACTION) SOILS

7.4.1.1 Impacts Analysis

Approximately 1.9 miles (26 percent) of the Stehekin Valley Road above Car Wash Falls was washed out by the 2003 flood (Table 21). Specifically, 1.6 miles between MP 12.9 and MP 14.5; 0.1 mile at the MP 15 landslide; 0.1 mile between MP 17.4 and MP 17.5; and 0.1 mile at Glory (MP 20.1) near Cascade Pass Trailhead. Another ½-mile of road between MP 20.3 and MP 20.8 was washed out by the 1995 flood, preventing vehicle access to Cottonwood Camp (MP 22.8).

Car Wash Falls to MP 15.3. Approximately 1.7 miles/2.5 acres (71 percent) of the 2.4-mile long road between Car Wash Falls and MP 15.3 washed out in the 2003 flood (Table 21). This section of the road would continue to deteriorate through erosion, washouts, and landsliding; would naturally revegetate; and the landslide at MP 15 would continue to grow until it eventually reaches a stable angle of repose. The periodic flood damage, erosion, emergency road repairs, reroutes, and the floodplain/riparian area filling associated with the previous road would permanently cease. These changes would stabilize the fill, increase organic matter and soil infiltration, and reduce compaction and erosion on the remaining roadbed (~0.7 miles, 1 acre) over time

MP 15.3 to Glory (MP 20.1). The 2003 flood caused relatively minor damage to this 5-mile long section of the road, but the road has been inaccessible to motorized or mechanized use since 2003. Hikers and stock users could continue to access this section of the road from the PCT, and the 12-foot wide roadbed would be maintained as a 6-foot wide trail as it has been since 2003 (Table 21). The rest of the roadbed (~3.6 acres) would revegetate naturally. These changes would produce long-term moderate, beneficial soil impacts.

Glory to Cottonwood Camp (MP 20.1 to MP 22.8). Approximately ½-mile or 0.7 acres of the road between MP 20.3 and MP 20.8 washed out in 1995, and there would be no road reconstruction between Glory and Cottonwood Camp. Hikers and stock users could continue to use the existing trail between Glory and Cottonwood Camp that has been in use since the 1995 flood. The trail is approximately 2.5 miles long and 6-feet wide (~2.2 acres), and incorporates approximately 2 miles of the former roadbed. Routine trail maintenance would continue. The rest of the roadbed (~1.5 acres) would revegetate naturally. Therefore, there would be no net change in soils condition since floods closed this section of the road to vehicle and bicycle use in 1995. In the long-term, these would be major beneficial soil affects.

PCT. Since the October 2003 flood, the small amount of foot and stock traffic on the Stehekin Valley Road has been rerouted to the PCT at MP 12.7. The PCT had the majority of this traffic prior to the flood, so any post-2003 affects would be negligible, and would be limited to approximately 3 miles (2.2 acres) or 0.1 percent of the 2,655 mile-long PCT.

7.4.1.2 Cumulative Impacts

Several other projects have, or are likely to disturb soils and reduce soil productivity in the Stehekin River Valley. Projects that have adversely impacted soils include:

- The original 22.8-mile long Stehekin Valley Road development that impacted approximately 50 acres of soil, most of it in the riparian zone and/or floodplain of the river (NPS 2005a);
- Past road reroutes due to flood damage (acres unknown);
- Recent emergency road improvements at MP 7 that disturbed approximately 0.2 acres of soil (NPS 2005a); and
- The *Coon Run Project* implemented in the fall of 2005 disturbed approximately 1.2 acres of soil for new road construction and old road scarified (Table 22).

Over time, the scarified area will be a 0.2-acre net benefit.

Past, routine maintenance of the 22.8-mile long road included gravel replacement, which has slightly widened the 12-foot wide road over time and reduced the surrounding soil productivity. This is a minor, long-term adverse impact. Road maintenance from the Stehekin Landing to Ranch and to Car Wash Falls (MP 12.9) has resumed since the fall of 2005.

Reasonably foreseeable future projects that will affect soils include implementation of the *Stehekin Valley Road Improvement Project* that will pave 5.2 miles of the road between Harlequin Bridge MP 4 to MP 9.2 and create 2 to 4 new bank barbs to protect the road (Table 22). The original gravel road surface and paved surface are both impervious surfaces and produce essentially the same effects of increased run-off and erosion potential (WSDE 1991). Therefore, the newly paved area will only increase the original area of impervious surface by approximately 1 acre. Some areas will be reclaimed, decreasing the cumulative impacts due to impervious surfaces. This project will also: 1) repair 2003 flood damage, 2) improve erosion control, 3) elevate sections of the roadbed, 4) build 20 pullouts, 5) add or replace 18 culverts, 6) reroute two sections of the road, and 7) construct 3,085 linear feet of drainage ditches; conservatively disturbing 10 acres of soil (NPS 2005a). Another 0.8 acre of old roadbed will be scarified. Newly scarified areas have the same adverse impact as new construction in the short-term (USFS 2004); therefore, the net short-term adverse impact will be 1.8 acres of new soil disturbance. Over time, the scarified area will be 0.8 acres of net soils benefit.

Table 22. Soils Cumulative Impacts

Project	Time Frame	Effects	Approximate Acres	Impact
Stehekin Valley Road	Original construction	Roadbed 23 miles long x 12-foot wide	34	Adverse
Pre-2003 flood damage	Past	Road widening and reroutes	Unknown	Adverse
MP 7 2003 flood damage	Post-2003	Emergency repairs	0.2	Adverse
Coon Run Project 2003 flood damage	Fall 2005	New road and bridge construction; short-term road scarification effects	1.2	Adverse
Coon Run Project 2003 flood damage	Fall 2005	Long-term road scarification effect	0.2	Beneficial
Road Maintenance	Past	23 miles long x 12-foot wide	34	Adverse
Road Maintenance From Stehekin Landing to Car Wash Falls	Ongoing	12.9 miles long x 12-foot wide	18.8	Adverse
Stehekin Valley Road Improvement Project	2006	Asphalt surface 5.2 miles long x 12-foot wide	1 acre ¹	Adverse
Stehekin Valley Road Improvement Project	2006	Construct turnouts, rerouting, etc.; short-term road scarification effects	1.8	Adverse
Stehekin Valley Road Improvement Project	2006	Long-term road scarification effects	0.8	Beneficial

Project	Time Frame	Effects	Approximate Acres	Impact
Maintain PCT in Project Area	Ongoing	3 miles long x 6-feet wide	1.1	Adverse

¹Net difference between original gravel road surface and new paved road surface (WSDE 2005)

Past cumulative actions have been major, long-term adverse impacts due to an increase in the amount of impervious surface, decreased infiltration, soil compaction, loss of soil moisture, and loss of organic soil horizon spread over more than a 22.8-mile long, 12-foot wide area (approximately 34 acres) mostly within the floodplain and riparian area of the Stehekin River. The actual area of cumulative impacts is larger than 34 acres and the area will continue to increase due to flood damage, rerouting, widening, and maintenance over time and other proposed projects (NPS 2005a; 2005b). These effects to soils are major, long-term, and adverse within the 100-foot non-Wilderness road corridor surrounding the Stehekin Valley Road. Over time, the road scarification and reclamation in the other proposed projects would have a net benefit of approximately 1 acre (Table 22).

The natural reclamation processes initiated by the 2003 flood would continue to produce beneficial cumulative soil impacts. The No Action Alternative would not contribute any additional soil disturbance to the overall cumulative impacts due to a continuance of the road closure from MP 12.9 to MP 22.8.

7.4.1.3 Compliance with Laws and Policy

The No Action Alternative would meet NPS soil regulations and policy to minimize potentially irreversible impacts on soils.

7.4.1.4 Conclusions

The 2.4 miles of road between Car Wash Falls and MP 15.3 would not be maintained as a road or a trail, and would continue to deteriorate through natural processes of erosion and mass wasting. The landslide at MP 15 would eventually reach a stable angle of repose. Allowing the road to naturally close and revegetate would stabilize the fill, increase organic matter and soil infiltration, and reduce compaction and erosion on the remaining roadbed over time. The periodic flood damage, erosion, emergency road repairs, reroutes, and the floodplain/riparian area filling associated with the previous road would permanently cease. The major, long-term beneficial affects that began with the October 2003 flood would continue.

The 2003 flood caused relatively minor damage to this 5-mile long section of the road, but the road has been inaccessible to motorized or mechanized use since 2003. Hikers and stock users could continue to access this section of the road from the PCT, and the 12-foot wide roadbed would be maintained as a 6-foot wide trail as it has been since 2003. The rest of the roadbed (~3.6 acres) would revegetate naturally. These changes would produce long-term moderate, beneficial affects.

There would be no road reconstruction between Glory and Cottonwood Camp. Hikers and stock users could continue to use the existing trail between Glory and Cottonwood Camp that has been in use since the 1995 flood. The trail is approximately 2.5 miles long and 6-feet wide (~2.2 acres), and incorporates approximately 2 miles of the former roadbed. Routine trail maintenance would continue. Therefore, there would be no net change in soils condition since floods closed this section of the road to vehicle and bicycle use in 1995. In the long-term, these would be major beneficial affects.

Since the October 2003 flood, the small amount of foot and stock traffic on the Stehekin Valley Road has been rerouted to the PCT at MP 12.7. The PCT had the majority of this traffic prior to the flood, so any post-2003 affects would be negligible, and would be limited to approximately 3 miles (2.2 acres) or 0.1 percent of the 2,655 mile-long PCT.

7.4.2 ALTERNATIVE A (NO ACTION) HYDROLOGY, CHANNEL MORPHOLOGY, FLOODPLAINS

7.4.2.1 Impacts Analysis

The 1995 and 2003 floods reclaimed Stehekin River channel capacity, floodplain connectivity, and increased meander length by scouring out road fill in the 100-year floodplain. The No Action Alternative would maintain these changes and continue reclamation through natural processes. There would be no official road and trail closure, reconstruction, or culvert removal.

Car Wash Falls to MP 15.3. Most of this 2.4-mile long, 3.5 acre section of the road (1.7 miles, 2.5 acres) washed out in the 2003 500-year flood (Table 21). This section also suffered damage in the 1995 100-year flood because the road constricted and controlled the channel, decreased floodplain capacity, and increased the velocity of flood flows.

Material eroded out of the riverbanks and roadbed during the floods was deposited in low gradient reaches, floodplains, and riparian areas downstream. The deposition resulted in adverse changes in the hydrology, channel morphology, and capacity of these important areas.

The remaining sections of the roadbed are fragmented and vegetation is becoming established. The vegetation will help stabilize the remaining road fill and increase sediment filtering and soil infiltration over time.

This section would not be maintained as a road or a trail, and would continue to deteriorate through natural processes of erosion, landsliding, and revegetation.

MP 15.3 to Cottonwood Camp (MP 22.8). This section (7.5 miles long, 10.8 acres) is essentially intact, and has been maintained as a 6-foot wide non-motorized, non-mechanized trail since 2003 (Figure 1; Table 21). Routine trail maintenance would continue and the rest of the 12-foot wide roadbed (3.6 acres) would revegetate naturally.

Glory to Cottonwood Camp (MP 20.1 to MP 22.8). Approximately ½-mile (0.7 acres) of road between MP 20.3 and 20.8 washed out in the 1995 100-year flood (Figure 1; Table 21). The NPS built a non-motorized, non-mechanized trail above the 100-year floodplain to circumvent this section. The new trail connects to 2 miles of the former road. This section has been maintained as a 6-foot wide trail since 1995, and the rest of the 12-foot wide roadbed (1.5 acres) is revegetating naturally.

The No Action Alternative would also eliminate the periodic flood damage, erosion, emergency road repairs, and reroutes associated with the former road above Car Wash Falls (9.9 miles, 14.3 acres). These changes would reduce the river's bedload (i.e. road fill); improve sediment transport; and eliminate floodplain filling and channel morphology changes over time.

Maintaining the ongoing processes and management changes that began with the 1995 and 2003 floods would have major, long-term beneficial affects to hydrology, channel morphology, and floodplain function of the Stehekin River.

7.4.2.2 Cumulative Impacts

The original 22.8-mile long Stehekin Valley Road filled in part of the river channel and floodplain - reducing connectivity, storage capacity, and the river's ability to convey floodwater. The No Action Alternative would allow the reclamation of channel capacity, floodplain connectivity, and increasing meander width that was initiated by the 1995 and 2003 floods to continue above Car Wash Falls. Natural revegetation of the former roadbed would also continue, increasing sediment filtering and soil infiltration over time. Periodic flood damage would cease, eliminating the sediment transport, floodplain filling, and the channel morphology changes associated with erosion of the former road. These would be major, long-term beneficial cumulative impacts.

The landslide at MP 15 would continue to enlarge until it reaches an angle of repose and the channel widens its meander bend at this location. These processes would add large quantities of sediment to the river over time and cause bar building and/or floodplain deposition in lower gradient areas downstream, resulting in a moderate, long-term cumulative effect on the river's floodplains and sediment transport capability.

The 2005 and 2006 *Stehekin Valley Road Improvement* and *Coon Run* projects (NPS 2005a; 2005b) are likely to adversely impact hydrology, channel morphology, and floodplains in the lower Stehekin River Watershed, at least in the short-term. The *Coon Run Project* rerouted the Stehekin Valley Road between MP 9 and 10 to provide vehicle access from Stehekin Valley Ranch to High Bridge Historic District in the fall of 2005. A 50-foot long bridge is planned to span Coon Creek that had been inundated by water from the Stehekin River since the 2003 flood. An elevated roadbed 350' long was built in 2005 through wetland/side channel habitat to approach the bridge. In addition, a temporary culvert crossing was installed. Approximately 1 acre of soil was disturbed for new road construction, and 0.2 acres of old road was scarified. These changes will decrease the side channel and floodplain capacity and connectivity, and have moderate, long-term negative cumulative impacts at this location.

The 2006 *Stehekin Valley Road Improvement Project* will move the road farther from the river at MP 7 and MP 7.5. This project is expected to have minor, long-term beneficial cumulative impacts by: 1) slightly increasing the flood storage capacity of the floodplain, 2) reducing the potential for fill erosion, 3) giving the river slightly more meander width, and 4) reducing the potential for restricted or channelized flood flows (NPS 2005a). The road would remain within the 100-year floodplain in several places, and there will be approximately 0.1 acre of new floodplain filling. The newly paved area will only increase the original (gravel) impervious surface by approximately 1 acre. Approximately 0.8 acres will be reclaimed, decreasing the cumulative impacts over time.

7.4.2.3 Compliance with Laws and Policy

Alternative A (No Action) would meet NPS policies to minimize potentially irreversible impacts on hydrology, channel morphology, and floodplains (Table 12).

7.4.2.4 Conclusions

The 1995 and 2003 floods reclaimed Stehekin River channel capacity, floodplain connectivity, and increased meander length by scouring out road fill in the 100-year floodplain. The No Action Alternative would maintain these changes and continue reclamation through natural processes such as revegetation and vegetative succession. There would be no official road and trail closure, reconstruction, and no culvert removal.

Revegetation of the former roadbed would increase sediment filtering and soil infiltration over time. Periodic flood damage would cease, eliminating the sediment transport, floodplain filling, and the channel morphology changes associated with erosion of the former road. These would be major, long-term beneficial cumulative impacts.

The landslide at MP 15 would continue to enlarge until it reaches an angle of repose and the channel widens its meander bend at this location. These processes would add large quantities of sediment to the river over time and cause bar building and/or floodplain deposition in lower gradient areas downstream, resulting in a moderate, long-term cumulative effect on the river's floodplains and sediment transport capability.

7.4.3 ALTERNATIVE A (NO ACTION) WATER QUALITY

7.4.3.1 Impacts Analysis

The water quality in the upper Stehekin River is generally excellent, although the Stehekin River has naturally high background levels of sediment. Prior to the 2003 flood, the river was listed as a Washington State Category I waterway that meets the tested standards for clean water. Floods periodically cause road fill erosion, bank erosion, and mass wasting (e.g. the landslide at MP 15) that have both short- and long-term chronic affects on the river's turbidity and sediment loading. Permanently closing the road above Car Wash Falls (MP 12.9) and converting the 12-foot wide roadbed to a 6-foot wide trail between MP 15.3 and Cottonwood Camp (MP 22.8) would have major, long-term beneficial affects to Stehekin River water quality because periodic flood damage, road maintenance, and emergency road reconstruction would cease.

The No Action Alternative does not include any active rehabilitation of the flood damage; the landslide at MP 15 would continue to enlarge until it reaches an angle of repose and the meander bend widens at this location. These processes would add large quantities of sediment to the river over time, and create a moderate, long-term adverse water quality affect.

In addition, the remaining road culverts would not be maintained or removed. The culverts may plug and cause road fill blowouts. The adverse water quality affects would include short-term turbidity and sedimentation.

7.4.3.2 Cumulative Impacts

Most of the Stehekin River Watershed is in Wilderness, and the largest component of the high sediment load is from natural sources (bank erosion and glaciation). However, the 22.8-mile long Stehekin Valley Road has had a long history of episodic, flood related erosion that locally affects water quality in the lower watershed (see Alternative A, No Action, Water Quality: Section 7.4.3). According to the LACH GMP, the Stehekin River contributes approximately 4,120 metric tons of suspended sediment to Lake Chelan each year.

Fill material from periodic erosion of the 22.8-mile long Stehekin Valley Road has contributed to this sediment load. The other primary, human-caused sources of turbidity and sediment are road reconstruction, emergency reroutes, and road maintenance. The river can attenuate these impacts to some degree, but decreased sediment transport capability may occur over time.

The floods of 1995 and 2003 washed out the most problematic sections of the road in the 100-year floodplain. The 2005-2006 *Stehekin Valley Road Improvement* and the *Coon Run* projects have/will reconstruct the washed out road segments below High Bridge Historic District (MP 11.2) (Table 12).

The design specification, road relocations, and floodplain reclamation in these projects will reduce the future flood damage and need for emergency road repairs compared to pre-2003 conditions.

The No Action Alternative would permanently close 9.9 miles of the Stehekin Valley Road, a 43 percent reduction in the original road length. The closure would decrease the cumulative water quality impacts that result from road construction, maintenance, flood damage, and reconstruction. The floodplain area that was reclaimed by the 1995 and 2003 floods would remain connected to the river and store some of the sediment generated by natural and anthropogenic sources upstream of Car Wash Falls.

Therefore, the No Action Alternative in combination with these other Stehekin Valley Road projects would result in major, long-term cumulative improvements to water quality in the lower Stehekin River.

7.4.3.3 Compliance with Laws and Policy

The No Action Alternative would: 1) improve water quality, 2) maintain the Stehekin River's Category I status, and 3) not contribute to future listing for sediment or turbidity under Section 303(d) of the CWA.

7.4.3.4 Conclusions

The No Action Alternative would have major, long-term beneficial affects to Stehekin River water quality because the natural reclamation begun in 1995 and 2003 would continue, and periodic flood damage, road maintenance, and emergency road reconstruction would cease.

The landslide at MP 15 would continue to enlarge until it reaches an angle of repose and the channel widens its meander bend at this location, and the remaining road culverts would not be maintained or removed. As a result, the culverts may plug and cause road fill blowouts. These combined processes could add large quantities of sediment to the river over time, creating a moderate, relatively long-term cumulative water quality affect.

7.4.4 ALTERNATIVE A (NO ACTION) FISHERIES AND AQUATIC HABITAT

7.4.4.1 Impacts Analysis

The presence of an extant bull trout population in the Stehekin River has not been confirmed, so this impact analysis assumes federally listed bull trout may occur in the project area, and there is suitable bull trout habitat in the project area. There is a population of State sensitive westslope cutthroat trout in the river and the accessible, perennial tributaries in the project area.

Aquatic habitat requirements and potential affects are similar for both species. For example, salmonid (i.e. trout and salmon) production was found to be inversely proportional to cobble embeddedness and fines in spawning gravel (Bjornn and Rieser 1991) because excessive sediment interferes with water flowing through spawning gravel and reduces the transport of oxygen to incubating eggs, lowering egg and fry survival.

Fine sediment in cobble substrate also fills interstitial space and pools, and reduces the amount of summer and winter rearing habitat and high flow refugia. Fine sediments reduce macroinvertebrate abundance and diversity, the food supply for juvenile salmonids. High-suspended sediment levels (>4,000 milligrams/liter) can cause salmonids to stop migrating.

The project-related fisheries and aquatic habitat affects are interdependent on the preceding road-related impacts analysis of soils (Section 7.4.1.1), hydrology, channel morphology, floodplains (Section 7.4.2.1), and water quality (Section 7.4.3.1).

The No Action Alternative would have major, long-term, beneficial affects on fisheries and aquatic habitat by permanently reducing road-related turbidity, sediment, and scour and filling. Natural reclamation of the road between Car Wash Falls and MP 15.3 may have minor to moderate, short-term adverse impacts if the remaining culverts are possible fish barriers, or plug and cause road fill blowouts.

7.4.4.2 Cumulative Impacts

The Stehekin River Watershed is glaciated and has naturally high levels of sediment that affect fisheries and aquatic habitat. The No Action Alternative would have moderate to major, long-term, beneficial affects on fisheries and aquatic habitat by permanently eliminating the road-related sources of turbidity and sediment (see Cumulative Impacts, Soils: Section 7.4.1.2; Hydrology, Channel Morphology, Floodplains: Section 7.4.2.2; and Water Quality: Section 7.4.3.2).

7.4.4.3 Compliance with Laws and Policy

ESA. The No Action Alternative would have “No Effect” or would be a major, long-term beneficial affect for Columbia River bull trout if they were present in the Stehekin River Watershed. There is no proposed or designated bull trout critical habitat on the east side of the Cascades.

NPS Management Policies 4.4.2.3, Management of Threatened or Endangered Plants and Animals. The No Action Alternative would meet the intent of NPS Management Policies 4.4.2.3 that requires the NPS to survey, protect, monitor, restore, and strive to recover all species listed, proposed, or candidates for listing under the ESA that are native to NPS units, and to manage, to the greatest extent possible, state, and locally endangered and threatened species as federally listed species.

7.4.4.4 Conclusions

The No Action Alternative would have long-term, major beneficial affects on fisheries and aquatic habitat in the lower river by permanently reducing road-related turbidity, sediment, and scour and fill. Natural reclamation of the road between Car Wash Falls and MP 15.3 may have minor to moderate, short-term adverse impacts if the remaining culverts are possible fish passage barriers, or plug and cause road fill blowouts.

The No Action Alternative would have “No Effect” or would be a long-term beneficial affect for Columbia River bull trout if they were present in the Stehekin River Watershed. There is no proposed or designated bull trout critical habitat on the east side of the Cascades.

This alternative would not contribute to future listing of westslope cutthroat trout or their essential habitat.

7.4.5 ALTERNATIVE A (NO ACTION) VEGETATION (COMMON NATIVE, SPECIAL STATUS, RIPARIAN, WETLAND, NOXIOUS/INVASIVE)

7.4.5.1 Impacts Analysis

The No Action Alternative would allow the common native, riparian, and wetland communities to reestablish themselves and improve floodplain function along the Stehekin River from Car Wash

Falls to MP 15.3 (Table 21). A total of 3.5 acres would be revegetated, 2.5 acres in the 100-year floodplain. Most of the floodplain is rocky and supports a Riparian-Nutrient Poor community. There are small pockets of Riparian Nutrient-Rich and wetland communities, primarily at the confluence of perennial tributaries and the river. These riparian and wetland areas are high value wildlife habitat.

The old roadbed between MP 15.3 and Glory would continue to be used as a hiking and stock trail, and would be maintained at approximately half the area of the former road (6 feet vs. 12-foot wide); a 3.6 acre reduction in the amount of unvegetated road surface (Table 21). The common native plants growing on the sections of remaining road fill are pioneer species. These plants, and natural succession to Upland Mesic forest, would continue to colonize and stabilize the road fill, decrease soil compaction, and eventually recruit large woody debris to the Stehekin River.

The ½-mile section of the road between Glory and Cottonwood Camp that washed out in 1995 would not be reconstructed. Approximately 0.7 acres in the 100-year floodplain would revegetate naturally (Table 21).

The new ½-mile section of trail between Glory and Cottonwood Camp is outside of the 100-year floodplain. Construction of this section removed approximately 0.4 acres of upland vegetation above the 100-year floodplain in 1996 (Table 21).

The new Glory to Cottonwood Camp trail incorporated 2 miles of the old roadbed. This section would be maintained at approximately half the area of the road (6 feet vs. 12-foot wide), a 1.5-acre reduction in the surface area of unvegetated roadbed.

Noxious and invasive plants utilize trails, waterways, wind, and roads as dispersal mechanisms to colonize new areas. There are small pockets of diffuse knapweed along the Stehekin River and at the dispersed campsites. The road segments that washed out by the floods would cease to be avenues for proliferation and dispersal of knapweed and other noxious and invasive plant by vehicles, hikers, stock, bicycles, water transport, and road maintenance gravel. The long-term, beneficial affects that began with the 1995 and 2003 floods would continue.

The recreational use of the PCT would not change, so there would be no change in the noxious and invasive plant proliferation and dispersal within the project area. NPS would continue to control the small occurrences of noxious and invasive plants along the river, the road, and the PCT annually.

NPS surveyed the project area in the spring and summer of 2005, and did not identify any special status plants. If there were special status plants in the project area, implementation of the No Action Alternative would prevent future road-related impacts.

7.4.5.2 Cumulative Impacts

The 22.8-mile Stehekin Valley Road corridor has had a long-term, cumulative impact on the common native plant, riparian, and wetland communities within the lower Stehekin River Corridor. Approximately 50 acres of vegetation has been disturbed during road construction, repairs, or maintenance, or directly impacted by road filling over time (NPS 2005a).

The other Stehekin Valley Road projects, *Stehekin River Road Improvement* and *Coon Run* have or will affect another 13 acres of vegetation in the corridor within the reasonably foreseeable future (NPS 2005a; 2005b). These projects will also reclaim (scarify and revegetate) one acre of former roadbed, in addition to the approximately 8 acres of road that were reclaimed by the 1995 and 2003 floods or would be converted to trail in this project area (Table 21).

The Forest Fuels Reduction and hazard tree programs have also removed trees and other vegetation along the Stehekin Valley Road.

Campsites, designated trails, and social trails (e.g. trails pioneered by the public) have also removed vegetation and exposed tree roots in the project area. Roadways, parking areas, campsites, designated trails, social trails and other nutrient poor, xeric, and disturbed sites are ideal habitat for noxious and invasive plant seeds to germinate.

Road fill material and road maintenance gravel have contributed to the spread of noxious and invasive plants along the roadways. Road fill for new construction must come from certified weed-free sources outside Stehekin to mitigate this problem. Gravel for road maintenance comes from the Company Creek Pit in Stehekin which is a potential source of noxious and invasive plant seeds and propagules. Most of these plants are removed from the pit by NPS staff; however, seeds and propagules may be spread with the gravel. The No Action Alternative would discontinue road maintenance in the project area, which would reduce the risk of noxious weed introduction or proliferation.

The project area does not have established populations of noxious and invasive plants, although diffuse knapweed is present. NPS staff would continue to control the small occurrences of noxious and invasive plants along the river, the road, and the PCT annually.

7.4.5.3 Compliance with Laws and Policy

ESA. The No Action Alternative would have “No Effect” on ESA listed plants because there are no known individuals or populations in the project area.

NPS Management Policies 4.4.2.3, Management of Threatened and Endangered Plants and Animals. The No Action Alternative would meet the intent of NPS Management Policies 4.4.2.3 that requires the NPS to survey, protect, monitor, restore, and strive to recover all species listed, proposed, or candidates for listing under the ESA that are native to NPS units, and to manage, to the greatest extent possible, state, and locally endangered and threatened species as federally listed species.

NPS Policies 2001. The No Action Alternative would meet NPS policy to manage all components and processes of naturally evolving Park ecosystems including the natural abundance, diversity, and ecological integrity of plants communities.

7.4.5.4 Conclusions

The No Action Alternative would allow the common native, riparian, and wetland communities to reestablish themselves and improve floodplain function along the Stehekin River from Car Wash Falls to MP 15.3 and from Glory to Cottonwood Camp. There are small pockets of Riparian Nutrient-Rich and wetland communities, primarily at the confluence of perennial tributaries and the river. These riparian and wetland areas are high value wildlife habitat.

The pioneer plants and natural succession to Upland Mesic forest would continue to colonize and stabilize the road fill, decrease soil compaction, increase organic matter, and eventually recruit large woody debris to the Stehekin River.

NPS surveyed the project area in the spring and summer of 2005, and did not identify any special status plants. If special status plants were in the project area, implementation of the No Action Alternative would prevent future road-related affects.

The road segments that washed out by the floods would cease to be avenues for proliferation and dispersal of knapweed and other noxious and invasive plant by vehicles, hikers, stock, bicycles, water transport, and road maintenance gravel. The recreational use of the PCT would not change, so there would be no change in the plant communities, or noxious and invasive plant proliferation and dispersal within the project area. NPS staff would continue to control the small occurrences of noxious and invasive plants along the river, the road, and the PCT annually.

7.4.6 ALTERNATIVE A (NO ACTION) TERRESTRIAL AND AMPHIBIOUS WILDLIFE

7.4.6.1 Impacts Analysis

The No Action Alternative would not involve any active wildlife habitat rehabilitation; however, the natural reclamation of the Stehekin River floodplain initiated by the 1995 and 2003 floods would continue. The area of reclaimed floodplain would be approximately 4.4 acres (3 miles) between Car Wash Falls and Bridge Creek, and 2.2 acres (1.5 miles) between Glory and Cottonwood Camp.

The importance of riparian areas as wildlife habitat is inversely proportional to their total area in the east Cascades. Riparian areas are relatively narrow, linear features that follow creeks and rivers, and provide high quality habitat and travel corridors for terrestrial and amphibious wildlife. Many terrestrial animals make dawn and dusk migrations to water, and many amphibians and reptiles make seasonal reproductive migrations to the rivers and streams. Floodplain reclamation and riparian area recovery would have moderate, long-term beneficial affects for amphibious and terrestrial wildlife that utilize the Stehekin River corridor (river, floodplain, riparian areas) for all or part of their life cycle, or for seasonal or diurnal movements.

The natural reclamation of nearly 10 miles of road within the river corridor would be a minor to moderate, long-term, beneficial affect for common and special status terrestrial and amphibious wildlife that utilize the Stehekin River corridor for all or part of their life cycle, or for seasonal or diurnal movements, or have potential habitat in the project area (Table 7) because road-related mortality, noise, and human activity would not occur, and wilderness character would be enhanced.

Implementation of the No Action Alternative) would have “No Effect” on the ESA listed species that may occur in the project area (gray wolf, grizzly bear, Canada lynx, bald eagle, northern spotted owl) due to one or more of the following factors. Post-project, the No Action Alternative would provide minor, long-term beneficial affects for the ESA listed species because road-related mortality, noise, and human activity would not occur, and wilderness character would be enhanced within the Stehekin River corridor.

7.4.6.2 Cumulative Impacts

The 22.8-mile long Stehekin River Road has had long-term, major cumulative impacts on high value wildlife habitat in the Stehekin River corridor (i.e. floodplains, wetlands, and riparian areas). The No Action Alternative would allow the passive reclamation of 4.5 miles of floodplain and riparian habitat to continue. This reclamation would have long-term, moderately beneficial affects for all terrestrial and amphibious wildlife that utilize the area.

Roads that parallel waterways for long distances can result in significant wildlife mortality. The road-related wildlife mortality on the Stehekin Valley Road has been historically low due to low traffic levels and relatively slow travel speeds. However, road-related mortalities, particularly of smaller species like amphibians and reptiles making reproductive migrations from upland areas to water, and butterflies gathering near standing water on the roadbed, have occurred. Permanently

eliminating motorized access above Car Wash Falls (MP 12.9) would eliminate road-related mortality. This would be a negligible, long-term beneficial affect for all terrestrial and amphibious wildlife that utilize the area.

Construction, reconstruction, emergency road repairs and reroutes, motorized vehicles, routine road maintenance, and other human-related noise and activity that result in wildlife disturbance have been long-term, adverse cumulative impacts associated with the Stehekin Valley Road. At least two other major Stehekin Valley Road reconstruction projects have/will occur in 2005/2006, *Stehekin Valley Road Improvement* and *Coon Run* (5.2 and 2 miles, respectively) (NPS 2005a; 2005b). The No Action Alternative would reduce these cumulative impacts by permanently eliminating motorized access to the constricted river corridor upstream of Car Wash Falls (approximately 8.5 road miles).

7.4.6.3 Compliance with Laws and Policy

ESA. The No Action Alternative would have “No Effect” and would provide minor, long-term beneficial affects on the ESA listed species that use the project area or have potential habitat in the project area (gray wolf, grizzly bear, Canada lynx, bald eagle, northern spotted owl) because road-related mortality, noise, and human activity would not occur, and wilderness character would be enhanced within the Stehekin River corridor.

NPS Management Policies 4.4.2.3, Management of Threatened and Endangered Plants and Animals. The No Action Alternative would meet the intent of NPS Management Policies 4.4.2.3 that requires the NPS to survey, protect, monitor, restore, and strive to recover all ESA listed, proposed, or candidate species that are native to NPS units, and to manage, to the greatest extent possible, state, and locally endangered and threatened species as federally listed species.

7.4.6.4 Conclusions

The No Action Alternative would not involve any active rehabilitation, however, the natural reclamation of the roadbed and the Stehekin River floodplain initiated by the 1995 and 2003 floods would continue. The area of reclaimed floodplain would be approximately 4.4 acres (3 miles) between Car Wash Falls and Bridge Creek, and 0.7 acre (½-mile) between Glory and Cottonwood Camp.

The No Action Alternative would have “No Effect” and would provide minor, long-term beneficial affects on the ESA listed species that use the project area or have potential habitat in the project area (gray wolf, grizzly bear, Canada lynx, bald eagle, northern spotted owl) because road-related mortality, noise, and human activity would not occur, and wilderness character would be enhanced within the Stehekin River corridor.

Natural floodplain, riparian area, and 9.9 miles of road reclamation within the river corridor would have minor to moderate, long-term beneficial affects for common and special status terrestrial and amphibious wildlife that utilize the Stehekin River corridor for all or part of their life cycle, or for seasonal or diurnal movements, or have potential habitat in the project area.

7.4.7 ALTERNATIVE A (NO ACTION) VISITOR ACCESS, EXPERIENCE, AND PARK OPERATIONS

Visitor Access. The Park’s primary user groups include hikers, cyclists, and stock users who access the Park during the summer. Most cyclists are day users who rent bicycles and travel between Stehekin and High Bridge Historic District (MP 11.2). Since 2003, the road between Car Wash Falls and Glory has been accessible only to experienced cyclists who could carry their bicycles over

impassable sections. The road between Glory and Cottonwood Camp has been washed out since 1995. Therefore, permanently closing the road above Car Wash Falls to bicycles would have similar negligible, long-term adverse impacts for cyclists.

There would continue to be easy access for hikers, stock users, and cross-country skiers to the Wilderness and other park trails via the PCT. The majority of stock trips begin at the Stehekin Valley Ranch and follow the PCT, and there is no stock trailer parking above High Bridge Historic District (MP 11.2). That use would continue unchanged.

Hikers and cross-country skiers would still be able to park at Car Wash Falls or Tumwater Camp and access the PCT via the MP 12.7 spur trail (0.2 miles south of Car Wash Falls parking area) if they preferred. The primitive parking area and turnaround at Car Wash Falls would be enlarged to accommodate six vehicles as large as a 12-passenger shuttle van.

PCT hikers approaching Stehekin from the west (Seattle) side would not have the option of taking a shuttle from Bridge Creek (MP 15.9) to Stehekin as they did prior to October 2003. Hikers would potentially have to hike to Car Wash Falls or High Bridge to catch a shuttle to Stehekin, if the NPS or a permittee choose to operate a shuttle in the future.

Some local businesses have adjusted their operations to provide drop camp, meal, and hostel-style tent services at Bridge Creek for through-hikers since 2003. These new services would continue to increase access to the Wilderness trail system for some user groups under this alternative.

Visitors would not have vehicle or bicycle access to Dolly Varden, Shady, Bridge Creek, Park Creek, Flat Creek, Glory, or Cottonwood camps. Hikers could access Dolly Varden from the parking area at MP 12.9. Motorized recreation is not a primary use in the Stehekin area because there are very few private vehicles, owned by Stehekin residents, and visitors cannot bring vehicles into the area. Stehekin residents and visitors who want to ride the shuttle would be affected by the road closure at MP 12.9. The NPS estimates the shuttle served an average of 2,500 people annually, or approximately 7 percent of the total Stehekin area visitors. Shuttle service to High Bridge Historic District resumed in the fall of 2005 after the implementation of the *Coon Run* project. Shuttle service above Car Wash Falls has not been offered since 2003. Therefore, the No Action Alternative would have a relatively minor, long-term adverse impact.

Visitor Experience. The No Action Alternative would eliminate vehicle and bicycle use above Car Wash Falls, and increase the area with wilderness character, more suitable for use by experienced backcountry visitors. Bicycles would not be excluded from the old road but access would be difficult. Visitors who desire increased wilderness character would perceive these changes as major, long-term beneficial affects.

The individuals who would like continued motorized vehicle access to southern portions of the Wilderness would perceive implementation of the No Action Alternative as a moderate to major, long-term adverse impact.

Park Operations. NPS staff would not have motorized access above Car Wash Falls for emergency services such as search and rescue or fire suppression. This condition has been unchanged since the October 2003 flood, and most of these park operations are already provided by air support due to the large expanses of roadless and Wilderness areas. There may be less need for emergency services due to decreased day use in the area. Therefore, the loss of 10 miles of road (at the edge of the Wilderness) would probably be insignificant to these operations.

Motorized access for other park operations such as trail maintenance and noxious weed control would also end at Car Wash Falls. Park personnel would need to hike or pack stock longer distances to perform these services. At the same time, there would be less need for weed control over time because vehicles are a primary source of weed introduction and proliferation.

The area above Car Wash Falls would be unroaded and there would be no need for routine maintenance or emergency road repairs above MP 12.9.

7.4.7.1 Cumulative Impacts

There is no motorized access to the Stehekin area from outside locations, and there was a very small, closed road system in the Stehekin area (approximately 26 miles) prior to 1995. Of the total miles (pre-1995), 12 miles were within the Park. The No Action Alternative would permanently close 10 miles of flood-damaged road, or 83 percent of the original road miles within the Park. The road above Car Wash Falls has been closed since 2003; the road above Glory has been closed since 1995.

There are no other road closures planned within the Park or the Stehekin area within the reasonably foreseeable future.

7.4.7.2 Compliance with Laws and Policy

The Organic Act directs the NPS to promote and regulate the use of national parks to conserve resources for their enjoyment by existing and future generations. NPS Management Policies and DO #17 Tourism identify visitor use patterns. The Park's primary user groups include hikers, cyclists, and stock users who access the Park during the summer. The No Action Alternative would continue to provide bicyclist access to High Bridge Historic District, and Wilderness and PCT access to hikers and stock users. These are the most commonly used routes for these user groups.

The No Action Alternative would permanently eliminate motorized vehicle noise above Car Wash Falls, and meet DO #47 that requires the NPS to the fullest extent practicable "to protect, maintain, or restore natural soundscapes in a condition unimpaired by inappropriate or excessive noise sources".

This alternative would continue to maintain the Stephen Mather Wilderness for future use and enjoyment as Wilderness.

The No Action Alternative would also meet the intention of NPS Management Policies for park roads "to enhance the quality of a visit, while providing for safe and efficient travel, with minimal or no impacts on natural and cultural resources (9.2.1.1)."

7.4.7.3 Conclusions

The No Action Alternative would continue to provide cyclist access to High Bridge Historic District, and Wilderness and PCT access to hikers and stock users. These are the most commonly used routes for these user groups. This alternative would also provide adequate NPS operations access.

The post-2003 permittee services at Bridge Creek would continue to increase access to the Wilderness trail system for some user groups under this alternative.

This alternative would also maintain future opportunities for a shuttle service to Car Wash Falls.

The No Action Alternative would eliminate vehicle access above Car Wash Falls, and increase the area with wilderness character, more suitable for use by experienced backcountry visitors. Visitors

who desire increased wilderness character would perceive these changes as moderate to major, long-term beneficial affects.

The individuals who would like continued vehicle access to southern portions of the Wilderness would perceive implementation of the No Action Alternative as a moderate to major, long-term adverse impact.

The permanent loss of 10 miles of road (at the edge of the Wilderness) would probably be a negligible, long-term adverse impact to most Park Operations. The area above Car Wash Falls would be unroaded and there would be no need for routine maintenance or emergency road repairs above MP 12.9. This would be a major, long-term beneficial affect on Park Operations.

7.4.8 ALTERNATIVE A (NO ACTION) SOCIO-ECONOMICS

7.4.8.1 Impacts Analysis

The No Action Alternative would create long-term changes in the local economy, including the changes in visitor use patterns and permittee services that followed the 2003 flood. These changes would continue.

The No Action Alternative would not have any implementation costs; no rehabilitation costs; no administrative costs; and no future road maintenance or emergency road reconstruction costs (Table 1).

The NPS would not have ongoing costs for shuttle service above High Bridge Historic District (MP 11.2). This would be a significant savings because the NPS-run shuttle service is not cost effective to operate above High Bridge in terms of cost per user. The NPS estimates it costs \$25,000 per year to subsidize the shuttle service.

The NPS would have ongoing costs for routine hiking and stock trail maintenance.

Local Economy. Several Stehekin Valley and Lake Chelan businesses are tied to visitor use in the project area. Lake Chelan businesses provide transportation services to get visitors into Stehekin, and Stehekin businesses offer visitor services such as food, lodging, guided backpacking, bicycle rentals, and horseback tours.

Alternative A (No Action) would reduce access to the upper valley by closing the Stehekin Valley Road to vehicle and bicycle use at Car Wash Falls. This action would reduce shuttle bus use compared to pre-2003 conditions, although visitors may still have the option to ride the shuttle or bicycles as far as Car Wash Falls.

This reduction in motorized and mechanized use may be offset by an increase in drop camp services, guided backpacking, and horseback tours, since many visitors would want assistance in accessing the recreation resources of the upper valley. It is likely that visitors would seek those services; Stehekin visitors already have to rely on transportation services just to access the north end of Lake Chelan.

Maintenance Costs. The No Action Alternative A would not include any rehabilitation or maintenance of the Stehekin Valley Road above Car Wash Falls. Thus, the NPS road maintenance costs would be reduced by approximately \$14,296 per year (\$1,444 per mile x 9.9 miles). The NPS would also save by not having any future costs for road repair or reconstruction along these 9.9 miles. NPS costs for pre-2003 road reconstruction are not available, but historically the road repairs associated periodic flood damage above Car Wash Falls were very expensive.

The NPS would have ongoing costs for routine hiking and stock trail maintenance for the road converted to trail between MP 15.3 and Cottonwood Camp (MP 22.8) since the 1995 and 2003 floods. The NPS would probably incur increased maintenance costs (currently \$550 per mile x 7.5 miles) because crews would need to hike and/or pack stock to perform these duties above MP 12.9.

7.4.8.2 Cumulative Impacts

Stehekin Valley Road reconstruction restored motorized access as far as Car Wash Falls in the fall of 2005. This action reestablished the lower/mid-valley visitor access that existed prior to the 2003 flood. Therefore, there are no cumulative socio-economic impacts.

7.4.8.3 Compliance with Laws and Policy

This EA meets the NPS NEPA and DO #12 requirements to consider socio-economics in NEPA analysis.

7.4.8.4 Conclusions

The No Action Alternative would have moderate, long-term variable affects on socio-economics. Affects to local businesses would be either adverse or beneficial, depending on whether the businesses offered motorized or non-motorized services for visitors, or had adjusted their concessions to meet changing visitor needs since the flood of 2003.

This alternative would have a major, long-term beneficial affect on Park budgets because shuttle service would end at MP 11.2, and road maintenance and reconstruction would end at MP 12.9.

The NPS would probably incur minor increased weed control, and trail and facilities maintenance costs because crews would need to hike and/or pack stock above MP 12.9 to perform these duties.

7.4.9 ALTERNATIVE A (NO ACTION) WILDERNESS

7.4.9.1 Impacts Analysis

Wilderness Character. Approximately 71 percent of the roadbed between Car Wash Falls (MP 12.9) and MP 15.3 washed out in the 2003 flood. Twenty percent of the road above Glory (MP 20.1) washed out in 1995. Since that time, erosion and revegetation have given the entire 9.9-mile long road above Car Wash Falls a more natural appearance. The No Action Alternative does not include any rehabilitation of the existing roadbed, so some visual intrusions would remain within sight of the Wilderness. This would reduce scenic values and wilderness character along the Stehekin River until a future flood washes away the remaining culverts, fill material, riprap, concrete, and bolts.

Between October 2003 and the fall of 2005, there was no vehicle traffic above MP 9.5. During this time, the wilderness character increased because there was no noise, exhaust fumes, dust, or traffic in the non-Wilderness road corridor. The last major reconstruction was in 1996 after the 1995 100-year flood, and there has not been any road maintenance or emergency road repairs since the 2003 flood. The No Action Alternative would maintain these major, long-term, beneficial changes in wilderness character within the Stehekin River Valley above MP 12.9.

Wilderness Facilities. Motorized and mechanized access to the Wilderness would end at Car Wash Falls. As a result, visitors would no longer have motorized or mechanized access to Shady, Bridge Creek, Park Creek, Flat Creek, Glory, or Cottonwood camps, or to upper valley trails. Hikers and stock users could still access these camps and the Wilderness from the PCT, the Stehekin Valley

Road between MP 15.3 and Glory, and the Glory to Cottonwood Camp trail. Dolly Varden Camp would be easily accessible from the MP 12.9 parking area (Appendix A2). However, permanently closing the road above MP 12.9 would reduce visitor access to and views of the river.

The single tent site at Shady Camp would remain difficult for hikers to access because sections of the road were completely washed out on either side of the camp in 2003, and there is no alternative trail to the camp. It is probable that the remaining tent site at Dolly Varden Camp will be washed away during a future flood.

Wilderness Designation. The No Action Alternative would maintain increased wilderness character that has been developing since October 2003. This alternative would not preclude the option to designate the 9.9-mile long (120 acre) non-Wilderness road corridor between Car Wash Falls and Cottonwood Camp as Wilderness through future congressional legislation.

7.4.9.2 Cumulative Impacts

There are no expected cumulative impacts that would affect the Wilderness in the project area.

7.4.9.3 Compliance with Laws and Policy

Alternative A (No Action) would continue to maintain the Stephen Mather Wilderness for future use and enjoyment as wilderness.

7.4.9.4 Conclusions

The No Action Alternative would increase the area with wilderness character, more suitable for experienced backcountry visitors. This alternative would not preclude the option to designate the 9.9-mile long (120 acre) non-Wilderness road corridor between Car Wash Falls and Cottonwood Camp as Wilderness through future congressional legislation.

Visitors who desire increased wilderness character including solitude, primitiveness, naturalness, and remoteness would perceive the No Action Alternative as a major, long-term beneficial affect.

7.4.10 ALTERNATIVE A (NO ACTION) PACIFIC CREST TRAIL

Allowing the Stehekin Valley Road to continue closing itself between Car Wash Falls and MP 15.3 through natural processes of erosion, revegetation, and mass wasting (No Action) would have the following affects to the PCT access, trail condition, backcountry campsite availability, and visitor use.

7.4.10.1 Impacts Analysis

Visitor Access to the PCT. Prior to the 1995 flood, motorized access was available to the PCT trailhead at Bridge Creek (MP 15.9). After the 1996 road reconstruction and before the October 2003 flood, motorized access to Bridge Creek was restored. Between October 2003 and the fall of 2005, motorized access ended at MP 9.5 near Stehekin Valley Ranch. The *Coon Run Project*, completed in the fall of 2005, restored vehicle access to Car Wash Falls (MP 12.9).

Hikers would walk the road 0.2 miles south to access the PCT via the MP 12.7 spur trail from the Car Wash Falls parking area. The majority of stock trips would still originate at the Stehekin Valley Ranch, and there would be no stock trailer parking above High Bridge (MP 11.2).

PCT hikers approaching Stehekin from west (Seattle) side would not have the option of taking a shuttle from Bridge Creek (MP 15.9) to Stehekin. Hikers may have the option of taking a shuttle

from the Car Wash Falls parking area or from High Bridge to Stehekin. NPS shuttle service to High Bridge resumed in the fall of 2005, after completion of the *Coon Run Project*.

Local businesses have adjusted their operations since 2003 and provided increased drop camp services to Bridge Creek Camp to accommodate through-hikers. Other permittee services at Bridge Creek include meal service and hostel-style cabin tents.

PCT Condition. The majority of hikers and stock users used the PCT (rather than the road) prior to 2003, and use patterns have not changed since 2003. The NPS would continue to maintain the trail to allow this ongoing level of use. Therefore, the No Action Alternative would not have any effect on the condition of the PCT.

Backcountry Campsite Availability. There would be no change in the number of backcountry campsites available for PCT users. The single tent site at Shady Camp would remain difficult for hikers to access because the road is washed out in either direction (e.g. the washout at Car Wash Falls or the landslide at MP 15) and there is no alternative trail to the camp. This site does not have stock facilities.

Dolly Varden Camp (MP 13) on the Stehekin River and was heavily impacted during the 2003 flood, and future floods could wash away the one remaining tent site. This would have a negligible effect on PCT users, since there are other camps in closer proximity to the PCT (Figure 1).

Visitor Use. Day trip hiking along the PCT north of Bridge Creek may decrease slightly, since few day hikers would hike beyond Bridge Creek (MP 15.9) from the Car Wash Falls parking area (MP 12.9). However, this potential change in use would be negligible.

There may be fewer through-hikers over Cascade Pass from Highway 20 on the west (Seattle) side of the Park because the shuttle service into Stehekin would not be available from Bridge Creek. The permittee services at Bridge Creek and Cottonwood camp may compensate for the loss of shuttle services, and any change is expected to be negligible.

7.4.10.2 Cumulative Impacts

There are no expected cumulative impacts that would affect the PCT near the project area.

7.4.10.3 Compliance with Laws and Policy

In accordance with the National Trail Systems Act of 1968, the PCT must be maintained as "...an extended trail so located as to provide for maximum outdoor recreation potential and for the conservation and enjoyment of the nationally significant scenic, historic, natural, or cultural qualities for the areas through which such trails may pass." Although the No Action Alternative would affect motorized access to the PCT at Bridge Creek, it would not affect the trail itself or its potential to offer outdoor recreation potential for other user groups (hikers and stock users).

7.4.10.4 Conclusions

The No Action Alternative would have no direct effect on the PCT, and only a negligible effect on PCT use and backcountry campsite availability. There would be a minor to moderate, long-term adverse impact on facilities used in conjunction with the PCT because Shady Camp would be difficult to access, and there would be a loss of motorized access and shuttle service to the PCT trailhead at Bridge Creek. The new permittee services at Bridge Creek may compensate for the loss of motorized access, as they have since October 2003.

7.4.11 ALTERNATIVE A (NO ACTION) WILD AND SCENIC RIVERS

7.4.11.1 Impacts Analysis

Free-flowing Character. The No Action Alternative would improve the free-flowing character of the Stehekin River to a moderate extent over the long-term. Prior floods have already washed away some of the riprap along the riverbank. Future flooding is likely to continue to wash away some of the remaining riprap and road fill, allowing the river to choose its natural course and flow unimpeded.

Classification. According to guidelines for WSR eligibility, classification, and management (FR 1982), river areas classified as Scenic have "... shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by road". When NPS completed its WSR Eligibility Study of the Stehekin River in 2002, Segment 2 (High Bridge to Cottonwood Camp) was classified as a Scenic River. At that time, the Stehekin Valley Road followed most of Segment 2, and there were camps at Tumwater, Dolly Varden, Shady, Bridge Creek, Park Creek, Flat Creek, Glory, and Cottonwood. The No Action Alternative would not affect the Scenic WSR classification of Segment 2 because most of these features would remain in their original or modified form, including the following:

- The Stehekin Valley Road would still follow the river from High Bridge Historic District to Car Wash Falls;
- The remaining road fill between Car Wash Falls and Bridge Creek would not be removed; and
- The road between Bridge Creek and Glory would be converted to a trail but none of the road fill would be removed.

This combination of factors would continue to make a Scenic classification appropriate for Segment 2, even though implementation of the No Action Alternative would continue to improve the Scenic quality of the river over time.

Outstandingly Remarkable Values. Alternative A (No Action) would have varying affects on the ORVs within the project area over the long-term. Fisheries, wildlife, and scenic resources, and the attraction of the river for recreational purposes would gradually improve to a minor extent as the Stehekin Valley Road area attains a more wilderness character (see Alternative A analyses of fisheries, wildlife, visual, and Wilderness resources).

Alternative A would have no effect on the project area's prehistoric resources, historic resources, or geologic ORVs.

7.4.11.2 Cumulative Impacts

The road construction work proposed at Wilson Creek, in Segment 1 downstream of the project area, would result in long-term, moderate adverse impacts to the free-flowing characteristics of the Stehekin River (NPS 2005a). This project is also expected to have negligible to minor adverse impacts on some of the ORVs along Segment 1.

The No Action Alternative would have long-term, moderate beneficial affects to the river's free-flowing character in Segment 2, and minor, long-term beneficial affects to several ORVs. The beneficial affects would help offset the adverse impacts to free-flowing character and ORVs from the other Stehekin Valley Road projects in Segment 1 (NPS 2005a; 2005b).

7.4.11.3 Compliance with Laws and Policy

The No Action Alternative would protect the free-flowing condition and ORVs along Segment 2 of the Stehekin River. This river segment would continue to qualify for inclusion in the National WSR system under a Scenic classification.

7.4.11.4 Conclusions

The No Action Alternative would have minor, long-term beneficial affects to the Stehekin River's WSR status. It would improve the river's free-flowing character and ORVs in the project area (Segment 2), and help offset anticipated minor to negligible adverse impacts to WSR values in Segment 1.

7.4.12 ALTERNATIVE A (NO ACTION) AIR QUALITY

7.4.12.1 Impacts Analysis

Vehicle use has been historically low above Car Wash Falls, and the highest level of air quality affects have been associated with periodic road reconstruction. All the motorized use and the associated air quality affects are typically concentrated during the summer/fall, which is the peak visitor and construction season. Permanently closing the road to motorized use above Car Wash Falls would have minor to moderate, long-term beneficial affects on air quality because there would be no dust or gasoline and diesel exhaust generated by privately owned, Park, or shuttle vehicles, routine road maintenance, or road reconstruction between MP 12.9 and MP 22.8.

Some negligible air quality affects would continue to occur throughout the project area from non-motorized visitor use (campfire smoke), stock use (dust), and trail maintenance activities (dust).

7.4.12.2 Cumulative Impacts

The No Action Alternative would have minor to moderate, beneficial cumulative impacts on air quality near the Stehekin River above Car Wash Falls, compared to pre-2003 conditions.

7.4.12.3 Compliance with Laws and Policy

The project area would continue to attain all ambient air quality standards and meet management criteria for a Class I airshed.

7.4.12.4 Conclusions

The No Action Alternative would improve air quality in the vicinity of the river above Car Wash Falls during the peak visitor seasons because there would be no dust or gasoline and diesel exhaust generated by privately-owned, Park, or shuttle vehicles, routine road maintenance, or road reconstruction between MP 12.9 and MP 22.8.

Some negligible air quality affects would continue to occur throughout the project area from non-motorized visitor use (campfire smoke), stock use (dust), and trail maintenance activities (dust). Overall, the air quality in this Class I airshed would be improved.

7.4.13 ALTERNATIVE A (NO ACTION) COMPLIANCE WITH THE LAKE CHELAN NRA GMP (NPS 2001)

The No Action Alternative would *meet* the following direction from the LACH GMP.

“Preserve or restore ecological processes and conditions in wetland, floodplain, shoreline, and riparian areas.”

“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.”

The No Action Alternative would *partially meet* the following direction from the LACH GMP. It would not fully meet the stated direction because developments would not be removed or restored to natural conditions through active rehabilitation measures.

“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.”

“The NPS would not manipulate the Stehekin River to protect federal property except roads and bridges subject 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) the actions will have less affects than other alternatives, and 4) the actions are permitted by the county, state, and other federal agencies. No new road construction will be proposed in the active river erosion zone. Previously manipulated sites that do not meet the above criteria for future manipulation would be restored to approximate natural conditions.”

“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 No Action Alternative would *not meet* the following direction from the GMP, because the Stehekin Valley Road would not be maintained for private vehicle use to Bridge Creek or shuttle service to Cottonwood Camp. In addition, only experienced hikers would be able to use the road between Car Wash Falls and Bridge Creek.

“Recreational access for visitors with disabilities would be enhanced.”

“...a heavy duty, high clearance shuttle vehicle road would be maintained between High Bridge and Cottonwood Camp.”

“Public shuttle service would be provided from the Landing to Cottonwood Camp. Only the public shuttle service, hikers, horses, and bicycles would be allowed to use the road from Bridge Creek to Cottonwood Camp.”

“Private vehicle use from High Bridge to Bridge Creek would be allowed ...”

7.4.14 ALTERNATIVE A (NO ACTION) IMPAIRMENT OF PARK RESOURCES OR VALUES

The No Action Alternative would *not impair* the following Park resources or values within the project area: soils, water quality, hydrology, channel morphology, floodplains, fisheries, aquatic habitat, vegetation, terrestrial and amphibious wildlife, visitor experience and access, socio-economics, Wilderness, PCT, and air quality.

7.5 Alternative B (Preferred Alternative). Permanently Close the Stehekin Valley Road Above Car Wash Falls

The Preferred Alternative would result in the same road closures, trail reroutes, and total acres reclaimed as the No Action Alternative (Figure 1; Table 21). In addition, the Car Wash Falls parking area would be enlarged, a 0.1-mile long spur trail would be built between the PCT and Shady Camp, and there would be some active road reclamation between Car Wash Falls and MP 15.3.

The Preferred Alternative would *officially* remove the Stehekin Valley Road above Car Wash Falls from the NPS road system and designate a non-motorized, non-mechanized trail above MP 15.3 to Cottonwood Camp in the NPS trail system. The No Action Alternative does not officially make these changes in the NPS road and trail systems.

7.5.1 ALTERNATIVE B (PREFERRED ALTERNATIVE) SOILS

7.5.1.1 Impacts Analysis

Approximately 1.9 miles (26 percent) of the Stehekin Valley Road above Car Wash Falls washed out in 2003 (Table 21). Specifically, 1.6 miles between MP 12.9 and MP 14.5; 0.1 mile at the MP 15 landslide; 0.1 mile between MP 17.4 and MP 17.5; and 0.1 mile at Glory (MP 20.1). Another ½-mile of road between Glory and Cottonwood Camp washed out in 1995.

Car Wash Falls to MP 15.3. Approximately 1.7 miles (71 percent) of the 2.4-mile long road between Car Wash Falls and MP 15.3 washed out in the 2003 flood (Table 21). This section of the road would continue to deteriorate through erosion, washouts, and landsliding; would naturally revegetate; and the landslide at MP 15 would continue to grow until it eventually reaches a stable angle of repose. The periodic flood damage, erosion, emergency road repairs, reroutes, and the floodplain/riparian area filling associated with the previous road would permanently cease. These changes would stabilize the fill, increase organic matter and soil infiltration, and reduce compaction and erosion on the remaining roadbed (~0.7 miles, 1 acre).

The Preferred Alternative would also officially remove this section of the road from the NPS road and trail system, and remove the culverts between MP 12.9 and 15.3 to prevent future blowouts/erosion. As a result, this alternative would provide more long-term soil benefits than the No Action Alternative.

MP 15.3 to Glory (MP 20.1). The 2003 flood caused relatively minor damage to this 5-mile long section, but the road has been inaccessible to motorized or mechanized use since 2003. Hikers and stock users could continue to access this section of the road from the PCT, and the 12-foot wide roadbed would be maintained as a 6-foot wide trail as it has been since 2003 (Table 21). The rest of the roadbed (~3.6 acres) would revegetate naturally. These changes would produce moderate, long-term beneficial affects.

Glory to Cottonwood Camp (MP 20.1 to MP 22.8). There would be no road reconstruction between Glory and Cottonwood Camp. Monitoring of the old roadway between Glory and Cottonwood Camp as called for in the 1997 EA would cease. There would be no further consideration of reestablishing the road through this area. Hikers and stock users could continue to use the existing trail between Glory and Cottonwood Camp that has been in use since the 1995 flood. The trail is approximately 2.5 miles long and 6-foot wide (~2.2 acres), and incorporates approximately 2 miles of the former roadbed. Routine trail maintenance would continue. Therefore,

there would be no net change in soils condition since floods closed this section of the road to vehicle and bicycle use in 1995. In the long-term, these would be major beneficial affects.

PCT. Since the October 2003 flood, the small amount of foot and stock traffic on the Stehekin Valley Road has been rerouted to the PCT at MP 12.7. The majority of this traffic used the PCT prior to the flood, so any post-2003 affects would be negligible, and would be limited to approximately 3 miles (2.2 acres). This is approximately 0.1 percent of the 2,655 mile-long PCT.

7.5.1.2 Cumulative Impacts

The cumulative impacts of past and reasonably foreseeable actions would be the same as the No Action Alternative (Table 22).

7.5.1.3 Compliance with Laws and Policy

The Preferred Alternative would meet NPS policy to minimize potentially irreversible impacts on soils (Table 12).

7.5.1.4 Conclusions

Approximately 1.7 miles (71 percent) of the 2.4-mile long road between Car Wash Falls and MP 15.3 washed out in the 2003 flood (Table 21). This section of the road would continue to deteriorate through erosion, washouts, and landsliding; would naturally revegetate; and the landslide at MP 15 would continue to grow until it eventually reaches a stable angle of repose. The periodic flood damage, erosion, emergency road repairs, reroutes, and the floodplain/riparian area filling associated with the previous road would permanently cease. These changes would stabilize the fill, increase organic matter and soil infiltration, and reduce compaction and erosion on the remaining roadbed (~0.7 miles, 1 acre) over time.

The Preferred Alternative would officially remove this section of the road from the NPS road and trail system, and remove the culverts between MP 12.9 and 15.3 to provide more long-term beneficial affects than the No Action Alternative.

Hikers and stock users would continue to access the road from the PCT at MP 15.3. The 12-foot wide roadbed from MP 15.3 to Glory would be maintained as a 6-foot wide trail as it has been since 2003. The rest of the roadbed (~3.6 acres) would revegetate naturally. These changes would produce long-term moderate, beneficial affects.

Hikers and stock users could continue to use the trail between Glory and Cottonwood Camp that was built after the 1995 flood. The trail is approximately 2.5 miles long and 6-feet wide (~2.2 acres), and incorporates approximately 2 miles of the former roadbed. Routine trail maintenance would continue. Therefore, there would be no net change in soil affects since floods closed this section of the road to vehicle and bicycle use in 1995. In the long-term, these would be major beneficial affects.

Since the October 2003 flood, the small amount of foot and stock traffic on the Stehekin Valley Road has been rerouted to the PCT at MP 12.7. The majority of this traffic used the PCT prior to the flood, so any post-2003 affects would be negligible, and would be limited to approximately 3 miles (2.2 acres).

7.5.2 ALTERNATIVE B (PREFERRED ALTERNATIVE) HYDROLOGY, CHANNEL MORPHOLOGY, FLOODPLAINS

7.5.2.1 Impacts Analysis

The 1995 and 2003 floods reclaimed Stehekin River channel capacity, floodplain connectivity, and increased meander length by scouring out road fill in the 100-year and 500-year floodplains. The Preferred Alternative would continue the natural reclamation process and remove debris and unneeded culverts. The road would be officially removed from the NPS road and trail system.

Car Wash Falls to MP 15.3. Most of this 2.4-mile long, 3.5 acre section of the road (1.7 miles, 2.5 acres) washed out in the 2003 500-year flood (Table 21). This section also suffered damage in the 1995 100-year flood because the road constricted and controlled the channel, decreased floodplain capacity, and increased the velocity of flood flows. Material eroded out of the riverbanks and roadbed was deposited in low gradient reaches, floodplains, and riparian areas downstream. The deposition resulted in adverse changes in the hydrology, channel morphology, and capacity of these important areas.

The remaining roadbed is fragmented and revegetating naturally. The vegetation will help stabilize the remaining road fill and increase sediment filtering and soil infiltration.

This section would be officially closed and would continue to deteriorate through erosion, landsliding, and revegetation. Culvert removal would provide more long-term water quality protection than the No Action Alternative.

MP 15.3 to Cottonwood Camp. This 7.5-mile long section is essentially intact and has been maintained as a 6-foot wide non-motorized, non-mechanized trail since 2003 (Figure 1; Table 21). Routine trail maintenance would continue, and the rest of the 12-foot wide roadbed (3.6 acres) would revegetate naturally.

Glory to Cottonwood Camp (MP 20.1 to MP 22.8). Approximately ½-mile (0.7 acres) of road between MP 20.3 and 20.8 washed out in the 1995 100-year flood (Figure 1; Table 21). The NPS built a non-motorized, non-mechanized trail above the 100-year floodplain to circumvent this section. The new trail connects to 2 miles of the former roadbed. This section has been maintained as a 6-foot wide trail since 1995; the rest of the 12-foot wide roadbed (1.5 acres) and is revegetating naturally.

The Preferred Alternative would eliminate the periodic flood damage, erosion, emergency road repairs, and road reroutes associated with the former road above Car Wash Falls (9.9 miles, 14.3 acres). These changes would reduce the river's bedload (i.e. road fill); improve sediment transport; and eliminate floodplain filling and channel morphology changes over time.

Maintaining the ongoing processes and management changes that began with the 1995 and 2003 floods, the official road closure, and the culvert removal in this alternative would have major, long-term beneficial affects to hydrology, channel morphology, and floodplain function of the Stehekin River.

7.5.2.2 Cumulative Impacts

The cumulative impacts of the Preferred Alternative would be the same as the No Action Alternative with the exception of the official road closure above MP 12.9 and culvert removal between MP 12.9 and 15.3. These actions would increase the cumulative benefits of this alternative compared to the No Action Alternative over time.

7.5.2.3 Compliance with Laws and Policy

The Preferred Alternative would meet NPS policies to minimize potentially irreversible impacts on hydrology, channel morphology, and floodplains (Table 12).

7.5.2.4 Conclusions

The 1995 and 2003 floods reclaimed Stehekin River channel capacity, floodplain connectivity, and increased meander length by scouring out 2.5 miles (3.4 acres) of road fill in the 100-year floodplain (Table 21). The Preferred Alternative would maintain these changes and continue reclamation through natural processes (same as the No Action Alternative), and would officially close the road and remove the culverts between MP 12.9 and 15.3 to provide more long-term beneficial affects than the No Action Alternative.

Revegetation of the former roadbed would increase sediment filtering and soil infiltration over time. Periodic flood damage would cease, eliminating the sediment transport, floodplain filling, and the channel morphology changes associated with erosion of the former road. These would be major, long-term beneficial cumulative impacts.

The landslide at MP 15 would continue to enlarge until it reaches an angle of repose and the channel widens its meander bend at this location. These processes would add large quantities of sediment to the river over time and cause bar building and/or floodplain deposition in lower gradient areas downstream, resulting in a moderate, long-term cumulative effect on the river's floodplains and sediment transport capability.

7.5.3 ALTERNATIVE B (PREFERRED ALTERNATIVE) WATER QUALITY

Permanently closing the road above Car Wash Falls (MP 12.9), and converting the 12-foot wide roadbed to a 6-foot wide trail between MP 15.3 and Cottonwood Camp (MP 22.8) would have major, long-term beneficial water quality affects because periodic flood damage, road maintenance, and emergency road reconstruction would cease. The remaining road culverts between Car Wash Falls and MP 15.3 would be removed to prevent plugging and blowouts.

The Preferred Alternative does not include any active rehabilitation of the landslide at MP 15. The landslide would continue to enlarge until it reaches an angle of repose and the meander bend widens at this location. These processes would add large quantities of sediment to the river over time, and create a moderate, relatively long-term adverse effect on water quality.

7.5.3.1 Cumulative Impacts

The Preferred Alternative in combination with these other Stehekin Valley Road projects would result in major, long-term cumulative improvements to water quality in the lower Stehekin River (see Soils: Cumulative Impacts, Section 7.4.1.2).

7.5.3.2 Compliance with Laws and Policy

The Preferred Alternative would: 1) improve water quality, 2) maintain the Stehekin River's Category I status, and 3) not contribute to future listing for sediment or turbidity under Section 303(d) of the CWA.

7.5.3.3 Conclusions

The Preferred Alternative would have major, long-term beneficial affects to Stehekin River water quality because the natural reclamation begun in 1995 and 2003 would continue, and periodic flood damage, road maintenance, and emergency road reconstruction would cease.

Removing the culverts between Car Wash Falls and MP 15.3 would provide more long-term water quality protection than the No Action Alternative.

The landslide at MP 15 would continue to enlarge until it reaches an angle of repose and the channel widens its meander bend at this location. These combined processes would add large quantities of sediment to the river over time, creating a relatively long-term moderately adverse impact.

7.5.4 ALTERNATIVE B (PREFERRED ALTERNATIVE) FISHERIES AND AQUATIC HABITAT

7.5.4.1 Impacts Analysis

The project-related fisheries and aquatic habitat affects are interdependent on the preceding road-related impacts analysis of soils (Section 7.4.1.1), hydrology, channel morphology, floodplains (Section 7.4.2.1), and water quality (Section 7.4.3.1). The Preferred Alternative would have major, long-term beneficial affects on fisheries and aquatic habitat by permanently reducing road-related turbidity and sediment.

Removing the culverts between Car Wash Falls and MP 15.3 would also eliminate any possible fish passage problems and the possibility of future blowouts and road fill erosion. Therefore, the Preferred Alternative would have more beneficial affects than the No Action Alternative.

7.5.4.2 Cumulative Impacts

The Stehekin River Watershed is glaciated and has naturally high levels of sediment that affect fisheries and aquatic habitat. The Preferred Alternative would have moderate to major, long-term beneficial affects on fisheries and aquatic habitat by permanently eliminating the road-related sources of turbidity, sediment, and scour and filling that are cumulative habitat impacts (see Cumulative Impacts, Soils: Section 7.4.1.2; Hydrology, Channel Morphology, Floodplains: Section 7.4.2.2; and Water Quality: Section 7.4.3.2).

7.5.4.3 Compliance with Laws and Policy

ESA. The Preferred Alternative would have “No Effect” or would be a major, long-term beneficial affect for Columbia River bull trout if they were present in the Stehekin River Watershed. There is no proposed or designated bull trout critical habitat on the east side of the Cascades.

NPS Management Policies 4.4.2.3, Management of Threatened and Endangered Plants and Animals. The Preferred Alternative would also meet the intent of NPS Management Policies 4.4.2.3 that requires the NPS to survey, protect, monitor, restore, and strive to recover all species listed, proposed, or candidates for listing under the ESA that are native to NPS units, and to manage, to the greatest extent possible, state, and locally endangered and threatened species as federally listed species.

7.5.4.4 Conclusions

The Preferred Alternative would have major, long-term beneficial affects on fisheries and aquatic habitat by permanently reducing road-related turbidity and sediment, the same as the No Action

Alternative. Removing the culverts between Car Wash Falls and MP 15.3 would eliminate any possibility of fish passage problems, plugging, and future blowouts.

The Preferred Alternative would have “No Effect” or would be a long-term beneficial affect for Columbia River bull trout if they were present in the Stehekin River Watershed. There is no proposed or designated bull trout critical habitat on the east side of the Cascades.

This alternative would not contribute to future listing of westslope cutthroat trout or their essential habitat, the same as the No Action Alternative.

7.5.5 ALTERNATIVE B (PREFERRED ALTERNATIVE) VEGETATION (COMMON NATIVE, SPECIAL STATUS, RIPARIAN, WETLAND, NOXIOUS/INVASIVE)

7.5.5.1 Impacts Analysis

The Preferred Alternative would have the same long-term, beneficial affects for common native plants, and riparian and wetland communities within the Stehekin River corridor as the No Action Alternative. The Preferred Alternative would allow the common native, riparian, and wetland communities to reestablish themselves and improve floodplain function along the Stehekin River from Car Wash Falls to MP 15.3 (Table 21). Over time, 3.5 acres would be revegetated, 2.5 acres within the 100-year floodplain. Most of the floodplain is rocky and supports a Riparian-Nutrient Poor community. There are small pockets of Riparian Nutrient-Rich and wetland communities, primarily at the confluence of perennial tributaries and the river. These riparian and wetland areas are high value wildlife habitat.

The old roadbed between MP 15.3 and Glory would continue to be used as a hiker and stock trail, and would be maintained at approximately half the area of the former road (6 feet vs. 12-feet wide); a 3.6 acre reduction in the amount of unvegetated road surface (Table 21). The common native plants growing on the sections of remaining road fill are pioneer species. These plants, and natural succession to Upland Mesic forest, would continue to colonize and stabilize the road fill, decrease soil compaction, and eventually recruit large woody debris to the Stehekin River.

A ½-mile section in the 100-year floodplain between Glory and Cottonwood Camp washed out in 1995 (~0.7 acres of riparian vegetation) and would continue to revegetate naturally (Table 21). The new trail that replaced this section removed approximately 0.4 acres of upland vegetation above the 100-year floodplain in 1996 (Table 21).

The new Glory to Cottonwood Camp trail incorporated 2 miles of the old roadbed. This section would be maintained at approximately half the area of the road (6 feet vs. 12-feet wide), a 1.5-acre reduction in the surface of the unvegetated roadbed.

NPS has not identified any special status plants in the project area; however, implementation of the Preferred Alternative would prevent future road-related affects if sensitive species were present.

The road segments that washed out by the floods would cease to be avenues for proliferation and dispersal of knapweed and other noxious and invasive plants by vehicles, hikers, stock, bicycles, water transport, and road maintenance gravel.

The recreational use of the PCT would not change, so there would be no change in the plant communities, or noxious and invasive plant proliferation and dispersal within the project area. The NPS would continue to control the small occurrences of noxious and invasive plants along the river, the road, and the PCT annually.

7.5.5.2 Cumulative Impacts

The Preferred Alternative would result in the same reduction of cumulative impacts as the No Action Alternative.

7.5.5.3 Compliance with Laws and Policy

ESA. The Preferred Alternative would have “No Effect” on ESA listed plants because there are no known individuals or populations in the project area.

NPS Management Policies 4.4.2.3, Management of Threatened and Endangered Plants and Animals. The Preferred Alternative would meet the intent of NPS Management Policies 4.4.2.3 that requires the NPS to survey, protect, monitor, restore, and strive to recover all species listed, proposed, or candidates for listing under the ESA that are native to NPS units, and to manage, to the greatest extent possible, state, and locally endangered and threatened species as federally listed species.

NPS Policies 2001. The Preferred Alternative would meet NPS policy to manage all components and processes of naturally evolving Park ecosystems including the natural abundance, diversity, and ecological integrity of plants communities.

7.5.5.4 Conclusions

The Preferred Alternative would allow the common native, riparian, and wetland communities to reestablish themselves and improve floodplain function along the Stehekin River from Car Wash Falls to MP 15.3 and from Glory to Cottonwood Camp, the same as the No Action Alternative. Most of the floodplain is rocky and supports a Riparian-Nutrient Poor community. There are small pockets of Riparian Nutrient-Rich and wetland communities, primarily at the confluence of perennial tributaries and the river. These riparian and wetland areas are high value wildlife habitat.

The pioneer plants and natural succession to Upland Mesic forest would continue to colonize and stabilize the road fill, decrease soil compaction, increase organic matter, and eventually recruit large woody debris to the Stehekin River.

Park staff surveyed the project area in the spring and summer of 2005, and did not identify any special status plants. If special status plants were in the project area, implementation of the Preferred Alternative would prevent future road-related impacts.

The road segments that washed out by the floods would cease to be avenues for proliferation and dispersal of knapweed and other noxious and invasive plant by vehicles, hikers, stock, bicycles, water transport, and road maintenance gravel, the same as the No Action Alternative. The recreational use of the PCT would not change, so there would be no change in the plant communities, or noxious and invasive plant proliferation and dispersal within the project area. NPS staff would continue to control the small occurrences of noxious and invasive plants along the river, the road, and the PCT annually.

7.5.6 ALTERNATIVE B (PREFERRED ALTERNATIVE) TERRESTRIAL AND AMPHIBIOUS WILDLIFE

7.5.6.1 Impacts Analysis

Implementation of the Preferred Alternative (culvert removal and debris removal, parking area improvements) would have “No Effect” on the ESA listed species that may occur in the project area

(gray wolf, grizzly bear, Canada lynx, bald eagle, northern spotted owl) due to one or more of the following factors: 1) short implementation time, 2) lack of current occupancy, 3) proposed mitigations, 4) the availability of high quality, extensive foraging, denning, and/or nesting habitat and travel corridors outside the action area, and/or 5) lack of suitable foraging and nesting habitat in the action area.

Post-project, the Preferred Alternative would provide minor, long-term beneficial affects for the ESA listed species because road-related mortality, noise, and human activity would not occur, and wilderness character would be enhanced within the Stehekin River corridor.

The Preferred Alternative would have the same minor to minor to moderate, long-term beneficial affects for the common and special status amphibious and terrestrial wildlife that utilize the Stehekin River corridor for all or part of their life cycle, or for seasonal or diurnal movements, or have potential habitat in the project area as the No Action Alternative.

7.5.6.2 Cumulative Impacts

The Preferred Alternative would result in the same decrease in cumulative impacts as the No Action Alternative.

7.5.6.3 Compliance with Laws and Policy

ESA. The Preferred Alternative would have “No Effect” on the ESA listed species that use the project area or have potential habitat in the project area (gray wolf, grizzly bear, Canada lynx, bald eagle, northern spotted owl) due to one or more of the following factors: 1) short implementation time, 2) lack of current occupancy, 3) proposed mitigations, 4) the availability of high quality, extensive foraging, denning, and/or nesting habitat and travel corridors outside the action area, and/or 5) lack of suitable foraging and nesting habitat in the action area.

Post-project, the Preferred Alternative would provide minor, long-term beneficial affects for the ESA listed species because road-related mortality, noise, and human activity would not occur, and wilderness character would be enhanced within the Stehekin River corridor.

NPS Management Policies 4.4.2.3, Management of Threatened and Endangered Plants and Animals. The Preferred Alternative would meet the intent of NPS Management Policies 4.4.2.3 that requires the NPS to survey, protect, monitor, restore, and strive to recover all ESA listed, proposed, or candidate species that are native to NPS units, and to manage, to the greatest extent possible, state, and locally endangered and threatened species as federally listed species.

7.5.6.4 Conclusions

The Preferred Alternative would allow natural reclamation of the roadbed and the Stehekin River floodplain initiated by the 1995 and 2003 floods to continue, the same as the No Action Alternative. The area of reclaimed floodplain would be approximately 4.4 acres between Car Wash Falls and Bridge Creek, and 0.7 acre between Glory and Cottonwood Camp.

The Preferred Alternative would have “No Effect” on the ESA listed species that use the project area or have potential habitat in the project area (gray wolf, grizzly bear, Canada lynx, bald eagle, northern spotted owl) due to one or more of the following factors: 1) short implementation time, 2) lack of current occupancy, 3) proposed mitigations, 4) the availability of high quality, extensive foraging, denning, and/or nesting habitat and travel corridors outside the action area, and/or 5) lack of suitable foraging and nesting habitat in the action area.

Post-project, the Preferred Alternative would provide minor, long-term beneficial affects for the ESA listed species because road-related mortality, noise, and human activity would not occur, and wilderness character would be enhanced within the Stehekin River corridor, the same as the No Action Alternative.

Natural floodplain, riparian area, and 9.9 miles of road reclamation within the river corridor would have minor to moderate, long-term beneficial affects for common and special status terrestrial and amphibious wildlife that utilize the Stehekin River corridor for all or part of their life cycle, or for seasonal or diurnal movements, or have potential habitat in the project area, the same as the No Action Alternative.

7.5.7 ALTERNATIVE B (PREFERRED ALTERNATIVE) VISITOR ACCESS, EXPERIENCE, AND PARK OPERATIONS

Visitor Access. The Park's primary user groups include hikers, cyclists, and stock users who access the Park during the summer. The road above Car Wash Falls would be permanently closed to cyclists. Most cyclists are day users that rent bicycles and travel between Stehekin and High Bridge Historic District (MP 11.2). Since 2003, the road between Car Wash Falls and Glory has been accessible only to experienced cyclists who could carry their bicycles over impassable sections. The road between Glory and Cottonwood Camp has been washed out since 1995. Therefore, permanently closing the road above Car Wash Falls to cyclists would have the same negligible, long-term adverse impacts for cyclists as the No Action Alternative.

There would continue to be easy access for hikers, stock users, and cross-country skiers to the Wilderness and other park trails via the PCT. The majority of stock trips begin at the Stehekin Valley Ranch and follow the PCT, and there is no stock trailer parking above High Bridge (MP 11.2). That use would continue unchanged.

Hikers and cross-country skiers would still be able to park at Car Wash Falls or Tumwater Camp and access the PCT via the MP 12.7 spur trail (0.2 miles south of Car Wash Falls). The primitive parking area and turnaround at Car Wash Falls would be enlarged to accommodate six vehicles as large as a 12-passenger shuttle van.

PCT hikers approaching Stehekin from the west (Seattle) side would not have the option of taking a shuttle from Bridge Creek (MP 15.9) to Stehekin as they did prior to October 2003. Hikers would potentially have to hike to Car Wash Falls (MP 12.9) or High Bridge (MP 11.2) to catch a shuttle to Stehekin, if the NPS or a permittee choose to operate a shuttle in the future.

Since the 2003 flood, some local businesses have adjusted their operations to provide drop camp, meal, and hostel-style tent services at Bridge Creek for through-hikers. These new services would continue to increase access to the Wilderness trail system for some user groups under this alternative.

Visitors would not have motorized or mechanized access to Dolly Varden, Shady, Bridge Creek, Park Creek, Flat Creek, Glory, or Cottonwood camps. Hikers could access Dolly Varden from the parking area at MP 12.9. A 0.1-mile long trail would be built for hikers to access Shady Camp from the PCT.

Motorized recreation is not a primary use in the Stehekin area because there are very few private vehicles, owned by Stehekin residents, and visitors cannot bring vehicles into the area. Stehekin

residents and visitors who want to ride the shuttle would be affected by the road closure at MP 12.9. The NPS estimates the shuttle served an average of 2,500 people annually, or approximately 7 percent of the total Stehekin area visitors. Shuttle service ended at Glory in 1995 and at MP 9.5 near Stehekin Valley Ranch in 2005, after the floods. Shuttle service to High Bridge Historic District resumed in the fall of 2005 after the implementation of the *Coon Run* project. Shuttle service above Car Wash Falls has not been offered since 2003. Therefore, the long-term, adverse motorized access affects would be relatively minor.

Visitor Experience. Vehicle and bicycle access would officially end at the Car Wash Falls (MP 12.9) parking area. The Preferred Alternative would increase the area with wilderness character, more suitable for use by experienced backcountry visitors because the road above Car Wash Falls would be closed to bicycles. Visitors who desire increased wilderness character would perceive these changes as moderate to major, long-term beneficial affects.

The individuals who would like continued vehicle and bicycle access to southern portions of the Wilderness would perceive implementation of the Preferred Alternative as a moderate to major, long-term adverse impact; similar to the No Action Alternative.

The Preferred Alternative would have minor, short-term adverse impacts (noise, dust, exhaust, traffic) on visitors if a helicopter or large trucks were used to remove the culverts and other material during reclamation of the road.

Implementation of the Preferred Alternative could be completed in a single season.

Park Operations. NPS staff would not have motorized access above Car Wash Falls for emergency services such as search and rescue or fire suppression. This condition has been unchanged since the 2003 flood, and most of these park operations are already provided by air support due to the large expanses of roadless and Wilderness areas. There may be less need for emergency services due to decreased day use in the area. Therefore, the permanent loss of 10 miles of road (at the edge of the Wilderness) would probably be a negligible, long-term adverse impact to these operations.

Motorized access for other park operations such as trail maintenance and noxious weed control would also end at Car Wash Falls. Park personnel would need to hike or pack stock longer distances to perform these services. At the same time, there would be less need for weed control over time because vehicles are a primary source of weed introduction and proliferation.

The area above Car Wash Falls would be unroaded and there would be no need for routine maintenance or emergency road repairs above MP 12.9. This would be a major, long-term beneficial affect.

7.5.7.1 Cumulative Impacts

There is no motorized access to the Stehekin area from outside locations, and there was a very small, closed road system in the Stehekin area (approximately 26 miles) prior to 1995. Of the total miles (pre-1995), 12 miles were within the Park. The Preferred Alternative would permanently close 10 miles of flood-damaged road, or 83 percent of the original road miles within the Park. The road above Car Wash Falls has been closed since 2003; the road above Glory has been closed since 1995.

There are no other road closures planned within the Park or the Stehekin area within the reasonably foreseeable future.

7.5.7.2 Compliance with Laws and Policy

The Organic Act directs the NPS to promote and regulate the use of national parks to conserve resources for their enjoyment by existing and future generations. NPS Management Policies and DO#17 Tourism identify visitor use patterns. The Park's primary user groups include hikers, cyclists, and stock users who access the Park during the summer. The Preferred Alternative would continue to provide bicycle access to High Bridge Historic District, and Wilderness and PCT access to hikers and stock users. These are the most commonly used routes for these user groups.

The Preferred Alternative would permanently eliminate motorized vehicle noise above Car Wash Falls, and meet DO #47 that requires the NPS to the fullest extent practicable "...to protect, maintain, or restore natural soundscapes in a condition unimpaired by inappropriate or excessive noise sources."

This alternative would continue to maintain the Stephen Mather Wilderness for future use and enjoyment as Wilderness.

The Preferred Alternative would also meet the intention of NPS Management Policies for park roads "...to enhance the quality of a visit, while providing for safe and efficient travel, with minimal or no impacts on natural and cultural resources (9.2.1.1)."

7.5.7.3 Conclusions

The Preferred Alternative would continue to provide bicycle access to High Bridge Historic District, and Wilderness and PCT access to hikers and stock users. These are the most commonly used routes for these user groups. This alternative would also provide adequate NPS operations access.

The post-2003 permittee services at Bridge Creek would continue to increase access to the Wilderness trail system for some user groups under this alternative. This alternative would also maintain future opportunities for a shuttle service to Car Wash Falls or High Bridge.

The Preferred Alternative would increase the area with wilderness character, more suitable for use by experienced backcountry visitors. Visitors who desire increased wilderness character would perceive these changes as moderate to major, long-term beneficial affects.

The individuals, primarily local Stehekin residents, who would like continued vehicle access to southern portions of the Wilderness would perceive implementation of the Preferred Alternative as a moderate to major, long-term adverse impact.

The Preferred Alternative would have minor, short-term adverse impacts (noise, dust, exhaust, traffic) on visitors if a helicopter or large trucks were used to remove the culverts and other material during reclamation of the road.

The permanent loss of 10 miles of road (at the edge of the Wilderness) would probably be a negligible, long-term adverse impact to most Park Operations. The area above Car Wash Falls would be unroaded and there would be no need for routine maintenance or emergency road repairs above MP 12.9. This would be a major, long-term beneficial affect on Park Operations.

7.5.8 ALTERNATIVE B (PREFERRED ALTERNATIVE) SOCIO-ECONOMICS

7.5.8.1 Impacts Analysis

The Preferred Alternative may create long-term changes in the local economy, including the changes in visitor use patterns and permittee services that followed the 2003 flood. These changes would be expected to continue.

The implementation costs of the Preferred Alternative would be for the specified road rehabilitation (culvert and debris removal); enlarging the MP 12.9 parking area; administrative costs to change NPS road and trail designations; and construction of a 0.1-mile long spur trail between the PCT and Shady Camp (Table 2).

There would be no cost for road maintenance or emergency road reconstruction. The NPS would have ongoing costs for routine hiking and stock trail maintenance.

The NPS would not have ongoing costs for shuttle service above High Bridge Historic District (MP 11.2). This would be a significant savings because the NPS-run shuttle service is not cost effective to operate above High Bridge in terms of cost per user. The NPS estimates it costs \$25,000 per year to subsidize the shuttle service.

Local Economy. Several Stehekin Valley and Lake Chelan businesses are tied to visitor use. Lake Chelan businesses provide transportation services to get visitors into Stehekin, and Stehekin businesses offer visitor services such as food, lodging, guided backpacking, bicycle rentals, and horseback tours.

The Preferred Alternative would reduce motorized and bicycle access to the upper valley by closing the Stehekin Valley Road at Car Wash Falls. This action would also reduce future shuttle bus use and bicycle rentals to a minor degree. Visitors would still have the option to ride bicycles as far as Car Wash Falls, and the NPS or a permittee would have the option of operating a shuttle to the MP 12.9 parking area.

The local economic losses related to the 2003 flood have probably been offset by other increases in permittee services, including hostel-style tents and food services at Bridge Creek, other drop camp services, guided backpacking, and horseback tours. These services are expected to remain in demand since many visitors want assistance in accessing the recreation resources in the upper valley.

Implementation Costs. The local economy may have minor to moderate, short-term socio-economic benefit from the proposed road rehabilitation if local businesses provide labor, supplies, or equipment needed to complete that work.

Administrative actions, such as changing the NPS road and trail designations would be implemented by NPS staff.

Maintenance Costs. The NPS would not have any future costs for routine road maintenance or periodic road reconstruction above MP 12.9. Thus, the NPS road maintenance costs would be reduced by approximately \$14,296 per year (\$1,444 per mile x 9.9 miles). The NPS would also save by not having any future costs for road repair or reconstruction along these 9.9 miles. NPS costs for pre-2003 road reconstruction are not available, but historically the road repairs associated periodic flood damage above Car Wash Falls were very expensive.

The NPS would have ongoing costs for routine hiking and stock trail maintenance for the road converted to trail between MP 15.3 and Cottonwood Camp (MP 22.8) since the 1995 and 2003

floods. The NPS would probably incur increased maintenance costs (currently \$550 per mile x 7.5 miles) because crews would need to hike and/or pack stock to perform these duties above MP 12.9. Annual routine maintenance of the new 0.1-mile long trail to Shady Camp would be \$55 (550 per mile).

7.5.8.2 Cumulative Impacts

Stehekin Valley Road reconstruction restored motorized access as far as Car Wash Falls in the fall of 2005. This action reestablished the lower/mid valley visitor access that existed prior to the 2003 flood. Therefore, there are no cumulative socio-economic impacts.

7.5.8.3 Compliance with Laws and Policy

This EA meets the NPS NEPA and DO #12 requirements to consider socio-economics in NEPA analysis.

7.5.8.4 Conclusions

The Preferred Alternative would have moderate, long-term variable affects on socio-economics. Affects to local businesses would be either adverse or beneficial, depending on whether the businesses offered motorized or non-motorized services for visitors, or had adjusted their concessions to meet changing visitor needs since the flood of 2003.

This alternative would have a major, long-term beneficial affect on Park budgets because shuttle service would end at MP 11.2, and road maintenance and reconstruction would end at MP 12.9.

The NPS would probably incur increased trail and facilities maintenance costs because crews would need to hike and/or pack stock above MP 12.9 to perform these duties.

7.5.9 ALTERNATIVE B (PREFERRED ALTERNATIVE) WILDERNESS

7.5.9.1 Impacts Analysis

Wilderness Character. Approximately 71 percent of the roadbed between Car Wash Falls (MP 12.9) and MP 15.3 washed out in the 2003 flood. Twenty percent of the road above Glory (MP 20.1) washed out in 1995. Since that time, erosion and revegetation have given the road a more natural appearance and increased its wilderness character. The proposed rehabilitation between Car Wash and MP 15.3 (culvert, concrete, and bolt removal) would further reduce the visual affects of the remaining road fragments, compared to the No Action Alternative.

Between October 2003 and the fall of 2005, there was no vehicle traffic above MP 9.5. During this time, the wilderness character, solitude, and remoteness increased because there was no noise, exhaust fumes, dust, or traffic in the non-Wilderness road corridor. The last major reconstruction was in 1996 after the 1995 100-year flood, and there has not been any road maintenance or emergency road repairs since the 2003 flood. The Preferred Alternative would maintain these long-term, beneficial changes in wilderness character within the Stehekin River Valley above MP 12.9.

Wilderness Facilities. Motorized and mechanized access to the Wilderness would end at Car Wash Falls. However, the parking area at Car Wash Falls would be enlarged to accommodate six vehicles up to the size of a 12-passenger shuttle van, improving visitor access to the MP 12.7 PCT trailhead.

Visitors would not have motorized or mechanized access to Shady, Bridge Creek, Park Creek, Flat Creek, Glory, or Cottonwood camps, or to upper valley trails. Hikers and stock users could still

access these camps and the Wilderness from the PCT, the Stehekin Valley Road between MP 15.3 and Glory, and the Glory to Cottonwood Camp trail. A 0.1-mile long hiking trail would be built between the PCT and Shady Camp. Dolly Varden Camp would be easily accessible from the end of the road parking area (MP 12.9), and is likely to wash out completely in future floods. However, permanently closing the road above MP 12.9 would reduce visitor access to and views of the river.

Wilderness Designation. The Preferred Alternative would maintain the increased wilderness character that has been developing since October 2003. This alternative would not preclude the option to designate the 9.9-mile long (120 acre) non-Wilderness road corridor between Car Wash Falls and Cottonwood Camp as Wilderness through future congressional legislation.

7.5.9.2 Cumulative Impacts

There are no expected cumulative impacts that would affect the Wilderness near the project area.

7.5.9.3 Compliance with Laws and Policy

The Preferred Alternative would continue to maintain the Stephen Mather Wilderness for future use and enjoyment as wilderness.

7.5.9.4 Conclusions

The Preferred Alternative would increase the area with wilderness character, more suitable for experienced backcountry visitors. The road rehabilitation (culvert, concrete, and bolt removal) would reduce the visual affects of the remaining road fragments, compared to the No Action Alternative.

This alternative would not preclude the option to designate the 9.9-mile long (120 acre) non-Wilderness road corridor between Car Wash Falls and Cottonwood Camp as Wilderness through future congressional legislation.

Visitors who desire increased wilderness character, solitude, primitiveness, naturalness, and remoteness would perceive the Preferred Alternative as a major, long-term beneficial affect.

7.5.10 ALTERNATIVE B (PREFERRED ALTERNATIVE) PACIFIC CREST TRAIL

Officially closing the Stehekin Valley Road to all access between Car Wash Falls and MP 15.3 (Preferred Alternative), enlarging the parking area at MP 12.9, and building a trail to Shady Camp would have the following affects to PCT access, trail condition, backcountry campsite availability, and visitor use.

Visitor Access to the PCT. Prior to the 1995 flood, motorized access was available to the PCT trailhead at Bridge Creek (MP 15.9). After the 1996 road reconstruction and before the October 2003 flood, motorized access was restored to Bridge Creek. Between October 2003 and the fall of 2005, motorized access ended at MP 9.5 near Stehekin Valley Ranch. The *Coon Run Project* was completed in the fall of 2005 and restored vehicle access to Car Wash Falls.

Hikers would walk the road 0.2 miles south to access the PCT via the MP 12.7 spur trail from the Car Wash Falls parking area. The parking area would be enlarged to accommodate up to six vehicles as large as a 12-passenger shuttle van.

The majority of stock trips would still originate at the Stehekin Valley Ranch. There would be no stock trailer parking above High Bridge (MP 11.2). These uses would be unchanged.

PCT hikers approaching Stehekin from the west (Seattle) side would not have the option of taking a shuttle from Bridge Creek (MP 15.9) to Stehekin. Hikers may have the option of taking a shuttle from the Car Wash Falls parking area or from High Bridge to Stehekin. NPS shuttle service to High Bridge resumed in the fall of 2005, after completion of the *Coon Run Project*.

Local businesses have adjusted their operations since 2003 and provided increased drop camp services to Bridge Creek Camp to accommodate through-hikers. Other permittee services at Bridge Creek include meal service and hostel-style cabin tents.

PCT Condition. The majority of hikers and stock users used the PCT (rather than the road) prior to 2003, and use patterns have not changed since 2003. The NPS would continue to maintain the trail to allow this ongoing level of use. Therefore, the Preferred Alternative would not have any affect on the condition of the PCT.

Backcountry Campsite Availability. There would be no change in the number of backcountry campsites available for PCT users. Since October 2003, there has been no easy access to Shady Camp. The new 0.1-mile long hiking trail would improve access to Shady Camp from the PCT.

Dolly Varden Camp (MP 13) on the Stehekin River and was heavily damaged during the 2003 flood, and future floods could wash away the one remaining tent site. This would have a negligible effect on PCT users, since there are other camps in closer proximity to the PCT (Figure 1; Appendix A2).

Visitor Use. Day trip hiking along the PCT north of Bridge Creek may decrease slightly, since few day hikers would hike beyond Bridge Creek (MP 15.9) from the Car Wash Falls parking area (MP 12.9). However, this potential change in use would be negligible.

There may be fewer through-hikers over Cascade Pass from Highway 20 on the west (Seattle) side of the Park because the shuttle service into Stehekin would not be available from Bridge Creek. The post-2003 permittee services at Bridge Creek and Cottonwood may compensate for the loss of shuttle services, and any change is expected to be negligible

7.5.10.1 Cumulative Impacts

There are no expected cumulative impacts that would affect the PCT near the project area.

7.5.10.2 Compliance with Laws and Policy

In accordance with the National Trail Systems Act of 1968, the PCT must be maintained as "...an extended trail so located as to provide for maximum outdoor recreation potential and for the conservation and enjoyment of the nationally significant scenic, historic, natural, or cultural qualities for the areas through which such trails may pass." The Preferred Alternative would affect motorized access to the upper PCT; it would not affect the trail itself or its potential to offer outdoor recreation potential for other user groups (hikers and stock users).

7.5.10.3 Conclusions

The Preferred Alternative would have no direct effect on the PCT, and only a negligible effect on PCT use. There would be negligible to minor beneficial affects on facilities used in conjunction with the PCT because the parking area at Car Wash Falls would be enlarged and could support shuttle service, and there would be better access to Shady Camp.

The permanent loss of motorized access and shuttle service to the PCT trailhead at Bridge Creek would be minor to moderate, adverse impacts. The new permittee services at Bridge Creek would continue to compensate for the loss of motorized access, as they have since October 2003.

7.5.11 ALTERNATIVE B (PREFERRED ALTERNATIVE) WILD AND SCENIC RIVERS

7.5.11.1 Impacts Analysis

Free-flowing Character. Closing the Stehekin Valley Road upstream of Car Wash Falls and partially rehabilitating the road (removing the tributary culverts and concrete) would improve the free-flowing character of the Stehekin River to a moderate extent over the long-term. Prior floods have already washed away some of the riprap along the riverbank. Future flooding is likely to continue to wash away some of the remaining riprap and road fill, and allow the river to choose its natural course and flow unimpeded.

Classification. According to guidelines for WSR eligibility, classification, and management (FR 1982), river areas classified as Scenic have "... shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by road." When NPS completed its WSR Eligibility Study of the Stehekin River in 2002, Segment 2 (High Bridge to Cottonwood Camp) was classified as a Scenic River. At that time, the Stehekin Valley Road followed most of Segment 2, and there were camps at Tumwater, Dolly Varden, Shady, Bridge Creek, Park Creek, Flat Creek, Glory, and Cottonwood. The Preferred Alternative would not affect the Scenic WSR classification of Segment 2 because most of these features would remain in their original or modified form, including the following:

- The Stehekin Valley Road would still follow the river from High Bridge Historic District to Car Wash Falls;
- The culverts, concrete, and bolts would be removed between Car Wash Falls and Bridge Creek but the remaining road fill would not be removed; and
- The road between Bridge Creek and Glory would be converted to a trail but none of the road fill would be removed.

This combination of factors would continue to make a Scenic classification appropriate for Segment 2, even though implementation of the Preferred Alternative would continue to improve the Scenic quality of the river over time.

Outstandingly Remarkable Values. The Preferred Alternative would have variable affects on ORVs over time. Fisheries, wildlife, and scenic resources, and the attraction of the river would gradually improve as the river continues to attain more natural channel, floodplain, and riparian functions and wilderness character (see Alternative B analysis of fisheries, wildlife, visual, and Wilderness resources, Sections 7.7.4, 7.7.6, 7.7.10, and 7.7.12).

The Preferred Alternative would also have a minor, long-term adverse impact on recreation resources, because there would be less access to the river above MP 12.9.

The Preferred Alternative would have no affect on the project area's prehistoric resources, historic resources, or geologic ORVs.

7.5.11.2 Cumulative Impacts

The *Coon Run* and *Stehekin Valley Road Improvement* projects (NPS 2005a; 2005b) will have moderate, long-term adverse impacts to river Segment 1 free-flowing characteristics.

The Preferred Alternative would have moderate, long-term beneficial affects to river Segment 2 free-flowing character and several ORVs. Thus, implementation of this alternative would help offset the

adverse impacts that are expected from the 2005-2006 road projects in river Segment 1 (NPS 2005a; 2005b).

7.5.11.3 Compliance with Laws and Policy

The Preferred Alternative would protect the free-flowing condition and ORVs along Segment 2 of the Stehekin River. This river segment would continue to qualify for inclusion in the National WSR system under a Scenic classification.

7.5.11.4 Conclusions

The Preferred Alternative would have moderate, long-term beneficial affects to the Stehekin River's WSR status. It would improve 9.9 miles of the river's free-flowing character and ORVs in the project area (Segment 2), and help offset anticipated minor to negligible adverse impacts to WSR values in Segment 1.

7.5.12 ALTERNATIVE B (PREFERRED ALTERNATIVE) AIR QUALITY

7.5.12.1 Impacts Analysis

Vehicle use has been historically low above Car Wash Falls, and the highest level of air quality affects have been associated with periodic road reconstruction. All the motorized use and the associated air quality affects are typically concentrated during the summer/fall, which is the peak visitor and construction season. Permanently closing the road to motorized use above Car Wash Falls would have minor to moderate, long-term beneficial affects on air quality because there would be no dust or gasoline and diesel exhaust generated by privately owned, Park, or shuttle vehicles, routine road maintenance, or road reconstruction between MP 12.9 and MP 22.8.

Some negligible air quality affects would continue to occur throughout the project area from non-motorized visitor use (campfire smoke), stock use (dust), and trail maintenance activities (dust).

7.5.12.2 Cumulative Impacts

The Preferred Alternative would have minor to moderate, beneficial cumulative impacts on air quality near the Stehekin River above Car Wash Falls, compared to pre-2003 conditions.

7.5.12.3 Compliance with Laws and Policy

The project area would be expected to continue to attain all ambient air quality standards and meet management criteria for a Class I airshed.

7.5.12.4 Conclusions

The Preferred Alternative would improve air quality in the vicinity of the river above Car Wash Falls during the peak visitor seasons because there would be no dust or gasoline and diesel exhaust generated by privately-owned, Park, or shuttle vehicles, routine road maintenance, or road reconstruction between MP 12.9 and MP 22.8.

Some negligible, adverse air quality affects would continue to occur throughout the project area from non-motorized visitor use (campfire smoke), stock use (dust), and trail maintenance activities (dust). Overall, the air quality in this Class I airshed would be improved.

7.5.13 ALTERNATIVE B (PREFERRED ALTERNATIVE) COMPLIANCE WITH THE LAKE CHELAN NRA GMP

Closing the road to vehicle traffic at Car Wash Falls (Alternative D, Road Reroute) would *meet* the following direction in the LACH GMP.

“Preserve or restore ecological processes and conditions in wetland, floodplain, shoreline, and riparian areas.”

“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.”

“The NPS would not manipulate the Stehekin River to protect federal property except roads and bridges subject 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) the actions will have less affects than other alternatives, and 4) the actions are permitted by the county, state, and other federal agencies. No new road construction will be proposed in active river erosion zone. Previously manipulated sites that do not meet the above criteria for future manipulation would be restored to approximate natural conditions.”

“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 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.”

Alternative D would *not* comply with the following GMP direction.

“Private vehicle use from High Bridge to Bridge Creek would be allowed...”

“Public shuttle service would be provided from the Landing to Cottonwood Camp. ... The section of road from High Bridge to Cottonwood Camp would be maintained for heavy-duty, high clearance shuttle vehicles.”

“Recreational access for visitors with disabilities would be enhanced.”

7.5.14 ALTERNATIVE B (PREFERRED ALTERNATIVE) IMPAIRMENT OF PARK RESOURCES OR VALUES

The Preferred Alternative would not impair the following Park resources or values within the project area: soils, water quality, hydrology, channel morphology, floodplains, fisheries, aquatic habitat, vegetation, terrestrial and amphibious wildlife, visitor experience and access, socio-economics, Wilderness, WSR, PCT, and air quality.

7.6 Alternative C. Reconstruct the Stehekin Valley Road from Car Wash Falls to Glory

Alternative C (Road Reconstruction) would reconstruct the Stehekin Valley Road in its former location from Car Wash Falls to Glory (Appendix A4 & A5; Table 21). This alternative would not rebuild the road or change the Glory to Cottonwood Camp trail that was build by the NPS after the 1995 flood (same as No Action and Preferred alternatives) (Table 21).

7.6.1 ALTERNATIVE C (ROAD RECONSTRUCTION) SOILS

7.6.1.1 Impacts Analysis

Approximately 1.9 miles (26 percent) of the 7.2-mile long road between Car Wash Falls (MP 12.9) and Glory (MP 20.1) washed out in the 2003 flood. Specifically, 1.6 miles between MP 12.9 and MP 14.5, 0.1 mile at the MP 15 landslide, 0.1 mile between MP 17.4 and MP 17.5, and 0.1 mile at Glory (MP 20.1) would need to be reconstructed to allow vehicle access. The area of the reconstructed road would be 12-feet wide or approximately 2.6 acres. The Stehekin Valley Road would be reconstructed in its former location, adjacent to the river. The former road was built on bedrock within the active channel and floodplain. Some rock blasting, concrete work, channel filling, and more than 73,365 yd³ of fill, riprap, and surface rock would be required to rebuild the road in this location.

Car Wash Falls to MP 15.3. Approximately 1.7 miles (71 percent) of the 2.4 miles of road between Car Wash Falls and MP 15.3 washed out in the 2003 flood. In 2003, the FHA estimated it would take 40,000 yd³ of fill (borrow and riprap) and 1,835 yd³ of surfacing rock to reconstruct the road between MP 12.9 and MP 14.5.

FHA estimated it would take another 31,100 yd³ of fill and 150 yd³ of surfacing rock to reconstruct the road at the MP 15 landslide. Since 2003, the slide has been enlarging and significantly more fill would be required that was originally estimated. Road reconstruction *may* be able to stabilize the active landslide at MP 15, to produce a major, long-term beneficial soils affect.

A new 48-inch diameter culvert would be installed at Car Wash Falls, and the concrete energy dissipater at Car Wash Falls would be reconstructed for erosion control.

The new road would be built in the 100-year floodplain to 100-year design standards as it was prior to 2003, and would continue to be susceptible to periodic flood damage.

MP 15.3 to Glory (MP 20.1). The road between MP 15.3 and Glory would require reconstruction or repair at MPs 17.4, 17.5, and 20.1 (~0.2 mile) to provide vehicle access. Between MP 17.4 and MP 17.5 (Park Creek Camp), the FHA estimated it would take 320 yd³ of fill, 110 yd³ of Class 5 riprap, and 100 yd³ of surfacing rock to repair the flood-damaged roadbed.

Park staff temporarily repaired the Park Creek Bridge (MP 18) abutments in 2004. If the repairs fail, a new, longer bridge would probably be necessary and would be analyzed as a separate project proposal.

Another 20 yd³ of surfacing rock would be needed to repair approximately 0.1 mile of road at Glory (20.1). Approximately 1,100 yd³ of rock rubble that was deposited on the roadbed from an unnamed tributary debris torrent in 1995 would be excavated. A new 48-inch diameter culvert would be installed to redirect water that is currently flowing over the deposition.

Glory to Cottonwood Camp (MP 20.1 to MP 22.8). There would be no road reconstruction between Glory and Cottonwood Camp. Hikers and stock users could continue to use the existing trail between Glory and Cottonwood Camp that has been in use since the 1995 flood. The trail is approximately 2.5 miles long and 6-feet wide (~2.2 acres), and incorporates approximately 2 miles of the former roadbed. Routine trail maintenance would continue. Therefore, there would be no net change in soils condition since floods closed this section of the road to vehicle and bicycle use in 1995, or from the No Action Alternative. In the long-term, these would be major beneficial soil affects.

PCT. Since October 2003, a negligible amount of foot and stock traffic has been rerouted from the Stehekin Valley Road to the PCT at MP 12.7. The majority of these users used the PCT prior to the flood, and that use would remain unchanged.

7.6.1.2 Cumulative Impacts

The cumulative soils impacts of past and reasonably foreseeable actions would be the same as the No Action Alternative (Table 22). In addition, Alternative C (Road Reconstruction) would reconstruct approximately 1.9 miles of road (~2.6 acres) between Car Wash Falls and Glory that washed out in 2003. The road construction would affect additional acres during construction; the FHA report notes access to the site for reconstruction would be difficult and the contractor would need to “build their way in”.

The reconstruction of the road between Car Wash Falls and Glory would recreate the road maintenance and emergency reconstruction affects (sedimentation, turbidity, floodplain filling) that existed between the 1995 and 2003 floods. This 7.2-mile long section is 32 percent of the original 22.8-mile long Stehekin Valley Road, and has a history of frequent flood damage. Therefore, reconstruction, maintenance, and emergency repairs would represent major, adverse cumulative impacts to the lower Stehekin River over time.

Combining the area of soil disturbance in this alternative with other cumulative impacts would result in moderate to major, long-term adverse cumulative impacts to soil, because of the location and length of the road within the narrow Stehekin River floodplain and riparian areas.

7.6.1.3 Compliance with Laws and Policy

Alternative C (Road Reconstruction) would meet NPS soil regulations and policy to minimize potentially irreversible adverse impacts on soils because the Stehekin Valley Road has a long history in this location, and the area of new impacts would be minimal (Table 12).

7.6.1.4 Conclusions

The 1995 and 2003 floods reclaimed approximately 2.4 miles of the 12-foot wide roadbed (~3.3 acres) between Car Wash Falls and Cottonwood Camp. The floods also eliminated routine maintenance and emergency repairs above Car Wash Falls.

Reconstruction of the 7.2-mile long road between Car Wash Falls and Glory in the Stehekin River floodplain would have the same adverse, long-term soils affects as pre-2003 conditions because the 12-foot wide roadbed would have the same amount (~10.5 acres) of lost soil productivity, decreased soil moisture, soil compaction, and routine maintenance needs as the former road. Some rock blasting, concrete work, channel filling, and more than 73,085 yd³ of fill, riprap, and surface rock would be required to rebuild the road in this location. Periodic flood damage would require emergency road reconstruction to keep the road functional, and would result in additional soil disturbance and loss over time.

Periodic flood damage would have major, long-term adverse impacts because eroded riverbank and fill material would be transported and deposited in the lower gradient floodplains and riparian areas of the Stehekin River. The coarse, sterile fill material would reduce soil productivity, and result in major long-term adverse impacts to the hydrology and function of these important areas.

In addition, new areas of soil disturbance would occur during construction. The FHA report notes access to the site for reconstruction would be difficult and the contractor would need to “build their

way in". Reconstruction would require some rock blasting and concrete work to secure the road. Soil mitigation measures would be used to minimize the short-term construction affects; however, adverse impacts are inevitable.

Therefore, implementation of Alternative C (Road Reconstruction) would result in major, long-term adverse impacts between Car Wash Falls and Glory and in the downstream depositional areas of the Stehekin River (similar to pre-2003 conditions), compared to the No Action and Preferred alternatives.

7.6.2 ALTERNATIVE C (ROAD RECONSTRUCTION) HYDROLOGY, CHANNEL MORPHOLOGY, FLOODPLAINS

7.6.2.1 Impacts Analysis

The 1995 and 2003 floods reclaimed Stehekin River channel capacity, floodplain connectivity, and increased meander length by scouring out road fill in the 100-year floodplain. Alternative C (Road Reconstruction) would rebuild the road in its former location within the Stehekin River Valley between Car Wash Falls and Glory, reversing these beneficial affects. The road between Glory and Cottonwood Camp would be maintained as a trail as it has been since 1995, maintaining these beneficial affects.

Car Wash Falls MP 12.9 to MP 15.3. Most of this section (1.7 miles, 2.5 acres) washed out in the 500-year flood of 2003 (Figure 1; Table 21). This section also suffered damage during the 100-year flood of 1995 because the road constricted and controlled the channel, decreased floodplain capacity, and increased the velocity of flood flows. The remaining roadbed is fragmented and revegetating naturally.

Material eroded out of the banks and roadbed during the floods was deposited in low gradient reaches, floodplains, and riparian areas downstream. The deposition caused adverse changes in the hydrology, channel morphology, and capacity of these important areas.

When this section was reconstructed in 1996, it was to 100-year flood specifications and the largest Federal Highway rock class (Class 6) was bolted to existing bedrock and boulders. The riprap was torn from the bolts and washed out during the record 2003 flood. Some rock blasting and concrete work would be needed to build a base for the new road.

The new road would be built to 100-year flood specifications, as it was in 1996. More than 31,100 yd³ of riprap (2003 FHA estimate) would be required to stabilize the active landslide at MP 15. Another 40,000 yd³ of riprap would be needed to rebuild the road between MP 12.9 and 14.5. Approximately 300 linear feet washed out at MP 13.8 and would require fill below the OHW mark. A major channel realignment would be needed to achieve the 1:1 slope and stabilize the landslide. Access to the river would be very difficult, and construction access would further undermine the existing slope.

Reconstruction would recreate the routine road maintenance, flood damage, and periodic emergency road reconstruction that existed prior to 2003. Emergency erosion control structures (rock bank barbs) may be needed to protect the road in the future. Bank barbs or other in-channel structures would affect the channel morphology and floodplain function by restricting and redirecting the river.

Reconstruction would cause major, long-term adverse impacts to the hydrology, channel morphology, and floodplains in the lower Stehekin River due to floodplain filling, channel confinement, channel alteration, and sediment delivery.

MP 15.3 to Glory. The road between MP 15.3 and Glory is essentially intact, but would require approximately 0.2 miles (0.1 acres) of reconstruction at MP 17.4, 17.5, and 20.1 (Appendix A4 and A5; Table 21). The reconstruction would require filling the floodplain with approximately 320 yd³ of borrow and 110 yd³ of Class 5 riprap.

Park staff temporarily repaired the Park Creek Bridge (MP 18) abutments in 2004. If the repairs fail, a new, longer bridge would probably be necessary and would be analyzed as a separate project proposal.

A 48-inch by 32-foot long culvert would be installed on the unnamed tributary at MP 20.1 to capture the water flowing over the roadbed and debris).

Reconstruction of this section would recreate the road maintenance and emergency road reconstruction impacts that existed prior to the 2003 flood.

Glory to Cottonwood Camp (MP 20.1 to MP 22.8). Approximately ½-mile (0.7 acres) of road between MP 20.3 and 20.8 washed out in the 1995 (Appendix A5; Table 21). The NPS built a non-motorized, non-mechanized trail above the 100-year floodplain to circumvent this section. The new trail connects to 2 miles of the former roadbed. This section has been maintained as a 6-foot wide trail since 1995, and the rest of the 12-foot wide roadbed (1.5 acres) has been allowed to revegetate naturally.

Alternative C would maintain these changes, which would eliminate the periodic flood damage, erosion, emergency road repairs, and road relocations associated with this section. These changes would be a moderate, beneficial affect over time because the river's bedload would be reduced, sediment transport would be improved, and floodplain filling and channel morphology changes would be reduced.

7.6.2.2 Cumulative Impacts

The floods of 1995 and 2003 washed out the most problematic sections of the Stehekin Valley Road in the 100-year floodplain. The 2005-2006 *Stehekin Valley Road Improvement* and the *Coon Run* projects have/will reconstruct the washed out segments below MP 11.2 (Table 12). These projects were designed to mitigate some of the previous floodplain impacts caused by the former road.

Alternative C (Road Reconstruction) would reconstruct approximately 2 miles of road (~2.7 acres) between Car Wash Falls and Glory that washed out in the 2003 500-year flood. The 7.2-mile long Car Wash Falls to Glory section is 32 percent of the original 22.8-mile long Stehekin Valley Road, and has a history of frequent flood damage. Therefore, implementation of Alternative C (Road Reconstruction) and the other Stehekin Valley Road projects would represent major, adverse cumulative hydrologic, channel morphology, and floodplain impacts due to floodplain filling, channel confinement and realignment, bank and road fill erosion, emergency repairs, erosion control structures, road relocations, and routine road maintenance over time.

A ½-mile of section of the 2.5-mile long road between Glory and Cottonwood Camp washed out in the 1995. This section would not be reconstructed and the remaining 2 miles of road would continue to be maintained as a 6-foot wide trail as it has since 1995. The flood reclamation and passive reclamation of this section (9 percent of the original road) would be a moderate, beneficial cumulative impacts.

7.6.2.3 Compliance with Laws and Policy

Reconstructing the Stehekin Valley Road in this location would meet NPS regulations and policy to minimize potentially irreversible impacts on hydrology, channel morphology, and floodplains because the Stehekin Valley Road has a long history in this location, and the new road would follow the old road alignment.

This alternative would not meet NPS policy to: "...1) manage for the preservation of floodplain values, 2) minimize potentially hazardous conditions associated with flooding, and 3) comply with the NPS Organic Act and all other federal laws and EOs related to the management of activities in flood-prone areas, including EO 11988 Floodplain Management, NEPA, applicable provisions of the Clean Water Act."

This alternative would not meet NPS policy to "... site facilities where they will not be damaged or destroyed by natural physical processes. Natural hazard areas include sites with unstable soils and geologic conditions, fault zones, thermal areas, floodplains, flash-flood zones, fire-prone vegetation, and coastal high-hazard areas. ***Park development that is damaged or destroyed by a destructive, hazardous, or catastrophic natural event will be thoroughly evaluated for relocation or replacement by new construction at a different location*** [emphasis added]. If a decision is made to relocate or replace a severely damaged or destroyed facility, it will be placed, if practicable, in an area that is believed to be free from natural hazards. In areas where dynamic natural processes cannot be avoided, such as seashores, developed facilities should be sustainably designed (e.g. removable in advance of hazardous storms or other conditions) (9.1.1.6)."

This alternative would not meet the Floodplain EO 11988 that directs the NPS to "take no action that supports further development in the 100-year floodplain, where floods could threaten development".

Rebuilding the road in its former location would require an ACOE 404(d) stream channel alteration permit and a WDFW HPA.

7.6.2.4 Conclusions

The new road between Car Wash Falls and Glory would be built to 100-year flood specifications, as it was in 1996. A major channel realignment and a large volume of fill would be needed to stabilize the landslide at MP 15. Access to the river would be very difficult, and construction access would further undermine the existing slope.

Reconstruction would recreate the routine road maintenance and emergency road reconstruction that existed between 1995 and 2003. Emergency erosion control structures (rock bank barbs) may be needed to protect the road. In-channel structures would affect the channel morphology and floodplain function by restricting and redirecting the river.

Instream work would occur during the low flow period. Other BMPs and mitigations would also reduce short-term construction affects (see Alternative C BMPs and Mitigation Measures: Section 5.3.4). However, it is inevitable that construction would cause short-term sedimentation and other adverse impacts.

Reconstruction would cause major, long-term adverse impacts to the hydrology, channel morphology, and floodplains in the lower Stehekin River due to floodplain filling, channel constriction, channel realignment, bank and road fill erosion, emergency repairs, erosion control structures, road relocations, and routine road maintenance similar to pre-2003 conditions.

Alternative C would maintain the 6-foot wide trail built between Glory and Cottonwood Camp after the 1995 flood. The rest of the remaining 12-foot wide roadbed (1.5 acres) would revegetate naturally. These changes would be a moderate, long-term beneficial affect because the river's bedload would be reduced, sediment transport would be improved, and floodplain filling and channel morphology changes would be reduced.

7.6.3 ALTERNATIVE C (ROAD RECONSTRUCTION) WATER QUALITY

7.6.3.1 Impacts Analysis

This alternative would rebuild the road to 100-year flood specifications in 100-year floodplain of the Stehekin River between Car Wash Falls and Glory, as it was in 1996. More than 73,085 yd³ of road fill material would be needed to complete the reconstruction of this section, and the landslide would be very difficult to stabilize.

There have been six large floods in the Stehekin River Watershed in the last 15 years (Figure 2), and large magnitude floods have become more frequent in the past decade (NPS 2005a). The last major reconstruction of this section was in 1996, following the 1995 flood. Therefore, it is inevitable that flood damage would continue to wash out the road in this location, creating major, short-term water quality affects.

BMPs and mitigations would be used to reduce water quality affects during construction (see Alternative C BMPs and Mitigation Measures: Section 5.3.4). It is inevitable, despite these precautions, that fine to medium textured fill material would enter the river and adversely impact water quality affects during the 1 to year construction period because the roadbed would need to be built up in the floodplain and high flow channel.

Routine road maintenance, period flood damage, and emergency road reconstruction would recreate the major, long-term adverse water quality affects (turbidity, sediment) that existed from 1996 to October 2003. In addition, the road would not have guardrails and would have the same risk of chemical spills from vehicles entering the river as it prior to the 2003 flood.

7.6.3.2 Cumulative Impacts

The floods of 1995 and 2003 washed out the most problematic sections of the road in the 100-year floodplain. The 2005-2006 *Stehekin Valley Road Improvement* and the *Coon Run* projects have/will reconstruct the washed out road segments below High Bridge Historic District (MP 11.2) (Table 12). The design specification, road relocations, and floodplain reclamation in these projects will reduce the future flood damage and need for emergency road repairs compared to pre-2003 conditions.

The ½-mile trail between MP 20.3 and 20.8 and the last 2 miles of the road would be maintained as a trail to Cottonwood Camp, as it has been since 1995. Therefore, the cumulative water quality impacts would be less than pre-1995 conditions.

7.6.3.3 Compliance with Laws and Policy

The Stehekin River's Category I status is applicable to the entire watershed (not just the lower watershed), and was designated prior to the October 2003 flood. Therefore, reconstructing the road in the same location would probably maintain the Category I designation.

7.6.3.4 Conclusions

Reconstruction would recreate the major, long-term adverse water quality affects (turbidity, sediment) that existed from 1996 to October 2003 due to construction, routine road maintenance, flood damage, and emergency road reconstruction. In addition, the road would not have guardrails and would have the same risk of chemical spills from vehicles entering the river as it prior to the 2003 flood.

The ½-mile trail between MP 20.3 and 20.8 and the last 2 miles of the road would be maintained as a trail to Cottonwood Camp, as it has been since 1995. Therefore, the cumulative water quality impacts would be less than pre-1995 conditions.

7.6.4 ALTERNATIVE C (ROAD RECONSTRUCTION) FISHERIES AND AQUATIC HABITAT

Alternative C would reconstruct 1.9 miles of road between Car Wash Falls and Glory that washed out in the 2003 flood. The road would be built to 100-year flood specifications in 100-year floodplain, as it was in 1996. The ½-mile section between MP 20.3 and 20.8 that washed out in 1995 would not be reconstructed, and the last 2 miles would be maintained as a trail to Cottonwood Camp, as it has been since 1995.

The project-related fisheries and aquatic habitat affects are interdependent on the preceding road-related impacts analysis of soils (Section 7.4.1.1), hydrology, channel morphology, floodplains (Section 7.4.2.1), and water quality (Section 7.4.3.1).

7.6.4.1 Impacts Analysis

Reconstruction would recreate all of the major, long-term adverse fisheries and aquatic habitat effects that existed from 1996 to October 2003 such as sedimentation, turbidity, channel alteration, and riverbed scour and filling. Approximately 2.6 acres of channel and floodplain were reclaimed by the 2003 flood; the reconstruction would refill this area with riprap and other road fill material. More fill would be required to stabilize the large landslide at MP 15. The riparian and other vegetation affects would be similar to the 1996 to October 2003 conditions, including the long-term loss of floodplain function and instream large woody debris recruitment potential.

The adverse construction affects would be minimized by low flow work windows (approximately mid to late July to October 1) and soil and water mitigations (see Alternative C BMPs and Mitigation Measures: Sections 5.3.4.1 and 5.3.4.3). However, reconstruction could take anywhere from 3½ to 11 years, increasing the risk of construction related sedimentation.

7.6.4.2 Cumulative Impacts

Alternative C (Road Reconstruction) would re-establish 7.2 miles of road between Car Wash Falls and Glory that washed out in the 2003 flood (Table 21). This section would be 32 percent of the original 22.8-mile long Stehekin Valley Road, and the most problematic in terms of long-term sediment production and flood damage.

7.6.4.3 Compliance with Laws and Policy

ESA. Alternative C (Road Reconstruction) would be “Likely to Adversely Affect” Columbia River bull trout if they were present in the Stehekin River Watershed due to construction and post-construction sediment delivery and channel alteration. There is no proposed or designated bull trout critical habitat on the east side of the Cascades.

The NPS would formally consult with the USFWS to obtain a Biological Opinion based on this “Likely to Adversely Affect” determination for bull trout should this alternative be selected for implementation.

NPS Management Policies 4.4.2.3, Management of Threatened and Endangered Plants and Animals. Alternative C would *not* meet the intent of NPS Management Policies 4.4.2.3 that requires the NPS to survey, protect, monitor, restore, and strive to recover all species listed, proposed, or candidates for listing under the ESA that are native to NPS units, and to manage, to the greatest extent possible, state, and locally endangered and threatened species as federally listed species due to probable adverse impacts to bull trout.

7.6.4.4 Conclusions

Road reconstruction (Alternative C) would recreate all of the major, long-term adverse fisheries and aquatic habitat impacts that existed from 1996 to October 2003 – sedimentation, turbidity, channel alteration, scour and filling, loss of large woody debris recruitment potential, and loss of floodplain function.

Alternative C would be “Likely to Adversely Affect” Columbia River bull trout if they were present in the Stehekin River Watershed, and would not contribute to future listing of westslope cutthroat trout or their essential habitat.

7.6.5 ALTERNATIVE C (ROAD RECONSTRUCTION) VEGETATION (COMMON NATIVE, SPECIAL STATUS, RIPARIAN, WETLAND, NOXIOUS/INVASIVE)

7.6.5.1 Impacts Analysis

Conservatively, the road reconstruction would refill approximately 2.5 acres of the Stehekin River 100-year floodplain between Car Wash Falls and MP 15.3 that were reclaimed by the 2003 flood. The reconstruction would result in major, long-term adverse impacts in high value, riparian and wetland habitats, similar to pre-2003 conditions. These habitats are naturally limited and disproportionately important to wildlife.

Routine maintenance and emergency repairs would include gravel replacement. Gravel replacement would slightly widened the 12-foot wide road over time and reduce the surrounding soil productivity.

The road between Car Wash Falls and Glory would become an avenue for the proliferation and dispersal of noxious and invasive plants by vehicles, hikers, stock, bicycles, water transport, and road maintenance gravel as it was prior to 2003.

The ½-mile section of the road between Glory and Cottonwood Camp that washed out in 1995 would not be reconstructed. Approximately 0.7 acres in the 100-year floodplain would revegetate naturally (Table 21).

Mitigations such as importing fill material from weed-free sources outside the Stehekin area and seeding disturbed sites with native species as soon as practicable (see Alternative C BMPs and Mitigation Measures: Sections 5.3.4.1 and 5.3.4.5) would reduce the short-term construction affects.

If special status plants were found prior to construction, the individuals or populations would be flagged and avoided, if possible, to prevent construction-related affects.

7.6.5.2 Cumulative Impact

The 2003 flood reclaimed approximately 2.6 acres of floodplain within the Stehekin River corridor above MP 12.9. Natural vegetation has been in progress since then. Alternative C (Road Reconstruction) would be reverse the reclamation process, and reintroduce new road-related impacts similar to pre-2003 conditions.

The road segments that washed out by the floods would become avenues for proliferation and dispersal of knapweed and other noxious and invasive plants by vehicles, hikers, stock, bicycles, water transport, and road maintenance gravel again. Park staff would continue to control the currently small occurrences of noxious and invasive plants along the river, the road, and the PCT annually.

7.6.5.3 Compliance with Laws and Policy

ESA. Alternative C would have “No Effect” on ESA listed plants because there are no known individuals or populations in the project area.

NPS Management Policies 4.4.2.3, Management of Threatened and Endangered Plants and Animals. Alternative C would meet the intent of NPS Management Policies 4.4.2.3 that requires the NPS to survey, protect, monitor, restore, and strive to recover all species listed, proposed, or candidates for listing under the ESA that are native to NPS units, and to manage, to the greatest extent possible, state, and locally endangered and threatened species as federally listed species.

NPS Policies 2001. Alternative C would meet NPS policy to manage all components and processes of naturally evolving Park ecosystems including the natural abundance, diversity, and ecological integrity of plants communities.

7.6.5.4 Conclusions

The road reconstruction between Car Wash Falls and Glory would result in major, long-term adverse impacts to riparian and wetland habitats, similar to pre-2003 conditions. Routine maintenance and emergency repairs would include gravel replacement which would slightly widened the 12-foot wide road over time and reduce the surrounding soil productivity.

The road between Car Wash Falls and Glory would become an avenue for the proliferation and dispersal of noxious and invasive plants by vehicles, hikers, stock, bicycles, water transport, and road maintenance gravel, as it was prior to 2003.

The ½-mile section between Glory and Cottonwood Camp that washed out in 1995 would not be reconstructed. Approximately 0.7 acres in the 100-year floodplain would revegetate naturally (Table 21).

Alternative C would have “No Effect” on ESA listed plants because there are no known individuals or populations in the project area.

7.6.6 ALTERNATIVE C (ROAD RECONSTRUCTION) TERRESTRIAL AND AMPHIBIOUS WILDLIFE

7.6.6.1 Impacts Analysis

The Stehekin Valley Road would be reconstructed in its former location between Car Wash Falls and MP 15.3, and motorized access would be restored to Glory (~7.2 road miles) in Alternative C (Road Reconstruction). Depending on location, timing, intensity, and duration of construction

activities, ongoing maintenance activities, and post-project emergency road repairs, wildlife activities such as nesting, foraging, and wildlife behavior such as avoidance of the area could be adversely impacted.

For example, the reconstruction would take 3½ to 11 years to complete, depending on the number of dump trucks that are available and the timing of seasonal low flow. The Stehekin Valley Road has low ambient noise and activity levels, and wildlife would probably avoid construction sites during working hours. Construction activities of this duration and intensity would have minor to moderate adverse impacts on all of the species that utilize the project area and the haul route from Company Creek pit.

Post-project road use, road maintenance, and emergency road repairs may also cause avoidance of the immediate area around sites that have relatively high levels of human or mechanical noise and activity. These impacts could have minor to moderate, long-term adverse impacts on all of the species that utilize the project area.

The road-related mortality rates of smaller, less mobile animals such as amphibians, reptiles, and butterflies may increase due to construction and post-construction traffic.

Alternative C would also result in some short- and long-term sediment delivery to the Stehekin River due to construction activities and periodic flood damage. Approximately 2.6 acres of floodplain and riparian habitat would be filled during road construction. These impacts would be minor, long-term adverse impacts for all amphibious and riparian dependent species that utilize the project area.

The effects to the potentially affected special status terrestrial and amphibious wildlife are described below.

Gray Wolf. Gray wolf has not been sighted in the valley in over ten years. However, since there is other suitable habitat, there is the potential for gray wolves to forage or travel through the project area. If gray wolves were in the area, during the 3½ to 11 year road reconstruction period it is likely that noise and human activity would cause them to avoid the area. It is determined that the relatively short-term construction activities associated with Alternative C would be “Not Likely to Adversely Affect” gray wolf due to the availability of other high quality, extensive foraging habitat and travel corridors in NOCA.

The long-term, post-project, road-related impacts (risk of mortality, noise, human activity) would be the same minor impacts that existed historically in the river corridor, and would be “Not Likely to Adversely Affect” gray wolf.

Grizzly Bear. Grizzly bear has not been sighted in the valley in over ten years, but there is suitable habitat. Therefore, it is possible that grizzly bear will occur in the project area. If grizzly bears were in the area, during road reconstruction it is likely that noise and human activity would cause them to avoid the area during the construction period as long as other attractants such as food or garbage were not available. Contractors would be required to remove all food and garbage to off-site locations at the end of each working day to avoid attracting bears and other scavengers (see Alternative C BMPs and Mitigation Measures: Section 5.3.4.6).

The project area is within the 95,000-acre Upper Stehekin River GBMU. This GBMU was designated when the Stehekin Valley Road was in the same location proposed in Alternative C. Therefore, reconstructing this low use road in the same location would not result in a net loss of grizzly bear habitat and would meet the “no net loss” policy on Grizzly Bear Recovery.

It is determined that the relatively short-term, construction activities associated with Alternative C would be “Not Likely to Adversely Affect” grizzly bear due to the proposed mitigations, and the availability of other high quality, extensive foraging habitat and travel corridors in NOCA.

The long-term, post-project, road-related impacts (risk of mortality, noise, human activity) would be the same minor impacts that existed historically in the river corridor, and would be “Not Likely to Adversely Affect” grizzly bear.

Canada Lynx. It is possible that lynx could occur in the project area, and there have been several unconfirmed sightings in the past, as recently at 2000. Lynx are likely to avoid areas of high noise and human activity. It is determined that the relatively short-term construction activities associated with Alternative C would be “Not Likely to Adversely Affect” Canada lynx due to the availability of other high quality denning habitat and extensive foraging habitat and travel corridors in NOCA.

The long-term, post-project, road-related impacts (risk of mortality, noise, human activity) would be the same minor impacts that existed historically in the river corridor, and would be “Not Likely to Adversely Affect” Canada lynx.

Bald Eagle. Bald eagle foraging and wintering habitat occurs along Lake Chelan. The only known bald eagle nest site is at the head of Lake Chelan, a minimum of 13 river miles from the project area. However, bald eagle populations are known to be expanding and the project area could provide favorable foraging and nesting habitat in the future. If so, eagles could be temporarily displaced by disturbance during construction and subsequent use of the rebuilt road. Given the extensive amount of nesting and foraging habitat present throughout the Stehekin Valley, and the lack of eagles currently nesting or foraging in the vicinity of the project area, Alternative C would be “Not Likely to Adversely Affect” bald eagles.

Northern Spotted Owl. There is no suitable nesting habitat for northern spotted owl in the Stehekin River corridor, and there is a very low likelihood that northern spotted owl may occur or may be actively nesting within the area affected by Alternative C (Road Reconstruction) during project implementation. If owls were present, road reconstruction could temporarily affect owls because of increased levels of noise and human activity, which could affect nesting success. To mitigate these potential adverse impacts, the project area would be surveyed for owls prior to implementation of construction activities.

If an individual(s) or an active nest were found, an Action Area would be delineated around active nest trees. The Action Area would have a radius of 1,000 feet extending out from in all directions during the nesting season (March 1 to September 6) (USFWS 2005). Construction activities would not be allowed during the owl breeding and nesting seasons, March 1 to at least September 6 near individuals or a known nest site (see Alternative C BMPs and Mitigation Measures: Section 5.3.4.6).

There are extensive areas of high quality foraging habitat in the forested, Wilderness areas adjacent to the river corridor. The river corridor where construction activities would be occurring has only marginal foraging habitat for northern spotted owl. Therefore, construction activities would not be expected to affect owl foraging activity.

It is determined that the relatively short-term construction activities associated with Alternative C would be “Not Likely to Adversely Affect” northern spotted owl due to the proposed mitigations, the lack of suitable foraging and nesting habitat in the action area, and the availability of high quality, contiguous foraging habitat and nesting habitat outside the action area.

The long-term, post-project, road-related impacts (risk of mortality, noise, human activity) would be the same minor impacts that existed historically in the river corridor, and would be “Not Likely to Adversely Affect” northern spotted owl.

Western Toad and Columbia Spotted Frog. The road-related mortality rates of smaller, less mobile species such as amphibians and reptiles may increase during increased levels of construction traffic. Road-related mortality would be a negligible, short-term affect because reconstruction activities would not occur until after the spring reproductive season because of high water and wet weather soil mitigations (see Alternative C BMPs and Mitigation Measures: Section 5.3.4.6), post-project the road would be a low traffic area, and the river corridor has little, if any, reproductive habitat for these species (e.g. marshes, slow water, pond margins).

Therefore, Alternative C would not affect western toad and Columbia spotted frog.

Other Birds. The noise and human activity during the 3½ to 11 year road reconstruction period could affect other special status bird species, specifically northern goshawk, Vaux’s swift, pileated woodpecker, Lewis’ woodpecker, and black-backed woodpecker.

There is no pileated, Lewis’, or black-backed woodpecker habitat (mature and old growth forests with lots of snags, or recent burn areas) between Car Wash Falls and Bridge Creek. Therefore, implementing Alternative C would not affect these woodpeckers.

Northern goshawks use upland mesic, coniferous forests and deciduous riparian forests, and fledged goshawks and old nests occur above High Bridge (MP 11.2). Suitable nesting and foraging habitats are also available along the PCT. The construction activities could have a negligible, moderately long-term adverse impact on goshawks because they would avoid nesting and foraging in the construction areas. However, there is other high quality, extensive nesting and foraging habitat in NOCA.

The mature and old growth stands along the PCT provide Vaux’s swift nesting habitat and the Stehekin River corridor provides foraging habitat. The construction activities could have a negligible, short-term adverse impact on Vaux’s swift because they would avoid foraging in the construction areas. However, there is other high quality foraging habitat along the river.

The long-term, post-project, road-related impacts (risk of mortality, noise, human activity) would be the same minor impacts that existed historically in the river corridor, and would not affect these species.

Gray Squirrel. There is no gray squirrel habitat (ponderosa pine mixed with hardwood) between Car Wash Falls and Bridge Creek, so implementing Alternative C would not affect gray squirrel.

Townsend’s Big-eared Bat. The Stehekin River corridor has rock cliff crevices and low human activity levels that provide high quality bat roosting habitat. Most roosting bats are extremely sensitive to human disturbance. Townsend’s big-eared bats hibernate during winter months when temperatures are between 0°C and 11.5°C (32-53°F). The bats hibernate in tight clusters, which may help stabilize body temperature against external changes in temperature. Males may select warmer hibernacula than do females and are more easily aroused and active in winter than are females. Their winter sleep is interrupted by frequent periods of wakefulness during which they move about in the caves or from one cave to another. Reproductive bats would be roosting and seasonal hibernation activity (e.g. site selection) may occur during the construction season. Therefore, the noise and activity levels during implementation of Alternative C would have a moderate to major,

relatively short-term adverse impact on Townsend's big-eared bats during the 3½ to 11 year road reconstruction period.

The post-project, long-term road-related impacts (risk of mortality, noise, human activity) would be the same minor to moderate, long-term adverse impacts that existed historically in the river corridor.

7.6.6.2 Cumulative Impacts

This upper Stehekin River above Car Wash Falls (MP 12.9) has not had motorized access since October 2003. Alternative C (Road Reconstruction) would increase the long-term, wildlife cumulative impacts associated with the road (human noise and activity, road-related mortality, habitat alteration) by reintroducing approximately 7.2 miles of road access in the constricted Stehekin River corridor.

7.6.6.3 Compliance with Laws and Policy

ESA. It is determined that the multi-year (~3½ to 11 years) road reconstruction activities in Alternative C would be "Not Likely to Adversely Affect" the ESA listed species that may occur in the project area due to one or more of the following factors: 1) lack of current occupancy, 2) proposed mitigations, 3) the availability of high quality, extensive foraging, denning, and/or nesting habitat and travel corridors outside the action area, and/or 4) lack of suitable foraging and nesting habitat in the action area.

It is also determined that long-term, post-project Alternative C would be "Not Likely to Adversely Affect" the ESA listed species that may occur in the project area because the road-related impacts (risk of mortality, noise, human activity) would be the same minor impacts that existed historically in the river corridor.

The NPS would informally consult with the USFWS to obtain their concurrence with these "Not Likely to Adversely Affect" determinations should this alternative be selected for implementation.

NPS Management Policies 4.4.2.3, Management of Threatened and Endangered Plants and Animals. Alternative C would meet the intent of NPS Management Policies 4.4.2.3 that requires the NPS to survey, protect, monitor, restore, and strive to recover all ESA listed, proposed, or candidate species that are native to NPS units, and to manage, to the greatest extent possible, state, and locally endangered and threatened species as federally listed species.

7.6.6.4 Conclusions

The reconstruction would take 3½ to 11 years to complete, depending on the number of dump trucks that are available and the timing of seasonal low flow. The Stehekin Valley Road has low ambient noise and activity levels, and wildlife would probably avoid construction sites during working hours. Construction activities of this duration and intensity would have minor to moderate adverse impacts on all of the species that utilize the project area and the haul route from Company Creek pit.

Post-project road use, road maintenance, and emergency road repairs may also cause avoidance of the immediate area around sites that have relatively high levels of human or mechanical noise and activity. These impacts could have minor to moderate, long-term adverse impacts on all of the species that utilize the project area.

The road-related mortality rates of smaller, less mobile animals such as amphibians, reptiles, and butterflies may increase due to construction and post-construction traffic.

Alternative C would also result in some short- and long-term sediment delivery to the Stehekin River due to construction activities and periodic flood damage. Approximately 2.6 acres of floodplain and riparian habitat would be filled during road construction. These impacts would be minor, long-term adverse impacts for all amphibious and riparian dependent species that utilize the project area.

It is determined that the multi-year (~3½ to 11 years) road reconstruction activities in Alternative C would be “Not Likely to Adversely Affect” the ESA listed species that may occur in the project area due to one or more of the following factors: 1) lack of current occupancy, 2) proposed mitigations, 3) the availability of high quality, extensive foraging, denning, and/or nesting habitat and travel corridors outside the action area, and/or 4) lack of suitable foraging and nesting habitat in the action area.

It is also determined that long-term, post-project Alternative C would be “Not Likely to Adversely Affect” the ESA listed species that may occur in the project area because the road-related impacts (risk of mortality, noise, human activity) would be the same minor impacts that existed historically in the river corridor.

Alternative C would not affect most of the other special status species (western toad, Columbia spotted frog, gray squirrel, and special status birds) due to lack of suitable habitat. However, the noise and activity levels during implementation of Alternative C would have a moderate to major, relatively short-term adverse impact on Townsend’s big-eared bats during the 3½ to 11 year road reconstruction period.

7.6.7 ALTERNATIVE C (ROAD RECONSTRUCTION) VISITOR ACCESS, EXPERIENCE, AND PARK OPERATIONS

Visitor Access. Motorized vehicle access would be reestablished between Car Wash Falls (MP 12.9) and Glory (Appendix A4 and A5). The motorized and mechanized access would end at Glory, as it has since 1995.

The Stehekin Valley Road between Car Wash Falls and Glory would be open to cyclists again. Most cyclists are day users that rent bicycles and travel between Stehekin and High Bridge Historic District (MP 11.2). Therefore, reopening the road to bicycles between Car Wash Falls and Glory would have minor, long-term beneficial affects for cyclists.

Hikers, stock users, and cross-country skiers would continue to have easy access to the Wilderness and other park trails via the PCT. Typically, most stock trips begin at the Stehekin Valley Ranch and follow the PCT. Stock use would continue on the rerouted section of the trail essentially unchanged. Hikers and cross-country skiers would still be able to park at Car Wash Falls parking area or Tumwater Camp and access the PCT via the MP 12.7 spur trail (Appendix A2).

PCT hikers approaching Stehekin from the west (Seattle) side could have the option of taking a shuttle from Bridge Creek (MP 15.9) or Glory (MP 20.1) to Stehekin as they did prior to 2003 and 1995, if the NPS or a permittee choose to operate a shuttle in the future.

Motorists and cyclists would have access to Dolly Varden, Shady, Bridge Creek, Park Creek, Flat Creek, and Glory camps. Only hikers and stock users would be able to access to Cottonwood Camp, as they have since 1995.

Since the 2003 flood, some local businesses have adjusted their operations to provide drop camp, meal, and hostel-style tent services at Bridge Creek for through-hikers. These new services may or may not continue under this alternative due to restored motorized and mechanized access to Glory.

Motorized recreation is not a primary use in the Stehekin area because there are very few privately-owned vehicles and visitors cannot bring vehicles into the area. Therefore, Stehekin residents and visitors who want to ride the shuttle would be the user groups beneficially affected by the road reroute. The NPS estimates the shuttle served an average of 2,500 people annually, or approximately 7 percent of the total Stehekin area visitors. Shuttle service ended at MP 9.5 near the Stehekin Valley Ranch in 2003 and at Glory in 1995, after the floods. Shuttle service to High Bridge Historic District resumed in the fall of 2005 after implementation of the *Coon Run* project. Therefore, reestablishing motorized access from Car Wash Falls to Glory would have minor, beneficial long-term affects for the users compared to the No Action Alternative.

Visitor Experience. Vehicle and bicycle access would be reestablished between Car Wash Falls and Glory. Visitors who desire increased solitude, natural soundscapes, primitiveness, naturalness and remoteness would perceive these changes as moderate to major, long-term adverse impacts.

The individuals who would like vehicle and bicycle access to southern portions of the Wilderness reestablished would perceive implementation of Alternative C (Road Reconstruction) as a moderate to major, long-term beneficial affect, compared to the No Action Alternative.

If 5 to 10 dump truck hauled 4 roundtrips from Company Creek pit per day, it would take approximately 183 to 459 days to complete the construction hauling between Stehekin and the project area. The construction season would be limited by seasonal high water, wet soil mitigations, and would coincide with the peak recreation season (summer-fall). Visitors using any part of the Stehekin Valley Road or Park destinations near the road would be exposed to noise, exhaust fumes, and dust created by heavy equipment traffic, rock blasting, and other construction activities.

To mitigate these affects and visitor safety concerns, the NPS would not allow construction traffic during weekends and federal holidays, and would limit construction traffic and activities to daylight hours. Despite mitigations, implementation of Alternative C would be a major affect on area visitors during the 3½ to 11 year reconstruction period.

Alternative C would reestablish the need for routine road maintenance and emergency road repairs between Car Wash Falls and Cottonwood Camp. Because the road would bisect the Wilderness, and road construction, reconstruction, routine maintenance, and emergency repairs would correspond with the peak seasons of visitor use, these operations would degrade the Wilderness qualities of the Stephen Mather Wilderness.

Park Operations. NPS staff would have motorized access to Glory for emergency services (e.g. search and rescue, fire suppression) for the first time since 2003. Most of these park operations are already provided by air support due to the large expanses of roadless and Wilderness areas. Reestablishing vehicle and bicycle access to Glory would probably create a need for increased emergency services.

Vehicle access for other park operations such as trail maintenance and noxious weed control ended at MP 9.5 near Stehekin Valley Ranch in 2003 and at Glory in 1995, after the floods. Since then, park personnel have had to hike or pack stock longer distances to perform these services. Alternative C would reestablish motorized access for these activities but would also increase the need for weed control over time because vehicles are a primary source of weed introduction and proliferation.

Alternative C would establish motorized access, and the need for routine road maintenance and emergency road repairs between Car Wash Falls and Cottonwood Camp. These park operations would be ongoing for the life of the road, and would correspond with the peak seasons of visitor use.

Wilderness and other Park visitors would experience moderate to major adverse impacts (noise, dust, exhaust) during these operations.

7.6.7.1 Cumulative Impacts

There is no motorized access to the Stehekin area from outside locations, and there was a very small, closed road system in the Stehekin area (approximately 26 miles) prior to 1995. Of the total miles (pre-1995), 12 miles were within the Park. Approximately 8 miles of road between Car Wash Falls and Glory has been closed since 2003; approximately 2 miles has been closed above Glory since 1995. Alternative C (Road Reconstruction) would reconstruct approximately 8 miles of road along the Stehekin River (adjacent to the Wilderness), or 67 percent of the miles within the Park. There are no other road closures planned within the Park or the Stehekin area within the reasonably foreseeable future.

Alternative C would require bringing many tons of fill and other construction materials (e.g. riprap and large culverts) into Stehekin by ferry and hauling the material to the project site. Therefore, the community of Stehekin and visitors on the Stehekin Valley Road and destinations near the road would be subjected to dust, noise, exhaust, and heavy equipment traffic during the 3½ to 11 year construction period.

7.6.7.2 Compliance with Laws and Policy

The Organic Act directs the NPS to promote and regulate the use of national parks to conserve resources for their enjoyment by existing and future generations. NPS Management Policies and DO #17 Tourism identify visitor use patterns. Primary user groups in the Complex include hikers, cyclists, and stock users who access the Park during the summer. Alternative C (Road Reconstruction) would continue to provide bicycle access to High Bridge Historic District, and Wilderness and PCT access to hikers and stock users. These are the most commonly used routes for these user groups. In addition, Alternative C would reestablish bicycle access between MP 12.7 and Glory (MP 20.1), similar to pre-2003 flood conditions.

Alternative C would not meet DO #47 that requires the NPS to the fullest extent practicable “to protect, maintain, or restore natural soundscapes in a condition unimpaired by inappropriate or excessive noise sources” because the new road would bisect the Wilderness, and road construction, reconstruction, routine maintenance and emergency repairs would correspond with the peak seasons of visitor use. As a result, this alternative would degrade the wilderness character (including the soundscape) of the Stephen Mather Wilderness.

Alternative C would not meet the intention of NPS Management Policies for park roads “...to enhance the quality of a visit, while providing for safe and efficient travel, with minimal or no impacts on natural and cultural resources (9.2.1.1)...” because the road reroute would impact numerous drainages, riparian, and wetland areas, and the road between Car Wash Falls and Glory would continue to be damaged by periodic floods.

7.6.7.3 Conclusions

Eight miles of road would be reconstructed between Car Wash Falls and Glory. Visitors who desire increased solitude, natural soundscapes, primitiveness, naturalness and remoteness would perceive these changes as moderate to major, long-term adverse impacts.

The individuals who would like vehicle and bicycle access to southern portions of the Wilderness reestablished would perceive these changes as moderate to major, long-term beneficial affects.

Alternative C (Road Reconstruction) would require bringing many tons of fill and other construction materials (e.g. riprap and large culverts) into Stehekin by ferry and hauling the material to the project site. Therefore, Stehekin, the Stehekin Valley Road, and Park destinations in vicinity of the road would be subjected to dust, noise, and exhaust caused by heavy equipment traffic, rock blasting, and other construction activities during the 3½ to 11 year reconstruction period.

Since the 2003 flood, some local businesses have adjusted their operations to provide drop camp, meal, and hostel-style tent services at Bridge Creek for through-hikers. These new services may or may not continue under this alternative due to restored motorized and mechanized access to Glory.

NPS staff would have motorized access as far as Glory for the first time since the fall of 2003. Since 2003, park personnel have had to hike or pack stock longer distances to perform these services. Reestablishing motorized access to Glory would facilitate park operations but would also increase the need weed control because vehicles are a primary source of weed introduction and proliferation.

Alternative C would reestablish access and the need for routine road maintenance and emergency road repairs as far as Glory. Because the new road would bisect the Wilderness, and road construction, reconstruction, routine maintenance, and emergency repairs would correspond with the peak seasons of visitor use, this alternative would degrade wilderness qualities.

7.6.8 ALTERNATIVE C (ROAD RECONSTRUCTION) SOCIO-ECONOMICS

7.6.8.1 Impacts Analysis

Alternative C (Road Reconstruction) would create long-term changes in the local economy, including a return to pre-October 2003 visitor use patterns and permittee services. The changes in permittee services that followed the 2003 flood would probably continue.

The NPS estimates the shuttle served an average of 2,500 people annually, or approximately 7 percent of the total Stehekin area visitors. Shuttle service above High Bridge Historic District has not been offered since 2003. The NPS or a permittee could offer shuttle service as far as Glory after implementation of Alternative C. The NPS-run shuttle service above High Bridge is not cost effective to operate in terms of cost per user. The NPS estimates it costs \$25,000 per year to subsidize the shuttle service.

The implementation costs of Alternative C would be for road reconstruction and repairs between MP 12.9 and 20.1 (Table 3). The engineering costs for this alternative reflect the substantial engineering challenges associated with rebuilding a road within the floodplain of the Stehekin River and through the MP 15 landslide.

The NPS would have ongoing costs for routine road maintenance and future costs for emergency road reconstruction, similar to post-1995 and pre-2003 conditions.

Local Economy. Several Stehekin Valley and Lake Chelan businesses are tied to visitor use within the project area. Lake Chelan businesses provide transportation services to get visitors into Stehekin, and Stehekin businesses offer visitor services such as food, lodging, guided backpacking, bicycle rentals, and horseback tours.

Alternative C would restore vehicle and bicycle access from Car Wash Falls to Glory. This action would be expected to restore visitor use and local business operations (e.g. bicycle rentals) to pre-2003 levels (minor, long-term beneficial affect).

The changes in permittee services including hostel-style tents, food, and drop camp services at Bridge Creek that have assisted visitors in accessing the upper valley since the 2003 flood would probably continue. Local permittees that continue to provide increased backcountry services as they have since 2003 would continue to have moderate, long-term socio-economic benefits.

The local Stehekin merchants would have major, short-term socio-economic benefits during road reconstruction from increased lodging, food, gas, and supply purchases. Local contractors may also have major, short-term socio-economic benefits from contracting a variety of construction-related work or equipment rentals.

Chelan county quarries, equipment rentals, and barge operators would have major, short-term socio-economic benefits from importing large amounts of road fill material for the road reconstruction.

Implementation Costs. In 2003, the FHA estimated Alternative C road reconstruction would cost approximately 6.6 million dollars to implement (Table 2). Since that time, the landslide at MP 15 has increased and additional fill material would be needed to reconstruct the road in this location, increasing the cost of implementation. The local economy would have major, short-term socio-economic benefits by providing some of the labor, supplies, or equipment needed to complete the road reconstruction.

The 2.5-mile long road to trail conversion between Glory and Cottonwood Camp would cost approximately \$26,400 to build. Construction would be completed by NPS staff.

NPS staff would implement administrative actions, and the local economy would not directly benefit.

Maintenance Costs. Reconstructing the road in this location would also have large, long-term costs for future maintenance and emergency reconstruction; the most recent major reconstruction was in 1996. Some of these expenditures would also benefit the local community.

At the same time, Alternative C would have major, long-term adverse impacts on Park budgets for road maintenance and emergency road repairs similar to post-1995 and pre-2003 conditions (previous costs for road repairs are not available). Routine road maintenance would average approximately \$10,397 per year (\$1,444 per mile x 7.2 miles).

The NPS would have ongoing costs for routine hiking and stock trail maintenance above Glory of \$1,485 (\$550 per mile x 2.7 miles). The cost of trail maintenance would probably be less (minor affect) when vehicle access is restored to Glory because crews would have 7.2 fewer miles to hike or pack to the trailheads.

7.6.8.2 Cumulative Impacts

There are no expected cumulative impacts that would affect socio-economics in the project area.

7.6.8.3 Compliance with Laws and Policy

This EA meets the NPS NEPA and DO #12 requirements to consider socio-economics in NEPA analysis.

7.6.8.4 Conclusions

The changes in permittee services including hostel-style tents, food, and drop camp services at Bridge Creek that have assisted visitors in accessing the upper valley since the 2003 flood would probably continue, and local permittees that provide these services would continue to have moderate,

long-term socio-economic benefits. Other local concessions would be expected to return to pre-2003 levels following implementation of Alternative C (Road Reconstruction) (minor, long-term beneficial affect).

The local Stehekin merchants would have major, short-term economic benefits during road reconstruction from increased lodging, food, gas, and supply purchases. Local contractors may also have major, short-term socio-economic benefits from contracting a variety of construction-related work or equipment rentals.

Chelan county quarries, equipment rentals, and barge operators would have major, short-term socio-economic benefits from importing large amounts of road fill material for the road reconstruction.

Reconstructing the road in this location would also have major, long-term costs for future maintenance and emergency reconstruction; the most recent major reconstruction was in 1996. Some of these expenditures would also benefit the local community. At the same time, Alternative C would have major, long-term adverse impacts on Park budgets for road maintenance and emergency road repairs similar to post-1995 and pre-2003 conditions

The NPS would have ongoing costs for routine hiking and stock trail maintenance above Glory. The cost of trail maintenance would probably be less (minor affect) when vehicle access is restored to Glory because crews would have 7.2 fewer miles to hike or pack to the trailheads.

7.6.9 ALTERNATIVE C (ROAD RECONSTRUCTION) WILDERNESS

7.6.9.1 Impacts Analysis

Wilderness Character. Approximately 71 percent of the roadbed between Car Wash Falls (MP 12.9) and MP 15.3 washed out in the 2003 flood. Since that time, erosion and revegetation have given the road a more natural appearance and increased its wilderness character. The reconstruction would require large amounts of riprap, some rock blasting, bolts, and concrete, and would be visible from vantage points along and above the river. Therefore, the reconstructed road would be a visual intrusion equal to or greater than pre-2003 conditions.

Between October 2003 and the fall of 2005, there was no vehicle traffic above MP 9.5. During this time, Wilderness qualities of solitude and remoteness increased in the non-Wilderness road corridor, Stehekin River Valley, and the Stephen Mather Wilderness. The *Coon Run Project 2005* reestablished vehicle access to Car Wash Falls (MP 12.9) in the fall of 2005; Alternative C (Road Reconstruction) would reestablished another 7.2 miles of vehicle access between Car Wash Falls and Glory. During the 2 to 3 year construction period there would be dust, noise, and exhaust fumes from vehicles, heavy equipment, and other construction activities (e.g. blasting, rock hauling) that would coincide with peak visitor seasons.

After construction is completed, the wilderness character between Car Wash Falls and Glory would be similar to 1995 to 2003 conditions when visitors occasionally experienced the dust, sight, sound, and smell of vehicles. Motorized use between Car Wash Falls and Glory would remain low after implementation of Alternative C, as it was prior to 2003, because there is no car ferry to Stehekin and the only vehicles belong to Stehekin residents, the NPS, or a shuttle service. There would be few conflicts between motorized and non-motorized users between Car Wash Falls and MP 15.3 because the majority of non-motorized use would be on the PCT and other trails. Conflicts between MP 15.3 and Glory would be the same as pre-2003 conditions, since all user groups are likely to follow the Stehekin Valley Road in this location. However, these conflicts are probably negligible.

The new road would be rebuilt in the 100-year floodplain of the Stehekin River, and the routine maintenance and emergency road repairs due to flood damage would be similar to pre-2003 conditions. The last major reconstruction was in 1996 after the 1995 100-year flood, and there has not been any road maintenance or emergency road repairs since 2003. Therefore, road reconstruction between MP 12.9 and MP 20.1 would have major, long-term adverse impacts on wilderness character.

The non-Wilderness road corridor between Glory and Cottonwood Camp would achieve a more natural appearance and increased wilderness character over time because the remaining roadbed would be maintained as a trail, as it has been since 1995. This would be a minor to moderate, beneficial affect on wilderness character above MP 20.1.

Wilderness Facilities. Alternative C would reestablish motorized access to the Wilderness as far as Glory. Bicycle access would also end at Glory because portions of the Glory to Cottonwood Camp trail are in designated Wilderness. Visitors would have vehicle and bicycle access to the Dolly Varden, Shady, Bridge Creek, Park Creek, Flat Creek, and Glory camps, and to upper valley trails as they did between 1995 and 2003. At the same time, reconstruction would increase visitor access to and views of the river. Therefore, Alternative C would have moderate, beneficial affects for motorists and cyclists that have limited road access to the Wilderness.

The majority of hikers and stock users follow the PCT and other Wilderness trails, rather than the Stehekin Valley Road. However, road reconstruction would allow these users the same access to the river and backcountry camps above MP 12.9 that existed prior to 1995. The former road between Glory and Cottonwood Camp would be maintained as a hiking and stock trail, as it has been since 1995. Therefore, Alternative C would have minor to moderate beneficial affects for these users.

Wilderness Designation. The Stehekin Valley Road existed in this location at the time of Wilderness designation. Therefore, Alternative C would have no affect on current Wilderness designation. However, it would preclude the option to designate the 7.2-mile long (87 acre) non-Wilderness road corridor between Car Wash Falls and Glory as Wilderness in the reasonably foreseeable future. The 2.5-mile long (30 acre) non-Wilderness road corridor between Glory and Cottonwood Camp could still be designated as Wilderness through congressional legislation after implementation of Alternative C.

7.6.9.2 Cumulative Impacts

There are no expected cumulative impacts that would affect the Wilderness in the project area.

7.6.9.3 Compliance with Laws and Policy

Alternative C (Road Reconstruction) would continue to maintain the Stephen Mather Wilderness for future use and enjoyment as Wilderness.

7.6.9.4 Conclusions

Since the 1995 and 2003 floods, erosion and revegetation have given the old road between Car Wash Falls and Cottonwood Camp a more natural appearance and increased its wilderness character. The reconstructed road would be a visual intrusion equal to or greater than pre-2003 conditions. At the same time, reconstruction would increase visitor access to and views of the river.

Wilderness qualities of solitude and remoteness have increased in the non-Wilderness road corridor, Stehekin River Valley, and the Stephen Mather Wilderness since 1995 and 2003. During the 2 to 3

year road reconstruction period there would be dust, noise, and exhaust fumes from vehicles, heavy equipment, and other construction activities (e.g. blasting, rock hauling) that would coincide with peak visitor seasons. After construction is completed, the wilderness character between Car Wash Falls and Glory would be similar to 1995 to 2003 conditions when visitors occasionally experienced the dust, sight, sound, and smell of vehicles. Motorized use between Car Wash Falls and Glory would remain low, and the majority of non-motorized use would be on the PCT and other trails.

The road would be reconstructed in the 100-year floodplain of the Stehekin River, and the routine maintenance and emergency road repairs due to flood damage would be similar to pre-2003 conditions. Therefore, road reconstruction between MP 12.9 and MP 20.1 would have major, long-term adverse impacts on wilderness character.

The former road between Glory and Cottonwood Camp would be maintained as a non-motorized trail, as it has been since 1995. The majority of hikers and stock users follow the PCT and other Wilderness trails; however, road reconstruction would allow these users the same access to the river and backcountry camps above MP 12.9 that existed prior to 1995. Visitors who desire increased wilderness character would perceive these changes as moderate, long-term beneficial affects.

Alternative C (Road Reconstruction) would have no affect on current Wilderness designation, but it would preclude the option to designate the 7.2 mile long (87 acre) non-Wilderness road corridor between Car Wash Falls and Glory as Wilderness in the reasonably foreseeable future. The 2.5-mile long (30 acre) non-Wilderness road corridor between Glory and Cottonwood Camp could still be designated as Wilderness through congressional legislation after implementation of Alternative C.

7.6.10 ALTERNATIVE C (ROAD RECONSTRUCTION) PACIFIC CREST TRAIL

7.6.10.1 Impacts Analysis

Reconstructing the Stehekin Valley Road in its former location from Car Wash Falls to Glory (Alternative C) would have the following affects to visitor access, PCT trail condition, backcountry campsite availability, and visitor use.

Visitor Access to the PCT. Prior to the 1995 flood, motorized access was available to the PCT trailhead at Bridge Creek (MP 15.9). Motorized access to Bridge Creek was restored in 1996. Between October 2003 and the fall of 2005, motorized access ended at MP 9.5 near Stehekin Valley Ranch. The *Coon Run Project* was completed in the fall of 2005 and restored vehicle access to Car Wash Falls (MP 12.9).

The majority of stock trips would still originate at the Stehekin Valley Ranch. There would be no stock trailer parking above High Bridge (MP 11.2). These uses would be unchanged since 1995.

PCT hikers approaching from Stehekin would have motorized access to the PCT as far as Bridge Creek, as they did prior to October 2003. PCT hikers approaching Stehekin from the west (Seattle) side may have the option of taking a shuttle from Bridge Creek (MP 15.9) or from High Bridge to Stehekin, as they did prior to October 2003. NPS shuttle service to High Bridge resumed in the fall of 2005, after completion of the *Coon Run Project*.

Local businesses have adjusted their operations since 2003 to provide increased drop camp services to Bridge Creek Camp and Cottonwood Camp to accommodate through-hikers. Other permittee services at Bridge Creek include meal service and hostel-style cabin tents. These services may still be in demand and be offered to visitors after implementation of Alternative C (Road Reconstruction).

PCT Condition. The majority of hikers and stock users used the PCT (rather than the road) prior to 2003, and use patterns have not changed. The NPS would continue to maintain the trail to allow this ongoing level of use.

Backcountry Campsite Availability. There would be no change in the number of backcountry campsites available for PCT users. Dolly Varden Camp (MP 13) on the Stehekin River and was heavily affected during the 2003 flood, and future floods could wash away the one remaining tent site. This would have a negligible effect on PCT users, since there are other camps in closer proximity to the PCT (Figure 1).

Visitor Use. Day trip hiking along the PCT north of Bridge Creek should return to pre-2003 levels if vehicle access is restored to MP 15.9. However, this potential change in use would be negligible.

The number of through-hikers over Cascade Pass from Highway 20 on the west (Seattle) side of the Park should return to pre-2003 levels if shuttle service is restored to Bridge Creek, and/or the post-2003 permittee services at Bridge Creek and Cottonwood continue. Any change is expected to be negligible.

7.6.10.2 Cumulative Impacts

There are no expected cumulative impacts that would affect the PCT in the project area.

7.6.10.3 Compliance with Laws and Policy

In accordance with the National Trail Systems Act of 1968, the PCT must be maintained as "...an extended trail so located as to provide for maximum outdoor recreation potential and for the conservation and enjoyment of the nationally significant scenic, historic, natural, or cultural qualities for the areas through which such trails may pass." Alternative C (Road Reconstruction) would maintain access to the PCT in a manner, which does not affect the trail itself, or its potential to offer outdoor recreation opportunities for a broad range of user groups (motorists, hikers, and stock users).

7.6.10.4 Conclusions

Alternative C (Road Reconstruction) would have only a negligible affect on PCT use. There would be a minor to moderate affect on facilities used in conjunction with the PCT because there would be motorized access and may be shuttle service to the PCT trailhead at Bridge Creek.

The new permittee services at Bridge Creek may continue to be in demand and to provide increased services at Bridge Creek. PCT use levels should return to pre-2003 levels. Therefore, Alternative C would have a minor to moderate, beneficial affects for the PCT.

7.6.11 ALTERNATIVE C (ROAD RECONSTRUCTION) WILD AND SCENIC RIVERS

7.6.11.1 Impacts Analysis

Free-flowing Character. Reconstructing and repairing the Stehekin Valley Road from Car Wash Falls to Glory (Alternative C) would have moderate, long-term adverse impacts to the free-flowing character of Segment 2 of the Stehekin River. Streambank modifications to stabilize the riverbank and redirect stream flow would include approximately 1.9 miles of riprap and/or road fill. These flow modifications are expected to alter the river's character by changing bank erosion, sediment transport and deposition, and floodplain and channel forming processes.

Classification. Alternative C may affect the Scenic WSR classification of Segment 2. According to guidelines for WSR eligibility, classification, and management, river areas classified as Scenic have

“shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by road” (FR 1982). When NPS completed its WSR Eligibility Study of the Stehekin River in 2002, Segment 2 was classified as a Scenic River. At the time, there was some riprap from the old roadbed remaining, as well as camps at Tumwater, Dolly Varden, Shady, Bridge Creek, Park Creek, Flat Creek, Glory, and Cottonwood Camp.

Depending on the extent of streambank modification needed to construct a road that will be able to withstand 100-year floods, Alternative C could affect the river’s status for WSR designation under a Scenic classification. The extent of riprap and/or rock bank barbs may make a “Recreational” classification more appropriate for this segment.

Outstandingly Remarkable Values. Alternative C would reconstruct the Stehekin Valley Road to allow continued motorized access along the Stehekin River as far as Glory. Although negligible to minor, short-term affects may occur to fish, wildlife, scenic, and recreational ORVs while the project is being implemented, in the long-term these values are expected to remain, as they were when the river’s eligibility was assessed in 2002. In 2002, the Stehekin Valley Road was already closed to motorized use from Glory to Cottonwood Camp because of major flood damage, which occurred in 1995. Alternative C would have no effect on the project area’s prehistoric resources, historic resources, or geologic ORVs.

7.6.11.2 Cumulative Impacts

The *Coon Run* and *Stehekin Valley Road Improvement* projects (NPS 2005a; 2005b) will have moderate, long-term adverse impacts to river Segment 1 free-flowing characteristics.

Alternative C (Road Reconstruction) would also have long-term, moderate adverse impacts to the river’s free-flowing character. Thus, Alternative C in river Segment 2 and the other Stehekin Valley Road reconstruction projects in river Segment 1 downstream of the project area (MP 4 to MP 10) would have adverse cumulative impacts on the free-flowing character along two of the three segments of the Stehekin River that are eligible for WSR designation.

7.6.11.3 Compliance with Laws, Policy

Alternative C (Road Reconstruction) would not fully protect the free-flowing condition of river Segment 2, but would protect ORVs. Depending on the extent of bank modification needed to build a new road, a Recreational classification may become more appropriate for this river segment. It is likely that Segment 2 would still qualify for inclusion in the National WSR system, even if the free-flowing character were altered by bank modifications, as it was when the segment was evaluated in 2002.

7.6.11.4 Conclusions

Alternative C (Road Reconstruction) would have moderate, long-term adverse impacts to the Stehekin River’s WSR status. It would degrade the river’s free-flowing character, but have no long-term, adverse impact on ORVs in the project area. It is possible that Alternative C would change the appropriate classification for Segment 2 from Scenic to “Recreational.”

7.6.12 ALTERNATIVE C (ROAD RECONSTRUCTION) AIR QUALITY

7.6.12.1 Impact Analysis

The road reconstruction would have moderate to major, short- and long-term adverse impacts to air quality (dust, exhaust) from Stehekin to Glory (20.1 miles). Reconstruction would require 5 to 10 dump trucks to make 4 roundtrips per day to bring the barged in fill material from Company Creek pit to the work sites. This traffic, and other construction traffic and activities would occur for 3½ to 11 years during the peak visitor seasons.

Air quality affects would be partially mitigated by limiting the hours of operation (daylight only, no weekends or holidays), watering work surfaces, minimizing soil disturbance, and revegetating disturbed soil areas as soon as practical following construction.

Long-term air quality affects would be similar to post-1995 and pre-2003 conditions, when the Stehekin Valley Road was open to Glory. Affects related to motorized visitor use, Park administrative use, and shuttle service would be localized, temporary (dissipating within a few minutes), and infrequent. Affects related to routine road maintenance and emergency road reconstruction due to flood damage would be moderate to major, short-term adverse impact depending on the level of activity.

There would be no motorized access above MP 20.1, so there would be no air quality affects.

7.6.12.2 Cumulative Impacts

The road reconstruction from MP 12.9 to MP 20.1 would have moderate to major, short-term adverse air quality impacts between Stehekin and the work sites for 2 to 3 years due to fill material hauling and other construction traffic and activities.

The NPS is also proposing to do some minor reroutes of the Stehekin Valley Road at MP 7 and MP 7.5 in 2006, followed by paving between MP 4 and MP 9.1 in 2010. The road reroutes and reconstruction in Alternative C may be concurrent with one or more these other actions. However, it is unlikely that these actions would be concurrent, and no cumulative air quality impacts are expected.

Some negligible adverse air quality impacts would continue to occur throughout the project area from non-motorized visitor use (campfire smoke), stock users (dust), and periodic trail maintenance activities (dust).

7.6.12.3 Compliance with Laws and Policy

The project area would continue to attain all ambient air quality standards and meet management criteria for a Class I airshed.

7.6.12.4 Conclusions

The road reconstruction would have moderate to major, short- and long-term adverse impacts to air quality (dust, exhaust) from Stehekin to Glory (20.1 miles) for 3½ to 11 years during the peak visitor seasons. The construction related air quality affects would be partially mitigated by weekend and holiday closures, daylight-only operations, and other mitigations (see Alternative C BMPs and Mitigation Measures: Section 5.3.4.11).

The post-project, long-term, adverse air quality affects related to motorized visitor use, Park administrative use, and shuttle service would be localized, temporary, and infrequent.

Air quality affects related to routine road maintenance and emergency road reconstruction due to flood damage would be moderate to major, depending on the level of activity.

7.6.13 ALTERNATIVE C (ROAD RECONSTRUCTION) COMPLIANCE WITH THE LAKE CHELAN NRA GMP

Reconstruction of the Stehekin Valley Road in its prior location (Alternative C) would *not meet* the following direction in the 1995 LACH GMP.

“Preserve or restore ecological processes and conditions in wetland, floodplain, shoreline, and riparian areas.”

“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.”

“The NPS would not manipulate the Stehekin River protect federal property except roads and bridges to the following criteria. Existing public roads would be protected in erosion/river conflict zones only if: (a) there are no feasible alternatives, (b) funds are available, (c) the actions will have less impacts than other alternatives, and (d) the actions are permitted by the county, state, and other federal agencies. No new road construction will be proposed in active river erosion zone. Previously manipulated sites that do not meet the above criteria for future manipulation would be restored to approximate natural conditions.”

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

“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 non new NPS structures would be constructed on the shoreline.”

“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.”

Alternative C would *partially meet* the following GMP direction. However, the road would only be reconstructed to Glory, so shuttle service would not be provided all the way to Cottonwood Camp.

“Public shuttle service would be provided from the Landing to Cottonwood Camp.”

“The section of road from High Bridge to Cottonwood Camp would be maintained for heavy-duty, high clearance shuttle vehicles.”

“Recreational access for visitors with disabilities would be enhanced.”

7.6.14 ALTERNATIVE C (ROAD RECONSTRUCTION) IMPAIRMENT OF PARK RESOURCES OR VALUES

Alternative C (Road Reconstruction) would *not impair* the following Park resources or values within the project area: soils, water quality, hydrology, channel morphology, floodplains, fisheries, and aquatic habitat, vegetation, terrestrial and amphibious wildlife, visitor experience and access, socio-economics, Wilderness, PCT, and air quality.

7.7 Alternative D. Reroute the Stehekin Valley Road from Car Wash Falls to Bridge Creek and from Glory to Cottonwood Camp

Alternative D (Road Reroute) would officially close and partially reclaim the former road between Car Wash Falls and MP 15.3, improve the Car Wash Falls parking area at MP 12.9, and build a 0.1-mile long spur trail from the PCT to Shady Camp, the same as the Preferred Alternative (Table 21; Appendix A3, A5, & A6).

Approximately 2.2 miles of the Stehekin Valley Road above MP 12.7 would be rerouted to the current PCT and would rejoin the former roadbed at MP 15.3 (Table 21; Appendix A4).

Approximately 2.2 miles of the current PCT would be moved to an adjacent location to accommodate the road reroute (Table 21).

The road between Glory and Cottonwood Camp washed out in the 1995 flood. Since then, the NPS built a ½-mile section of new trail around the wash out and connected it to the remaining 2 miles of road. The road between Glory and Cottonwood Camp would be reconstructed in the same location as the existing hiking and stock trail (Table 21; Appendix A4).

7.7.1 ALTERNATIVE D (ROAD REROUTE) SOILS

7.7.1.1 Impacts Analysis

Car Wash Falls and to MP 15.3. The 1.7 miles (2.5 acres) of road between Car Wash Falls and MP 15.3 that washed out in 2003 would continue to deteriorate through erosion, washouts, and mass wasting in Alternative D (Table 21; Appendix A1 & A2). The roadbed would naturally revegetate and the landslide at MP 15 would continue to grow until it eventually reached a stable angle of repose. The periodic flood damage, erosion, emergency road repairs, temporary reroutes, road reroutes, and the floodplain/riparian area filling associated with the previous road would cease. These changes would stabilize the fill, increase organic matter and soil infiltration, and reduce compaction and erosion on the remaining roadbed (~0.7 miles, 1 acre) over time.

Alternative D would also officially remove this section of the road from the NPS road and trail system, and remove the culverts between MP 12.9 and 15.3 to prevent future blowouts/erosion. As a result, this alternative would provide more long-term soil benefits than the No Action Alternative, the same as the Preferred Alternative.

MP 15.3 to Glory (MP 20.1). The Stehekin Valley Road between MP 15.3 and Glory is essentially intact. Approximately 0.2 miles (0.1 acre) of road reconstruction would be needed at MPs 17.4, 17.5, and 20.1.

A 48-inch by 32-foot long culvert would be installed on the unnamed tributary at MP 20.1.

The reconstruction would have negligible, adverse impacts on soils. Reconstruction would also recreate the road maintenance and emergency road reconstruction impacts that existed prior to the 2003 flood. These changes would produce moderate, long-term adverse soils effects.

Glory to Cottonwood Camp (MP 20.1 to MP 22.8). The ½-mile section of road between MP 20.3 and 20.8 that washed out in 1995 would be rerouted out of the floodplain onto the existing trail. The reroute would reestablish motorized and mechanized access to Cottonwood Camp (Appendix A4). In the long-term, the 12-foot wide road reroute would adversely impact twice the acreage as the 6-foot wide trail (0.7 vs. 0.4 acres); and more acres would have short-term, adverse impacts during construction.

The rest of the road from MP 20.8 to MP 22.8 was not badly damaged by the 1995 flood, and would only need drainage structure repair. Since 1995, this section has been maintained as a 6-foot wide trail and the other half of the 12-foot wide roadbed (~1.5 acres) has been revegetating.

Road Reroute MP 12.7 to MP 15.3. Alternative D would build approximately 2.2 miles of new road within the existing Wilderness where the only previous soil affects were associated with the non-motorized PCT (Appendix A3). The new road would be 12-foot wide (3.2 acres) compared to the 6-foot wide (1.6 acre) trail it would replace. Larger areas of short-term soil disturbance would occur during construction. The reroute would be more stable, and would need less routine maintenance and reconstruction than the former road it would replace (between Car Wash Falls and MP 15.3).

The existing trail alignment generally follows the contour on the Old Wagon Road. Soil erosion is not evident except where the trail is intercepting water from a number of perennial tributary and wetland crossings, causing gullies and eroding the trail. The road reroute would cross McGregor, Buzzard, and Canim creeks and a number smaller drainages. The stream crossings would require bridges, bottomless arches, and/or culverts that could accommodate 100-year floods and provide fish passage if needed. The crossings and approaches would be moderate, long-term adverse impacts to the floodplains, wetlands, and riparian soils of these tributaries (number of acres unknown).

The new road would bisect an old growth western redcedar wetland that was partially killed in the Shady Fire (August 2005). The road prism would result in soil compaction due to construction and use. The compaction would probably result in mortality of the shallow-rooted redcedars that closely parallel the existing 6-foot wide PCT alignment. This would be a major, long-term adverse impact to the old growth redcedar wetland, character of the area, and the soils within a new non-Wilderness road corridor.

Soil mitigation measures would be used to minimize the short-term, adverse construction affects. Overall, the long-term adverse impacts would be moderate to major.

PCT Reroute. Construction of the approximately 2.2-mile long PCT reroute would result in approximately 1.6 acres of lost soil productivity. Larger areas of temporary soil disturbance may occur during construction. Soil mitigation measures would be used to minimize the short-term, adverse construction affects.

The new trail would require drainage structures on each tributary or wetland area, and the structures would be sufficiently sized to prevent drainage and erosion problems. Trail approaches to the stream crossings would require fill. Ongoing use of the hiker/stock trail, and trail maintenance would result in minor, long-term adverse impacts similar to the affects associated with the current trail.

7.7.1.2 Cumulative Impacts

The cumulative soils impacts of past and reasonably foreseeable actions would be the same as the No Action Alternative (Table 22).

Alternative D would have fewer adverse cumulative soil impacts in the Stehekin River corridor above MP 12.9 than pre-1995 and 2003 conditions because 3.3 acres of road would be reclaimed by the floods and culvert removal, the same as the Preferred Alternative.

Alternative D would also have more cumulative impacts than the No Action or Preferred alternatives because a ½-mile of new road would be constructed between Glory and Cottonwood Camp. However, the 0.7 acre of floodplain between MP 20.3 and MP 20.8 that was reclaimed by the 1995

flood would not be affected by the reroute, and reclamation of this section would be a major, long-term beneficial affect. The new road between MP 20.3 and MP 20.8 would be built above the 100-year floodplain and would be less prone to flood damage than the former road, so would have fewer cumulative impacts (maintenance, erosion, reconstruction) than the pre-1995 road.

Alternative D would also have more adverse cumulative soil impacts in the Stephen Mather Wilderness (3.2 acres of new road; 1.6 acres of new trail) than the No Action or Preferred alternatives. However, the reroute would be more stable, and would need less routine maintenance and reconstruction than the former road it would replace (between Car Wash Falls and MP 15.3).

In all, the road reroutes and reconstruction in Alternative D would require approximately 6,150 yd³ of fill and gravel, or less than 8 percent of Alternative C.

7.7.1.3 Compliance with Laws and Policy

Alternative D (Road Reroute) would not meet NPS wetland management EO 11990 and policy to minimize potentially irreversible soil impacts to soils in the old growth western redcedar wetland.

7.7.1.4 Conclusions

Alternative D (Road Reroute) would have fewer adverse cumulative soil affects in the Stehekin River corridor than pre-1995 and 2003 conditions because 2.4 miles of road between MP 12.9 and 15.3 would be reclaimed by natural processes and culvert removal, the same as the Preferred Alternative.

Alternative D would have more adverse impacts than the No Action or Preferred alternatives in the Stehekin River corridor because 7.5 miles of road between MP 15.3 and MP 22.8 would be reconstructed or rerouted. The road above MP 15.3 would have less floodplain filling, routine maintenance, flood damage, and emergency repairs than pre-1995 or 2003 conditions because a ½-mile of road between MP 20.3 and 20.8 would be rerouted above the 100-year floodplain.

Alternative D would have more adverse cumulative soil impacts in the Wilderness (2.2 miles of new road and trail) than the No Action or Preferred alternatives (Table 1). However, the road reroute would be more stable, and would need less routine maintenance and reconstruction than the former road it replaces (between Car Wash Falls and MP 15.3).

Therefore, Alternative D would have moderate, long-term adverse impacts because 9.7 miles of road would be rerouted or reconstructed, 2.3 miles of new trail would be constructed, routine road maintenance would be reestablished, and some emergency road repairs would be needed, over time.

7.7.2 ALTERNATIVE D (ROAD REROUTE) HYDROLOGY, CHANNEL MORPHOLOGY, FLOODPLAINS

7.7.2.1 Impacts Analysis

The 1995 and 2003 floods reclaimed Stehekin River channel capacity, floodplain connectivity, and increased meander length by scouring out road fill in the 100-year floodplain. Alternative D (Road Reroute) would officially close the road and remove the culverts between Car Wash Falls and MP 15.3, the same as the Preferred Alternative. A new road would be built between MP 12.7 and 15.3 to replace this section, and the PCT would be rerouted to an adjacent location (Appendix A3). The road between MP 15.3 and Glory would need only minor reconstruction to provide vehicle access.

A ½-mile section of the road between Glory and Cottonwood Camp (MP 20.3 to MP 20.8) would be rebuilt above the 100-year floodplain (site of the current trail) (Appendix A4). The new road section would connect to the 2 miles of road that was not damaged by the 1995 flood.

Car Wash Falls to MP 15.3. Most of this 1.7 mile section washed out in the 2003 500-year flood and suffered damage in the 1995 100-year flood because the road constricted and controlled the channel, decreased floodplain capacity, and increased the velocity of flood flows. The material eroded out of the riverbanks and roadbed during floods was deposited in low gradient reaches, floodplains, and riparian areas downstream. The deposition resulted in adverse changes in the hydrology, channel morphology, and capacity of these important areas.

Permanently closing this section of the road would result in long-term, major beneficial effects for the lower Stehekin River (the same as No Action and Preferred alternatives) because the flood damage, erosion, routine road maintenance, emergency road repairs, road reroutes, and floodplain and riparian filling associated with this section would cease.

The culverts between Car Wash Falls and MP 15.3 would be removed to prevent future blowouts and erosion of fill material due to plugged or undersized culverts, as in the Preferred Alternative. Therefore, Alternative D would result in major, long-term beneficial effects in the lower Stehekin River corridor, the same as the Preferred Alternative.

Glory to Cottonwood Camp (MP 20.1 to MP 22.8). Approximately ½-mile of road between MP 20.3 and 20.8 washed out in the 1995 100-year flood. This section would be rerouted onto the existing trail above the 100-year floodplain. The road reroute would reestablish motorized and mechanized access to Cottonwood Camp (Appendix A4). The rest of the road from MP 20.8 to MP 22.8 was not badly damaged by the 1995 flood, and would not be reconstructed or relocated. Adverse impacts would be less than pre-1995, when this section of the road was in the channel and the 100-year floodplain.

Road Reroute and Trail Construction MP 12.7 to MP 15.3. Alternative D would reroute or reconstruct approximately 2.2 miles (3.2 acres) of the Stehekin Valley Road and construct 2.2 miles (1.6 acres) of new trail between MP 12.7 and 15.3 (Appendix A4). The road and PCT reroutes would cross a number of high gradient, “flashy” tributaries that respond rapidly to runoff (often below impervious rock faces), including Canim, Buzzard, and McGregor creeks. The stream crossing structures (culverts, bridges, or bottomless arches), relief culverts, waterbars, and drainage ditches would need to be sufficiently sized and spaced and maintained to prevent blowouts, and the run-off and gully problems that are evident on the current PCT.

The new roadbed would be built on the Old Wagon Road, and would require approximately 500 yd³ of fill per mile. The stream crossing structures and associated fill material would alter the floodplain and riparian areas of these tributaries to varying degrees. Long-term effects would be moderate to major depending on the type of stream crossings that are used. Channel-spanning bridges would: 1) require the least amount of fill, 2) maintain channel geometry and substrate, 3) not constrict peakflows, and 4) allow floodplain function.

Bottomless arches (similar to a ½-culvert) and culverts would need to be sized for 100-year floods to prevent constriction of high flows, channel scour, deposition, and bank erosion. Arches or culverts would require large amounts of fill to bring the road approaches up to grade, effectively altering floodplain function. Bottomless arches maintain gradients and natural streambed roughness to: 1) prevent changes in channel morphology such as downcutting or aggrading, 2) maintain velocity through the structure, and 3) maintain channel substrate. Some constriction and increased turbulence

could occur through bottomless arches during bankfull and peakflows. Corrugated pipe culverts typically increase turbulence and velocity during high flows, which can lead to downcutting and erosion below the outlet. Structural design mitigations (e.g. properly sized culverts installed at grade) should prevent changes in channel morphology.

The road and PCT reroutes would bisect an old growth western redcedar wetland that was partially killed in the Shady Fire of August 2005. The road prism would probably result in altered hydrology (greater soil saturation above the road; drier soils below the road), and a change in the character and size of the wetland. The hydrologic changes could create additional mortality, harvest of hazard trees, or reduced regeneration potential.

The road and PCT reroutes would be new affects in existing Wilderness, and would have moderate to major, long-term adverse impacts on the lower reaches of the Stehekin River tributaries and their associated floodplains, riparian and wetlands, and the old growth western redcedar wetland near MP 15.3.

Stehekin Valley Road MP 15.3 to Glory. The Stehekin Valley Road between MP 15.3 and Glory is essentially intact, but would require approximately 0.2 miles of reconstruction at MP 17.4, 17.5 (Park Creek Camp), and Glory (MP 20.1) to provide motorized access to the new Cascade Pass Trailhead.

A 48-inch by 32-foot long culvert would be installed on the unnamed tributary at MP 20.1. Reconstruction would recreate the road maintenance and emergency road reconstruction that existed prior to the 2003 flood.

7.7.2.2 Cumulative Impacts

Stehekin River. The floods of 1995 and 2003 washed out the most problematic sections of the Stehekin Valley Road in the 100-year and 500-year floodplains. The 2005-2006 *Stehekin Valley Road Improvement* and the *Coon Run* projects have or will reconstruct the washed out road segments below MP 11.2 (Table 12). These projects were designed to mitigate some of the previous floodplain impacts caused by the former road.

The road between Car Wash Falls and MP 15.3 was built in the floodplain of the Stehekin River and had a history of periodic flood damage. This 2.4-mile long section (10 percent of the original 22.8-mile road) would be closed and partially reclaimed. The road reroute between MP 12.7 and 15.3 would not directly influence the river or its floodplain; would be more stable and less prone to flood damage; and would require less routine maintenance and emergency repairs than the former road.

Alternative D would also reconstruct or reroute approximately 7.5 miles of road in the Stehekin River corridor between MP 15.3 and 22.8. This section is 33 percent of the original 22.8-mile long Stehekin Valley Road, and has a history of flood damage. The reconstruction would recreate some of the road maintenance and emergency reconstruction problems that existed prior to the 1995 flood. However, the most problematic section (MP 20.3 to 20.8) would be rerouted above the 100-year floodplain, and less flood damage would be expected over time.

Therefore, implementation of Alternative D in combination with the other Stehekin Valley Road projects would have moderate, cumulative hydrologic, channel morphology, and floodplain benefits compared to historic (pre-1995) conditions. At the same time, this alternative would have moderate, cumulative adverse impacts compared to post-2003 conditions.

Stehekin River Tributaries. The primary cumulative impacts on the Stehekin River tributaries in the Wilderness boundary are associated with naturally high sediment levels, the PCT, and other trails. These impacts have been negligible to date.

Rerouting the road and the PCT (Alternative D) would more than double the number of structures needed to cross the perennial tributaries including Canim, Buzzard, and McGregor creeks, intermittent streams, and wetlands, and to correct existing drainage problems. The new structures could cause increased erosion, decreased floodplain connectivity, channel morphology changes, and increased maintenance would be needed to keep the structures functioning properly and prevent blowouts. Therefore, implementation of Alternative D could result in moderate, long-term adverse impacts to the lower reaches of these Stehekin River tributaries and their associated floodplains, riparian and wetlands, and the old growth redcedar wetland near MP 15.3 compared to the No Action or Preferred alternatives.

7.7.2.3 Compliance with Laws and Policy

Alternative D (Road Reroute) would not meet NPS wetland management EO 11990 and policy to minimize potentially irreversible impacts because of the potential hydrologic impacts to the old growth western redcedar wetland.

7.7.2.4 Conclusions

Permanently closing the road between Car Wash Falls and MP 15.3 would result in long-term, major beneficial affects for the lower Stehekin River because the flood damage, erosion, routine road maintenance, emergency road repairs, road reroutes, and floodplain and riparian filling associated with this section would cease. The culverts between Car Wash Falls and MP 15.3 would also be removed to prevent future blowouts and erosion due to plugged or undersized culverts.

The road and PCT 2.2-mile long road and trail reroutes between MP 12.7 and 15.3 would be new affects in existing Wilderness, and would have moderate to major, long-term adverse impacts on the lower reaches of the Stehekin River tributaries and their associated floodplains, riparian and wetlands, and the old growth redcedar wetland near MP 15.3. At the same time, the road reroute would not directly influence the Stehekin River or its floodplain (could be affected by sediment transport); would be more stable and less prone to flood damage; and would require less routine maintenance and emergency repairs than the former road.

Alternative D would also reconstruct or reroute approximately 7.5 miles of road in the Stehekin River Valley between MP 15.3 and 22.8. This section is 33 percent of the original 22.8-mile long Stehekin Valley Road, and has a history of frequent flood damage. The reconstruction would recreate some of the road maintenance and emergency reconstruction problems that existed prior to the 1995 flood. However, the most problematic section (MP 20.3 to 20.8) would be built above the 100-year floodplain, and less flood damage would be expected over time.

Therefore, implementation of Alternative D in combination with the other Stehekin Valley Road projects would have moderate to major, beneficial cumulative hydrologic, channel morphology, and floodplain affects compared to historic (pre-1995) conditions. At the same time, this alternative would have moderate, long-term adverse impacts compared to the No Action and Preferred alternatives.

7.7.3 ALTERNATIVE D (ROAD REROUTE) WATER QUALITY

7.7.3.1 Impacts Analysis

Car Wash Falls to MP 15.3. Officially closing the road between Car Wash Falls and MP 15.3 would have major, long-term beneficial water quality affects because periodic flood damage, road maintenance, and emergency road reconstruction would cease, the same as the No Action and Preferred alternatives. The remaining road culverts between Car Wash Falls and MP 15.3 would be removed to prevent plugging and blowouts, the same as the Preferred Alternative.

The landslide at MP 15 would continue to enlarge until it reaches an angle of repose and the meander bend widens at this location. These processes would add large quantities of sediment to the river over time, and create a moderate, relatively long-term adverse water quality affect.

MP 12.7 to MP 15.3. Rerouting the road to the current PCT would eliminate the frequent flood damage and need for repairs associated with the former river road. However, if the numerous stream crossing structures, relief culverts, waterbars, and drainage ditches in the new road are undersized, improperly spaced, or not adequately maintained, rill, gully, cut and fillslope failures, blowouts, and other erosion problems are likely to occur. Some of these problems are evident along the existing PCT.

Low water fords would not be used as stream crossings because of chronic water quality problems such as increased turbidity, sedimentation, and oil (and other chemicals) from vehicles receiving an under carriage wash.

MP 15.3 to Glory. The roadbed at MP 17.4 and Park Creek Camp (MP 17.5) would be filled and resurfaced to provide motorized access. No in-water work would be needed to reconstruct this section.

The excavation of depositional material left by the 2003 flood and installation of a new culvert would reduce a chronic turbidity problem.

The road would not have guardrails and would have the same risk of chemical spills from vehicles entering the river as it did prior to the 2003 flood.

Ongoing road maintenance, periodic flood damage, and emergency road repairs would be moderate, long-term, adverse impacts.

Glory to Cottonwood Camp (MP 20.1 to MP 22.8). The road between MP 20.3 and MP 20.8 washed out in 1995, and would be reconstructed above the 100-year floodplain, on the existing trail (Appendix A4). This section would reconnect with the remaining 2 miles of undamaged road.

The road would not have guardrails and would have the same risk of chemical spills from vehicles entering the river as it did prior to the 2003 flood. However, water quality effects would be less than pre-1995, when a ½-mile long section was in the 100-year floodplain.

Routine road maintenance, possible flood damage, and emergency road repairs would create minor to moderate, long-term adverse impacts.

7.7.3.2 Cumulative Impacts

According to the LACH GMP, the Stehekin River contributes approximately 4,120 metric tons of suspended sediment to Lake Chelan each year. Fill material from periodic erosion of the 22.8-mile long Stehekin Valley Road has contributed to this sediment load. The road closure between Car

Wash Falls and MP 15.3 (2.4 miles) and the road reroute (½-mile) between MP 20.3 and 20.8 would decrease the cumulative water quality impacts. The floodplain area reclaimed by the 1995 and 2003 floods would remain connected to the river and store some of the sediment generated by natural and anthropogenic sources.

The numerous stream crossing structures, relief culverts, waterbars, and drainage ditches in the MP 12.7 to MP 15.3 road and PCT reroutes would need to be sufficiently sized, spaced, and maintained to prevent blowouts and erosion that would add to the cumulative impacts. Design features, construction mitigations, and the NPS road maintenance program would minimize the potential for these impacts.

7.7.3.3 Compliance with Laws and Policy

Alternative D (Road Reroute) would maintain the Stehekin River's Category I status and would not contribute to future listing for sediment or turbidity under Section 303(d) of the CWA.

7.7.3.4 Conclusions

Closing the road between Car Wash Falls and MP 15.3 would have major, long-term beneficial water quality affects because the natural reclamation begun in 1995 and 2003 would continue; culvert removal would prevent future blowouts; and the periodic flood damage, road maintenance, and emergency road reconstruction would cease. The landslide at MP 15 would continue to enlarge until it reaches an angle of repose and the channel widens its meander bend at this location creating a moderate, relatively long-term water quality affect. These affects would be the same as the Preferred Alternative.

The rerouted road segment between MP 12.7 to MP 15.3 would be more stable, and require less routine and emergency maintenance than the former road it would replace (Car Wash Falls to MP 15.3). The numerous stream crossing structures, relief culverts, waterbars, and drainage ditches would need to be sufficiently sized, spaced, and maintained to prevent the kind of erosion problems that are evident on the existing PCT.

Culvert installation (MP 20.1) would occur during low flow to minimize turbidity and sediment delivery. The excavation of depositional material left by the 2003 flood and the culvert would reduce a chronic turbidity problem.

The ½-mile long road segment that washed out between Glory and Cottonwood Camp in 1995 would be rerouted to the current trail alignment, above the 100-year floodplain. Water quality affects would be less than pre-1995, when this section was in the 100-year floodplain.

The new road would not have guardrails and would have the same risk of chemical spills from vehicles entering the river as it prior to the 2003 flood.

The BMPs and other mitigation measures (see Alternative D BMPs and Mitigation Measures: Section 5.4.4.3) would minimize short-term water quality affects during the reconstruction and culvert installation. It is inevitable that fine to medium textured fill material would enter the river and adversely impact water quality during construction, despite these precautions.

Post-construction, the 9.7-mile long road segment would have routine maintenance, and probable flood damage and emergency repairs that would be moderate, long-term adverse impacts to water quality.

7.7.4 ALTERNATIVE D (ROAD REROUTE) FISHERIES AND AQUATIC HABITAT

The project-related fisheries and aquatic habitat affects are interdependent on the preceding road-related impact analyses of soils (Section 5.4.4.1), hydrology, channel morphology, floodplains (Section 5.4.4.2), and water quality (Section 5.4.4.3) affects.

Car Wash Falls to MP 15.3. The 2003 flood washed out 1.7 miles of the most problematic road sections between Car Wash Falls and MP 15.3. Alternative D (Road Reroute) would have moderate to major, long-term, beneficial affects on fisheries and aquatic habitat by permanently eliminating the road-related turbidity, sediment, and scour and filling associated with this section and allowing the landslide at MP 15 to reach an angle of repose, the same as the No Action and Preferred alternatives.

Removing the culverts between Car Wash Falls and MP 15.3 would also eliminate any possible fish passage problems and the possibility of future blowouts and road fill erosion, the same as the Preferred Alternative.

Road Reroute MP 12.7 to MP 15.3. The road and trail reroutes in Alternative D would require stream crossing structures across Canim, Buzzard, and McGregor creeks as well as other smaller drainages. Channel-spanning bridges and bottomless arches have natural substrate and pools, and would provide unimpeded fish passage on the fish-bearing tributaries. Therefore, all the perennial and intermittent streams would be surveyed to determine fish presence or absence, and bridge or arches would be used on fish-bearing streams.

The road reroute would cross numerous high gradient, high energy, flashy tributaries. Corrugated pipe culverts are less expensive than bridges or arches but typically increase turbulence and velocity during high flows, which can cause fish passage problems and erosion. The cross sectional profile of corrugated pipes (i.e. no resting pools or laminar flow) also causes fish passage problems at all flows, despite mitigations (i.e. baffles). Low water fords would not be used because they create shallow, laminar flow (fish passage problems) and water quality problems. Culverts could be used on the non-fishbearing streams.

The numerous relief culverts, waterbars, and drainage ditches would be sufficiently sized, spaced, and adequately maintained to prevent erosion, blowouts, gullies, rills, undercutting, and other long-term adverse impacts. Design features and the NPS road maintenance program would minimize the potential for these long-term adverse impacts. Other long-term adverse impacts include probable flood damage and emergency repairs, to a much lesser extent than the former river road.

The short-term, adverse construction affects would be minimized by low flow work windows (approximately July 1 to October 1) and soil and water mitigations (see Alternative D BMPs and Mitigation Measures: Sections 5.4.4.1 and 5.4.4.3).

MP 15.3 to Glory. The roadbed at MP 17.4 and Park Creek Camp (MP 17.5) would be filled and resurfaced to provide motorized access. No in-water work would be needed, and there would be no direct affect on fisheries or aquatic habitat. Road maintenance, periodic flood damage, and emergency repairs would be long-term, adverse impacts when this section is reconstructed.

A culvert would be installed on an intermittent, non-fishbearing tributary at Glory (MP 20.1). In the long-term, the excavation of depositional material left by the 2003 flood and installation the new culvert would reduce a chronic turbidity problem, a minor beneficial affect. The short-term construction affects would be minimized by the low flow work window (approximately July 1 to October 1), BMPs, and soil and water mitigations (see Alternative D BMPs and Mitigation

Measures: Sections 5.4.4.1 and 5.4.4.3). Road maintenance, periodic flood damage, and emergency repairs would be long-term, adverse impacts.

Road Reroute Glory to Cottonwood Camp (MP 20.1 to MP 22.8). The 1995 flood washed out the most problematic section of the Glory to Cottonwood Camp road. The new ½-mile long road reroute between MP 20.3 and MP 20.8 would be built above the 100-year floodplain, so there would be less flood damage, routine road maintenance, and emergency road reconstruction than there was prior to 1995.

Design features, construction mitigations, and the NPS road maintenance program would minimize the potential for adverse impacts. The short-term construction mitigations would include low flow/dry season work windows (approximately July 1 to October 1), and other soil and water mitigations (see Alternative D BMPs and Mitigation Measures: Sections 5.4.4.1 and 5.4.4.3).

Therefore, Alternative D would have minor to moderate, long-term adverse impacts to fisheries and aquatic habitat compared to the No Action and Preferred alternatives.

7.7.4.1 Cumulative Impacts

Alternative D (Road Reroute) would restore approximately 9.7 miles of road access, including 2.2 miles of new road in the current Wilderness and 7.5 miles in the Stehekin River Valley, that has not been in use since 1995 or 2003. These miles would represent 43 percent of the original Stehekin Valley Road.

The road reconstruction/relocations and future routine road maintenance, periodic flood damage, and emergency road repairs would have moderate adverse cumulative impacts on fisheries and aquatic habitat compared to current conditions (No Action) or Preferred Alternative. Alternative D would have less adverse cumulative impact than pre-1995 or 2003 conditions because 2.4 miles of the most problematic miles between MP 12.9 to MP 15.3 would not be reconstructed, and a ½-mile of road between MP 20.3 and MP 20.8 would be rerouted above the 100-year floodplain.

The primary fisheries and aquatic habitat cumulative impacts in the Wilderness are naturally high sediment loading, the PCT, and other trails (erosion/sediment delivery and stream-trail crossings). The new road and the PCT reroute would cross numerous high gradient, high-energy streams, including at least three fish-bearing streams (McGregor, Buzzard, and Canim) that have westslope cutthroat trout populations. The road-stream and trail-stream crossings on fish-bearing streams would be either channel-spanning bridges or bottomless arches to prevent long-term fish passage problems. The cumulative adverse impacts would include road maintenance, and probable flood damage and emergency repairs to a lesser extent than the former river road. Therefore, Alternative D would not contribute to future listing of westslope cutthroat trout or their essential habitat.

7.7.4.2 Compliance with Laws and Policy

ESA. Alternative D (Road Reroute) would be “Not Likely to Adversely Affect” Columbia River bull trout if they are present in the Stehekin River Watershed. There is no proposed or designated bull trout critical habitat on the east side of the Cascades.

The NPS would informally consult with the USFWS to obtain their concurrence with this determination should this alternative be selected for implementation.

NPS Management Policies 4.4.2.3, Management of Threatened and Endangered Plants and Animals. Alternative D would meet the intent of NPS Management Policies 4.4.2.3 that requires the NPS to survey, protect, monitor, restore, and strive to recover all species listed, proposed, or

candidates for listing under the ESA that are native to NPS units, and to manage, to the greatest extent possible, state, and locally endangered and threatened species as federally listed species.

7.7.4.3 Conclusions

Sedimentation, turbidity, channel alteration, scour and filling, loss of large woody debris recruitment potential, and loss of floodplain function due to road reconstruction/relocations and future routine road maintenance, periodic flood damage, and emergency road repairs would have moderate, long-term adverse impacts on fisheries and aquatic habitat compared to current conditions. Alternative D would have less adverse cumulative impact than pre-1995 or 2003 conditions because 2.4 miles of the most problematic miles between MP 12.9 to MP 15.3 would not be reconstructed, and a ½-mile of road between MP 20.3 and MP 20.8 would be rerouted above the 100-year floodplain.

The road-stream and trail-stream crossings on fish-bearing streams would be either channel-spanning bridges or bottomless arches to prevent long-term fish passage and erosion problems. The numerous relief culverts, waterbars, and drainage ditches would be sufficiently sized, spaced, and adequately maintained to prevent erosion, blowouts, gullies, rills, undercutting, and other long-term adverse impacts. Design features and the NPS road maintenance program would minimize the potential for these long-term adverse impacts.

Alternative D would be “Not Likely to Adversely Affect” Columbia River bull trout, and would not contribute to future listing of westslope cutthroat trout or their essential habitat.

7.7.5 ALTERNATIVE D (ROAD REROUTE) VEGETATION (COMMON NATIVE, SPECIAL STATUS, RIPARIAN, WETLAND, NOXIOUS/INVASIVE)

7.7.5.1 Impacts Analysis

Car Wash Falls to MP 15.3. Alternative D (Road Reroute) would allow the floodplain reclamation initiated by the 2003 flood to continue between Car Wash Falls and MP 15.3 (Table 21). Over time, 3.2 acres would be naturally revegetated, most of it in the floodplain.

Most of the floodplain is rocky and supports a Riparian-Nutrient Poor community. There are small pockets of Riparian Nutrient-Rich and wetland communities, primarily at the confluence of perennial tributaries and the river. Floodplains and riparian and wetland areas are high value wildlife habitat; therefore, this would be a major, long-term beneficial affect.

Road and PCT Reroutes MP 12.7 to 15.3. Some trees and other vegetation that provide soil protection would be removed along the 2.2-mile long road and PCT reroutes, and the 0.1-mile long trail to Shady Camp (Appendix A3 & A6). The finished roadbed would be 12-feet wide and the trails would be 6-feet wide, or approximately 4.9 unvegetated acres.

Total clearing for road construction would be approximately 24-feet wide, or another 3.2 acres of short-term vegetation removal. Available moisture would allow rapid regrowth of the understory vegetation adjacent to the road prism following construction.

Post-project road and trail maintenance would include clearing or brushing vegetation to maintain sight distance. The routine clearing limits would be 4-feet wide on either side of the road prism (1.1 acre) or 2-feet wide on either side of the trails (0.3 acre). Only low-growing plants would become reestablished in the clearing limits. Therefore, the road and trail reroutes would have moderate, long-term adverse impacts to the Upland Mesic forest.

The road reroute would bisect a small (~1 acre), old growth western redcedar wetland, following the current PCT. The 6-foot wide PCT winds through the largest, oldest trees and comes very close to the trees. The Shady Fire in August 2005 killed a number of the trees.

Western redcedar roots are extensive and the taproots are poorly defined or nonexistent; the fine roots develop a profuse, dense network (Tesky 1992). Root systems tend to be shallower and less extensive on wet soils than on deep, moderately dry soils (Tesky 1992). When a thick duff layer is present, many western redcedar roots lie in the duff rather than in the underlying soil.

Every effort would be made to retain the living and dead trees during road and trail construction. However, some trees would need to be removed, and the trees closest to the road prism would be adversely impacted by soil compaction and damage to the root systems over time.

Wetlands and riparian areas are characterized by a combination of hydrology, soils, and vegetation characteristics. The development of wetland habitats is dependent on the presence of surface water or saturated soils for sufficient duration to promote development of plant communities that have a dominance of species adapted to survive and grow under extended periods of anaerobic soil conditions. Constructing a road prism perpendicular to the slope, surface flow, and subsurface flow would cause changes in hydrology. Areas upslope of the road would be wetter than they are now due to the damming effect of the road, and areas downslope would be drier. Therefore, the new road construction would probably cause major, long-term adverse impacts to the redcedar wetland and moderate, long-term adverse impacts the riparian areas associated with the numerous perennial stream crossings including Canim, Buzzard, and McGregor creeks because of changes in hydrology.

Other mitigations such as importing fill material from weed-free sources outside the Stehekin area and seeding disturbed sites with native species as soon as practicable would reduce the short-term construction affects. Soil, floodplain, wetland, and riparian area mitigations would also minimize short- and long-term adverse construction affects.

Park staff surveyed the project area in the spring and summer of 2005, and did not identify any special status plants. If special status plants were found prior to construction, the individuals or populations would be flagged and avoided to prevent construction-related affects.

Routine road maintenance and emergency reconstruction would require gravel replacement. The gravel replacement would slightly widen the 12-foot wide roadbed over time and reduce the surrounding soil productivity, over time.

Glory to Cottonwood Camp (MP 20.1 to MP 22.8). The ½-mile section of the road between Glory and Cottonwood Camp that washed out in 1995 would be rerouted outside the 100-year floodplain in upland vegetation. Approximately 0.7 acres in the 100-year floodplain would continue to revegetate naturally, as it has since 1995 in exchange for 0.7 acres of upland vegetation that would be removed for the new road reroute (Appendix A4). Clearing for the ½-mile of road construction would be approximately 24-feet wide, or another 0.8 acres of long-term vegetation removal.

Post-project maintenance would include clearing or brushing vegetation to maintain sight distance 4-feet wide on either side of the 2.5-mile long road prism (2.4 acres).

Rerouting the road between MP 20.3 and 20.8 would have major, beneficial affects compared to pre-1995 conditions when the road was in the 100-year floodplain. The new road construction and post-project road maintenance would be moderate, adverse impacts compared to post-1995 conditions when the remaining road was maintained as a trail.

7.7.5.2 Cumulative Impacts

This alternative would reroute or reopen approximately 9.7 miles of road and build 2.3 miles of new trail between MP 12.7 and Cottonwood Camp. The 4.4 miles of new road and trails between MP 12.7 and 15.3, and the 0.1 mile trail to Shady Camp would be new avenues for the proliferation and dispersal of noxious and invasive plants by vehicles, hikers, stock, bicycles, water transport, and/or road maintenance gravel in the current Wilderness. The 2.4 miles of reclaimed road between Car Wash Falls and MP 15.3 would have decreased noxious and invasive weed proliferation and dispersal. NPS would continue to control the small occurrences of noxious and invasive plants along the river, the road, the PCT, and other trails annually. Therefore, these would be negligible to minor, adverse cumulative impacts.

This is the only old growth western redcedar wetland in the project area, and this type of habitat is uncommon in the Stehekin River Watershed. The Shady Fire in August 2005 killed some of the trees. Additional trees would be removed for road and trail construction. The combined effects of altered hydrology, soil compaction, and root damage are likely to weaken and/or kill more of the redcedar trees and change the perimeter and area of the wetland over time. Therefore, these would be major, adverse cumulative impacts.

7.7.5.3 Compliance with Laws and Policy

ESA. Alternative D would have “No Effect” on ESA listed plants because there are no known individuals or populations in the project area.

NPS Management Policies 4.4.2.3, Management of Threatened and Endangered Plants and Animals. Alternative D would meet the intent of NPS Management Policies 4.4.2.3 that requires the NPS to survey, protect, monitor, restore, and strive to recover all species listed, proposed, or candidates for listing under the ESA that are native to NPS units, and to manage, to the greatest extent possible, state, and locally endangered and threatened species as federally listed species.

NPS Policies 2001. Alternative D would not meet NPS policy to “...manage wetlands in compliance with NPS mandates and the requirements of EO 11990 Wetland Protection, the CWA, and the Rivers and Harbors Appropriation Act of 1899, and the procedures described in DO #77-1 Wetland Protection. The Service will: 1) provide leadership and take action to prevent the destruction, loss, or degradation of wetlands, 2) preserve and enhance the natural and beneficial values of wetlands, and 3) avoid direct and indirect support of new construction in wetlands unless there are no practicable alternatives and the proposed action includes all practicable measures to minimize harm to wetlands.”

7.7.5.4 Conclusions

Alternative D (Road Reroute) would allow the 100-year and 500-year floodplain reclamation and revegetation initiated by the 2003 flood to continue between Car Wash Falls and MP 15.3. These floodplains, riparian, and wetland areas are high value wildlife habitat, and this would be a major, long-term beneficial affect.

Rerouting the road and PCT between MP 12.7 and 15.3, and building the spur trail to Shady Camp would remove approximately 4.9 acres of vegetation in the current Wilderness. Only low-growing plants would become reestablished in the clearing limits. The road and trail reroutes would have moderate, long-term adverse impacts to the Upland Mesic forest and the riparian areas associated with the numerous perennial stream crossings including Canim, Buzzard, and McGregor creeks. The road reroute would probably be a major, long-term adverse impact on the old growth western

redcedar wetland due to altered hydrology, soil compaction, and root damage, and some limited tree removal.

The road and trail reroutes would be new avenues for the proliferation and dispersal of noxious and invasive plants by vehicles, hikers, stock, bicycles, water transport, and/or road maintenance gravel within the current Wilderness. The 2.4 miles of reclaimed road between Car Wash Falls and MP 15.3 would have decreased noxious and invasive weed proliferation and dispersal. NPS would continue to control the small occurrences of noxious and invasive plants along the river, the road, the PCT, and other trails annually. Therefore, these would be negligible to minor, adverse. The 2.4 miles of reclaimed road between Car Wash Falls and MP 15.3 would have decreased noxious and invasive weed proliferation and dispersal. NPS would continue to control the small occurrences of noxious and invasive plants along the river, the road, the PCT, and other trails annually. Therefore, this would be a minor, long-term adverse impact.

Rerouting the road between MP 20.3 and 20.8 would be a major, long-term beneficial affect compared to pre-1995 conditions when the road was in the 100-year floodplain. The new road construction and post-project road maintenance would be a moderate, adverse impacts compared to post-1995 conditions when the remaining road was maintained as a trail.

Alternative D would have “No Effect” on ESA listed plants because there are no known individuals or populations in the project area.

7.7.6 ALTERNATIVE D (ROAD REROUTE) TERRESTRIAL AND AMPHIBIOUS WILDLIFE

7.7.6.1 Impacts Analysis

In Alternative D (Road Reroute), the Stehekin Valley Road would be: 1) relocated to the current PCT, 2) the current PCT would be relocated to a parallel location, and 3) the road would be rebuilt between Bridge Creek and Cottonwood Camp. Depending on location, timing, intensity, and duration of construction activities, ongoing maintenance activities, and emergency road repairs, wildlife activities such as nesting, foraging, and other wildlife behavior such as avoidance of the area could be adversely impacted.

For example, the road and trail reroutes would take 2 to 3 years to complete, depending on the number of dump trucks that are available and the timing of seasonal low flow. The Stehekin Valley Road and the PCT have low ambient noise and activity levels, and wildlife would probably avoid construction sites during working hours. Construction activities of this duration and intensity would have minor to moderate adverse impacts on all of the species that utilize the project area and the haul route from Company Creek pit.

Post-project road use, road maintenance, and emergency road repairs may also cause avoidance of the immediate area around sites that have relatively high levels of human or mechanical noise and activity. These impacts could have minor to moderate, adverse impacts on all of the species that utilize the project area.

The road-related mortality rates of smaller, less mobile species such as amphibians, reptiles, and butterflies may increase due to construction and post-construction traffic.

Alternative D would also result in some short- and long-term sediment delivery to waterways due to construction activities, riparian and wetland filling, and periodic flood damage at stream crossings and in the river corridor. These impacts would be minor, adverse impacts for all amphibious and riparian dependent species that utilize the project area.

The new road would wind through the remaining old growth, western redcedar trees. Every effort would be made to retain the trees, however, the hydrologic impacts to the wetland because of soil compaction and the road prism may result in some tree mortality. Changes in hydrology could have minor to moderate, long-term adverse impacts on the western redcedar wetland and old growth dependent species (see Alternative D Soils: Section 7.7.1 and Hydrology, Channel Morphology, Floodplains: Section 7.7.2).

The effects to the potentially affected special status terrestrial and amphibious wildlife are described below.

Gray Wolf. Gray wolf has not been sighted in the valley in over ten years. However, since there is suitable habitat, there is the potential for gray wolves to forage or travel through the project area. If gray wolves were in the area, during 2 to 3 year road reconstruction period it is likely that noise and human activity would cause them to avoid the area. It is determined that the short-term construction activities associated with Alternative D would be “Not Likely to Adversely Affect” gray wolf due to the availability of other high quality, extensive foraging habitat and travel corridors in NOCA.

The long-term, post-project impacts (risk of road-related mortality, noise, human activity) would be similar to the current PCT impacts and the historical road impacts in the river corridor, and would be “Not Likely to Adversely Affect” gray wolf.

Grizzly Bear. Grizzly bear has not been seen in the valley in over ten years, but there is suitable habitat. Therefore, it is possible that grizzly bears will occur in the project area. If grizzly bears were in the area during road reconstruction, it is likely that noise and human activity would cause them to avoid the area during the construction period as long as other attractants such as food or garbage were not available. Contractors would be required to remove all food and garbage to off-site locations at the end of each working day to avoid attracting bears and other scavengers (see Alternative D BMPs and Mitigation Measures: Section 5.4.4.6).

The project area is within the 95,000-acre Upper Stehekin River GBMU. This GBMU was designated when the Stehekin Valley Road and PCT were in use. Therefore, rerouting part of this low use road and high use trail would not result in a net loss of grizzly bear habitat and would meet the “no net loss” policy on Grizzly Bear Recovery.

It is determined that the short-term, construction activities associated with Alternative D would be “Not Likely to Adversely Affect” grizzly bear due to the proposed mitigations, and the availability of other high quality, extensive foraging habitat and travel corridors in NOCA.

The long-term, post-project impacts (risk of road-related mortality, noise, human activity) would be similar to the current PCT impacts and the historical road impacts in the river corridor, and would be “Not Likely to Adversely Affect” grizzly bear.

Canada Lynx. It is possible that lynx occur in the project area, and there have been several unconfirmed sightings in the past, as recently at 2000. Lynx are likely to avoid areas of high noise and human activity. It is determined that the short-term construction activities associated with Alternative C would be “Not Likely to Adversely Affect” Canada lynx due to the availability of other high quality denning habitat and extensive foraging habitat and travel corridors in NOCA.

The long-term, post-project impacts (risk of road-related mortality, noise, human activity) would be similar to the current PCT impacts and the historical road impacts in the river corridor, and would be “Not Likely to Adversely Affect” Canada lynx.

Bald Eagle. Bald eagle foraging and wintering habitat occurs along Lake Chelan. The only known bald eagle nest site is at the head of Lake Chelan, a minimum of 13 river miles from the project area. However, bald eagle populations are known to be expanding and the project area could provide favorable foraging and nesting habitat in the future. If so, eagles could be temporarily displaced by disturbance during construction and subsequent use of the rebuilt road. Given the extensive amount of nesting and foraging habitat present throughout the Stehekin Valley, and the lack of eagles currently nesting or foraging in the vicinity of the project area, Alternative D would be “Not Likely to Adversely Affect” bald eagles.

Northern Spotted Owl. Northern spotted owl nesting has been documented in close proximity to the proposed action area, and there is a high likelihood that northern spotted owl would occur or may be actively nesting near the construction sites during project implementation. Road reconstruction could temporarily affect owls because of increased levels of noise and human activity, which could affect nesting and foraging success. The project area would be surveyed for owls prior to implementation of construction activities to mitigate these potential adverse impacts.

An Action Area would be delineated around active nest trees if an individual(s) or an active nest were found. The Action Area would have a radius of 1,000 feet extending out from in all directions during the nesting season (March 1 to September 6) (USFWS 2005). Construction activities would not be allowed during the owl breeding and nesting seasons, March 1 to at least September 6 near individuals or a known nest site (see Alternative D BMPs and Mitigation Measures: Section 5.4.4.6).

There are areas of high quality foraging habitat in the forested, Wilderness areas surrounding the proposed action areas, particularly the old growth western redcedar wetland. Some of the old growth trees were killed by the Shady Fire in August 2005. Road-related impacts (e.g. soil compaction, changes in hydrology) may result in additional tree mortality, and some trees would be removed for road construction. Over time, “hazard trees” such as fire-killed snags would be removed to protect the road and trail users. The snag removal and tree mortality could have a moderate, long-term adverse impact on species that are part of the owls’ prey base (see Alternative D, Soils: Section 7.7.1, and Hydrology, Channel Morphology, Floodplains: Section 7.7.2).

It is determined that the short-term construction activities associated with Alternative D would be “Not Likely to Adversely Affect” northern spotted owl due to the proposed mitigations.

Long-term, Alternative D would be “Likely to Adversely Affect” northern spotted owl because the increased noise and human activity levels in close proximity to potential nesting habitat and the reduction of important foraging habitat (the western redcedar wetland) may reduce reproductive success.

Western Toad and Columbia Spotted Frog. Western toad and Columbia spotted frog breed in lower velocity habitat, including side-channels, ditches, ponds, and wetlands. Hydrologic impacts to the old growth redcedar wetland because of soil compaction and the road prism could have a minor, long-term adverse impact on these species (see Alternative D Soils: Section 7.7.1 and Hydrology, Channel Morphology, Floodplains: Section 7.7.2).

Amphibians including western toad and Columbia spotted frog would have moderate, long-term adverse impacts because the new road would cross numerous drainages, riparian, and wetland habitats used by these species. Road-related mortalities during construction and post-construction would increase compared to the other alternatives.

Other Birds. The noise and activity during road reconstruction and long-term habitat alteration could affect other special status bird species specifically northern goshawk, Vaux's swift, pileated woodpecker, Lewis' woodpecker, black-backed woodpecker, and their habitats.

The mature and old growth stands along the PCT provide nesting and foraging habitat for pileated woodpecker, and the Shady Fire of August 2005 created potential habitat for Lewis' and black-backed woodpeckers. The road and trail reroutes would wind through the fire area, and require some tree and snag removal.

Northern goshawks use upland mesic, coniferous forests and deciduous riparian forests, and fledged goshawks and old nests occur above High Bridge (MP 11.2). Suitable nesting and foraging habitats are available along the PCT.

The mature and old growth stands along the PCT provide Vaux's swift nesting habitat and the Stehekin River provides foraging habitat.

The construction activities would have minor, short-term adverse impacts on these species because they would avoid nesting and foraging in construction areas.

Construction would cause minor to moderate, long-term adverse impacts because rerouting the road and the PCT would require the removal of some fire-killed snags and old growth western redcedar that are the nesting and foraging habitat for these species.

Gray Squirrel. There is no gray squirrel habitat (ponderosa pine mixed with hardwood) in the proposed action area, so implementing Alternative D would not affect gray squirrel.

Townsend's Big-eared Bat. The Stehekin River corridor has rock cliff crevices and low human activity levels that provide high quality bat roosting habitat. Most roosting bats are extremely sensitive to human disturbance. Townsend's big-eared bats hibernate during winter months when temperatures are between 0°C and 11.5°C (32-53°F). The bats hibernate in tight clusters, which may help stabilize body temperature against external changes in temperature. Males may select warmer hibernacula than do females and are more easily aroused and active in winter than are females. Their winter sleep is interrupted by frequent periods of wakefulness during which they move about in the caves or from one cave to another. Reproductive bats would be roosting and seasonal hibernation activity (e.g. site selection) may occur during the construction season. Therefore, the noise and activity levels during implementation of Alternative D would have a moderate to major, short-term adverse impact on Townsend's big-eared bats during the 2 to 3 year road reconstruction period.

The long-term, post-project, road-related impacts (risk of mortality, noise, human activity) would be similar to the minor to moderate impacts that existed historically in the river corridor.

7.7.6.2 Cumulative Impacts

The Alternative D action area has the only old growth western redcedar wetland in the project area, and some of the trees were killed in the August 2005 Shady Fire. The fire created potential habitat for species that require abundant snags such as Lewis' woodpecker and black-backed woodpecker. The 2.2-mile long road and PCT reroutes would wind through the burn area. Over time, the snags near the road and trail would become "hazard trees" and would need to be removed to protect visitors, creating a cumulative impact for snag-dependent species.

The combined effects of altered hydrology, soil compaction, and root damage are likely to weaken and/or kill some of the live western redcedar trees and change the perimeter and area of the wetland

over time. Hydrologic impacts to the old growth redcedar wetland because of soil compaction and the road prism could have a long-term, minor to moderate impacts on wetland and old growth dependent species.

Northern spotted owls could experience moderate, long-term adverse cumulative impacts due to the Shady Fire, other Stehekin Valley Road work near McGregor Meadows, and loss of habitat in the valley, in conjunction with Alternative D.

7.7.6.3 Compliance with Laws and Policy

ESA. It is determined that the short-term construction activities associated with Alternative D would be “Not Likely to Adversely Affect” northern spotted owl due to the proposed mitigations. Long-term, Alternative D would be “Likely to Adversely Affect” northern spotted owl because the increased noise and human activity levels in close proximity to potential nesting habitat and the reduction of important foraging habitat (the western redcedar wetland) may reduce reproductive success.

The NPS would formally consult with the USFWS to obtain a Biological Opinion based on this “Likely to Adversely Affect” determination for northern spotted owl should this alternative be selected for implementation.

It is determined that the 2 to 3 years of road reconstruction activities in Alternative D would be “Not Likely to Adversely Affect” gray wolf, grizzly bear, Canada lynx, and bald eagle due to one or more of the following factors: 1) lack of current occupancy, 2) the relatively short implementation time, and/or 3) the availability of high quality, extensive foraging, nesting, and/or denning habitat and travel corridors in the Park. The long-term, post-project impacts (risk of road-related mortality, noise, human activity) would be similar to the current PCT impacts and the historical road impacts in the river corridor, and would be “Not Likely to Adversely Affect” these species.

The NPS would informally consult with the USFWS to obtain their concurrence with these “Not Likely to Adversely Affect” determinations should this alternative be selected for implementation.

NPS Management Policies 4.4.2.3, Management of Threatened or Endangered Plants and Animals. Alternative D would *not* meet the intent of NPS Management Policies 4.4.2.3 that requires the NPS to survey, protect, monitor, restore, and strive to recover all ESA listed, proposed, or candidate species that are native to NPS units, and to manage, to the greatest extent possible, state, and locally endangered and threatened species as federally listed species due to the probable adverse impacts to northern spotted owl.

7.7.6.4 Conclusions

The Stehekin Valley Road beyond Car Wash Falls and the PCT has low ambient noise and activity levels, and wildlife would probably avoid construction sites during working hours. In general, any of the adverse construction affects would be minor to moderate and short-lived due to the proposed mitigations (see Alternative D BMPs and Mitigation Measures: Section 5.4.4.6).

Post-project road use may also cause avoidance of the immediate area around sites that have relatively high levels of human or mechanical noise and activity.

Changes in hydrology, live tree removal, and hazard tree removal could have minor to moderate, long-term adverse impacts on the western redcedar wetland and old growth and snag dependent species.

The road-related mortality rates of smaller, less mobile species such as amphibians, reptiles, and butterflies may increase due to construction and post-construction traffic.

It is determined that the short-term construction activities associated with Alternative D would be “Not Likely to Adversely Affect” northern spotted owl due to the proposed mitigations. Long-term, Alternative D would be “Likely to Adversely Affect” northern spotted owl because the increased noise and human activity levels in close proximity to potential nesting habitat and the reduction of important foraging habitat (the western redcedar wetland) may reduce reproductive success.

It is determined that the 2 to 3 years of road reconstruction activities in Alternative D would be “Not Likely to Adversely Affect” gray wolf, grizzly bear, Canada lynx, and bald eagle due to one or more of the following factors: 1) lack of current occupancy, 2) the relatively short implementation time, and/or 3) the availability of high quality, extensive foraging, nesting, and/or denning habitat and travel corridors in the Park. The long-term, post-project impacts (risk of road-related mortality, noise, human activity) would be similar to the current PCT impacts and the historical road impacts in the river corridor, and would be “Not Likely to Adversely Affect” these species.

7.7.7 ALTERNATIVE D (ROAD REROUTE) VISITOR ACCESS, EXPERIENCE, AND PARK OPERATIONS

Visitor Access. Motorized vehicles and cyclists would be rerouted to a newly constructed road between MP 12.7 and Bridge Creek. The new road would connect to the old Stehekin Valley Road at MP 15.3, and motorists could continue along the reconstructed Stehekin Valley Road between MP 15.3 and Cottonwood Camp. Most cyclists are day users that rent bicycles and travel between Stehekin and High Bridge Historic District. Therefore, reestablishing access to cyclists above MP 12.7 would have minor, long-term beneficial affects for cyclists.

Hikers, stock users, and cross-country skiers would continue to have easy access to the Wilderness and other park trails via the PCT. Typically, most stock trips begin at the Stehekin Valley Ranch and follow the PCT. Stock use would continue on the rerouted section of the trail essentially unchanged. Hikers and cross-country skiers would still be able to park at the Car Wash Falls parking area or Tumwater Camp and access the PCT via the MP 12.7 spur trail (0.2 miles south of Car Wash Falls).

PCT hikers approaching Stehekin from the west (Seattle) side could have the option of taking a shuttle from Bridge Creek to Stehekin as they did prior to 2003 and 1995, if the NPS or a permittee chooses to operate a shuttle in the future.

Since the 2003 flood, some local businesses have adjusted their operations to provide drop camp, meal, and hostel-style tent services at Bridge Creek for through-hikers. These new services may or may not continue under this alternative due to restored motorized and mechanized access to Cottonwood Camp.

Visitors would not have vehicle or bicycle access to the Dolly Varden and Shady camps from the road reroute. Dolly Varden would be accessible to hikers from the parking area at MP 12.9. A 0.1-mile long trail would be built for hikers to access Shady Camp from the PCT. Vehicle and bicycle access would be reestablished to Bridge Creek, Park Creek, Flat Creek, Glory, and Cottonwood camps.

Motorized recreation is not a primary use in the Stehekin area because there are very few privately owned vehicles and visitors cannot bring vehicles into the area. Therefore, Stehekin residents and visitors who want to ride the shuttle would be the user groups affected by the road reroute and

reconstruction. The NPS estimates the shuttle served an average of 2,500 people annually, or approximately 7 percent of the total Stehekin area visitors. Shuttle service ended at MP 9.5 near the Stehekin Valley Ranch in 2003 and at Glory in 1995, after the floods. Shuttle service to High Bridge Historic District resumed in the fall of 2005 after implementation of the *Coon Run* project. Therefore, reestablishing motorized access from MP 12.7 to Cottonwood Camp (MP 22.8) would have a relatively minor, beneficial long-term affects for motorists and visitors compared to the No Action Alternative.

Visitor Experience. Vehicle and bicycle access would be established from MP 12.7 to Cottonwood Camp, similar to pre-1995 conditions. The road reroute would be in closer proximity to the PCT than the former road, and hikers and stock users would experience noise, dust, and exhaust from shuttle, Park, and private vehicles at times. Visitors who desire increased solitude, natural soundscapes, and remoteness would perceive these changes as moderate to major, long-term adverse impacts.

The individuals who would like vehicle, shuttle, and bicycle access to southern portions of the Wilderness reestablished would perceive implementation of Alternative D (Road Reroute) as a moderate to major, long-term beneficial affect compared to the No Action Alternative.

If 5 to 10 dump truck hauled 4 roundtrips from Company Creek pit per day, it would take approximately 17 to 36 days to complete the construction hauling between Stehekin and the project area. The construction season would be limited by seasonal high water, wet soil mitigations, and possibly northern spotted owl mitigations, and would coincide with the peak recreation season (summer-fall). Visitors using any part of the Stehekin Valley Road, or Park destinations near the road, would be exposed to noise, exhaust fumes, dust, and heavy equipment traffic during the construction season. To mitigate these affects and visitor safety concerns, the NPS would not allow construction traffic during weekends and federal holidays, and would limit construction traffic and activities to daylight hours. Alternative D would be a major adverse impact on area visitors during the 2 to 3 year reconstruction period despite mitigations.

The reclamation would have minor, short-term affects (noise, dust, exhaust, traffic) on visitors if a helicopter or large trucks were used to remove the culverts and other material between Car Wash Falls and MP 15.3.

Alternative D would establish the need for routine road maintenance and emergency road repairs between MP 12.7 and Cottonwood Camp. Because the new road would bisect the current Wilderness in close proximity to the PCT, and road construction, reconstruction, routine maintenance, and emergency repairs would correspond with the peak seasons of visitor use, these operations would degrade the Wilderness qualities of the Stephen Mather Wilderness.

Park Operations. NPS staff would have motorized access as far as Cottonwood Camp for emergency services (e.g. search and rescue, fire suppression) for the first time since 1995. Most of these park operations are already provided by air support due to the large expanses of roadless and Wilderness areas. Reestablishing motorized and mechanized access to Cottonwood Camp would probably create a need for increased emergency services.

Motorized access for other park operations such as trail maintenance and noxious weed control ended at MP 9.5 near Stehekin Valley Ranch in 2003 and at Glory in 1995, after the floods. Since then, park personnel have had to hike or pack stock longer distances to perform these services. Reestablishing motorized access to Cottonwood Camp would increase access but would also

increase the need for weed control over time because vehicles are a primary source of weed introduction and proliferation.

Alternative D would establish motorized access and the need for routine road maintenance and emergency road repairs between MP 12.7 and Cottonwood Camp. These park operations would be ongoing for the life of the road, and would correspond with the peak seasons of visitor use. PCT users and other Park visitors would experience moderate to major adverse impacts (noise, dust, exhaust) during these operations.

7.7.7.1 Cumulative Impacts

There is no motorized access to the Stehekin area from outside locations, and there was a very small, closed road system in the Stehekin area (approximately 26 miles) prior to 1995. Of the total miles (pre-1995), 12 miles were within the Park. Approximately 8 miles of road between Car Wash Falls and Glory have been closed since 2003; approximately 2.5 miles have been closed between Glory and Cottonwood Camp since 1995.

Alternative D would reestablish approximately 9.7 miles of road, or 81 percent of the original road miles within the Park. There are no other road closures planned within the Park or the Stehekin area within the reasonably foreseeable future.

Alternative D would require bringing many tons of fill and other construction materials (e.g. riprap and large culverts) into Stehekin by ferry and hauling the material to the project site. Therefore, the community of Stehekin and visitors traveling on the Stehekin Valley Road and at Park destinations near the road would be subjected to dust, noise, exhaust, and heavy equipment traffic during the 2 to 3 year construction period.

7.7.7.2 Compliance with Laws and Policy

The Organic Act directs the NPS to promote and regulate the use of national parks to conserve resources for their enjoyment by existing and future generations. NPS Management Policies and DO #17 Tourism identify visitor use patterns. Primary user groups in the Complex include hikers, cyclists, and stock users who access the Park during the summer. Alternative D (Road Reroute) would continue to provide bicyclist access to High Bridge Historic District, and Wilderness and PCT access to hikers and stock users. These are the most commonly used routes for these user groups. In addition, Alternative D would reestablish bicyclist access between MP 12.7 and Cottonwood Camp (MP 22.8), similar to pre-1995 flood conditions.

Alternative D would not meet DO #47 that requires the NPS to the fullest extent practicable "...to protect, maintain, or restore natural soundscapes in a condition unimpaired by inappropriate or excessive noise sources." because the new road would bisect the current Wilderness in close proximity to the PCT. Road construction, reconstruction, routine maintenance, and emergency repairs would correspond with the peak seasons of visitor use. As a result, this alternative would degrade the wilderness character (including soundscape) of the Stephen Mather Wilderness.

Alternative D would not meet the intention of NPS Management Policies for park roads "...to enhance the quality of a visit, while providing for safe and efficient travel, with minimal or no impacts on natural and cultural resources (9.2.1.1)." because the road reroute would impact numerous drainages, riparian, and wetland areas, and the old road between Bridge Creek and Cottonwood Camp would continue to be damaged by periodic floods.

7.7.7.3 Conclusions

The MP 12.7 to MP 15.3 road reroute would be in much closer proximity to the PCT than the former road (Appendix A3). Visitors who desire increased wilderness character would perceive these changes as moderate to major, long-term adverse impacts.

The individuals who would like motorized vehicle and bicycle access to southern portions of the Wilderness reestablished would perceive implementation of Alternative D (Road Reroute) as a moderate to major, long-term beneficial affect compared to the No Action Alternative.

Alternative D would require bringing many tons of fill and other construction materials (e.g. riprap and large culverts) into Stehekin by ferry and hauling the material to the project site. Therefore, the community of Stehekin and visitors on the Stehekin Valley Road and at Park destinations near the road would be subjected to dust, noise, exhaust, and heavy equipment traffic during the 2 to 3 year construction period.

The reclamation would have minor, short-term adverse impacts (noise, dust, exhaust, traffic) on visitors if a helicopter or large trucks were used to remove the culverts and other material between Car Wash Falls and MP 15.3.

Since the 2003 flood, some local businesses have adjusted their operations to provide drop camp, meal, and hostel-style tent services at Bridge Creek for through-hikers. These new services may or may not continue under this alternative due to restored vehicle and bicycle access to Cottonwood Camp.

NPS staff would have motorized access to Cottonwood Camp (MP 22.8) for emergency services such as search and rescue or fire suppression for the first time since 1995. Most of these park operations are already provided by air support due to the large expanses of roadless and Wilderness areas. Reestablishing motorized and mechanized access to Cottonwood Camp would probably create a need for increased emergency services.

Motorized access for other park operations such as trail maintenance and noxious weed control ended at MP 9.5 near Stehekin Valley Ranch in 2003 and at Glory in 1995, after the floods. Since then, park personnel have had to hike or pack stock longer distances to perform these services. Reestablishing motorized access to Cottonwood Camp would increase access but would also increase the need for weed control over time because vehicles are a primary source of weed introduction and proliferation.

Alternative D would establish motorized access, and the need for routine road maintenance and emergency road repairs between MP 12.7 and Cottonwood Camp. Because the new road would bisect the current Wilderness in close proximity to the PCT, and road construction, reconstruction, routine maintenance, and emergency repairs would correspond with the peak seasons of visitor use, this alternative would degrade the Wilderness qualities of the Stephen Mather Wilderness.

7.7.8 ALTERNATIVE D (ROAD REROUTE) SOCIO-ECONOMICS

7.7.8.1 Impacts Analysis

Alternative D (Road Reroute) would create long-term changes in the local economy, including a return to pre-1995 visitor use patterns and permittee services. The changes in permittee services that followed the 2003 flood would probably continue.

The NPS estimates the shuttle served an average of 2,500 people annually, or approximately 7 percent of the total Stehekin area visitors. Shuttle service ended at Glory in 1995 and at MP 9.5 near Stehekin Valley Ranch in 2003, after the floods. Shuttle service to High Bridge resumed in the fall of 2005 after implementation of the *Coon Run* project. The NPS or a permittee could offer shuttle service as far as Cottonwood Camp after implementation of Alternative D. The NPS-run shuttle service above High Bridge is not cost effective to operate in terms of cost per user. The NPS estimates it costs \$25,000 per year to subsidize the shuttle service.

Alternative D would incur costs for approximately 2.2 miles of new road construction; road reconstruction and repairs between MP 12.7 and 20.1; the specified rehabilitation of the old road between MP 12.9 and 15.3 (culvert and debris removal); construction of a 0.1-mile long spur trail between the PCT and Shady Camp; approximately 2.2 miles of PCT construction; and administrative costs for changes in the Wilderness boundary (Table 3).

The engineering costs for Alternative D would be significantly less than Alternative C (44 vs. 10 percent) because of the substantial engineering challenges associated with Alternative C (Tables 2 & 3).

The NPS would have ongoing costs for routine road maintenance, similar to pre-1995 (9.7 vs. 9.9 miles of road). However, the costs for emergency road reconstruction would be less than pre-flood conditions because the most problematic road segments (MP 12.9 to MP 15.3 and MP 20.3 to MP 20.8) would be rerouted out of the Stehekin River floodplain. Some areas of the road between MP 15.3 and 20.1 would continue to have periodic flood damage that would need emergency road repairs.

Local Economy. Several Stehekin Valley and Lake Chelan businesses are tied to visitor use within the project area. Lake Chelan businesses provide transportation services to get visitors into Stehekin, and Stehekin businesses offer visitor services such as food, lodging, guided backpacking, bicycle rentals, shuttles, and horseback tours.

Alternative D would restore motorized and bicycle access from Car Wash Falls to Cottonwood Camp. This action would be expected to restore visitor use and local business operations (e.g. bicycle rentals) to pre-1995 levels (minor, long-term beneficial affect).

The changes in permittee services including hostel-style tents, food, and drop camp services at Bridge Creek that have assisted visitors in accessing the upper valley since the 2003 flood would probably continue. Local permittees that continue to provide increased backcountry services as they have since 2003 would continue to have moderate, long-term socio-economic benefits.

The local Stehekin merchants would have major, short-term socio-economic benefits during road reconstruction from increased lodging, food, gas, and supply purchases. Local contractors may also have major, short-term socio-economic benefits from contracting a variety of construction-related work or equipment rentals.

Lake Chelan quarries, equipment rentals, and barge operators would have major, short-term socio-economic benefits from importing large amounts of road fill material for the road construction.

Implementation Costs. The total estimated cost of implementing Alternative D is \$1,339,075 (Table 3), or approximately 20 percent of Alternative C (Table 2). The local economy would have major, short-term beneficial affects by providing some of the labor, supplies, or equipment needed to complete the road reconstruction.

Administrative actions including changes in the Wilderness boundaries would be implemented by NPS and congressional staff, and would not directly benefit the local economy.

Maintenance Costs. The NPS would have ongoing costs for routine road maintenance, similar to pre-1995 conditions (9.7 vs. 9.9 miles of road). Routine road maintenance would average approximately \$14,007 per year (\$1,444 per mile x 9.7 miles) and would be a major, long-term adverse impact on Park budgets.

However, the costs for emergency road reconstruction would be less than pre-flood conditions (previous costs for road repairs are not available) because the most problematic road segments (MP 12.9 to MP 15.3 and MP 20.3 to MP 20.8) would be rerouted out of the Stehekin River floodplain. Some areas of the road between MP 15.3 and MP 20.1 would continue to have periodic flood damage that would need emergency road repairs (moderate, long-term adverse impact).

Annual routine maintenance of the new 0.1-mile long trail to Shady Camp would be \$55 (550 per mile).

The cost of PCT maintenance would be similar to or less than current conditions because drainage structures and creek crossings would be improved during the reconstruction.

The cost of trail maintenance above MP 22.8 would probably be less (minor affect) when vehicle access is restored to Cottonwood Camp because crews would have 9.7 fewer miles to hike or pack to the trailheads.

7.7.8.2 Cumulative Impacts

There are no expected cumulative impacts that would affect socio-economics in the project area.

7.7.8.3 Compliance with Laws and Policy

This EA meets the NPS NEPA and DO #12 requirements to consider socio-economics in NEPA analysis.

7.7.8.4 Conclusions

The changes in permittee services including hostel-style tents, food, and drop camp services at Bridge Creek that have assisted visitors in accessing the upper valley since the 2003 flood would probably continue, and local permittees that provide these services would continue to have moderate, long-term socio-economic benefits. Other local concessions would be expected to return to pre-2003 levels following implementation of Alternative D, a minor, long-term socio-economic benefit.

The local Stehekin merchants would have major, short-term economic benefits during road reconstruction from increased lodging, food, gas, and supply purchases. Local contractors may also have major, short-term socio-economic benefits from contracting a variety of construction-related work or equipment rentals.

Lake Chelan quarries, equipment rentals, and barge operators would have major, short-term socio-economic benefits from importing large amounts of road fill material for the road reconstruction.

The NPS would have ongoing costs for routine road maintenance, similar to pre-1995 conditions, and maintenance would be a major, long-term adverse impact on Park budgets.

However, the costs for emergency road reconstruction would be less than pre-flood conditions because the most problematic road segments (MP 12.9 to MP 15.3 and MP 20.3 to MP 20.8) would be rerouted out of the Stehekin River floodplain. Some areas of the road between MP 15.3 and MP

20.1 would continue to have periodic flood damage that would need emergency road repairs (moderate, long-term adverse impact).

The NPS would have ongoing costs for routine hiking and stock trail maintenance above Cottonwood Camp. The cost of trail maintenance would probably be less (minor affect) when vehicle access is restored to Cottonwood Camp because crews would have 9.7 fewer miles to hike or pack to the trailheads.

7.7.9 ALTERNATIVE D (ROAD REROUTE) WILDERNESS

7.7.9.1 Impacts Analysis

Wilderness Character. Approximately 71 percent of the roadbed between Car Wash Falls (MP 12.9) and MP 15.3 washed out in the 2003 flood. Twenty percent of the road above Glory (MP 20.1) washed out in 1995. Since that time, erosion and revegetation have given the road a more natural appearance and increased its wilderness character. The proposed rehabilitation between Car Wash and MP 15.3 (culvert, concrete, and bolt removal) would further reduce the visual affects of the remaining road fragments, the same as the Preferred Alternative.

The road reroute between MP 12.7 and MP 15.3 would be located on the approximate alignment of the current PCT, and the new PCT reroute would be closer to the new road than it was to the old road that followed the Stehekin River corridor (Appendix A4). Wilderness qualities such as remoteness, solitude, primitiveness, and naturalness would decrease compared to pre-October 2003 conditions when the Stehekin Valley Road was located farther from the PCT because trail users would experience the dust, sight, sound, and smell of vehicles between MP 12.7 and MP 15.3. These affects would be greatest during the 2 to 3 year construction period.

After construction is completed, the level of motorized use above MP 12.7 would be low, as it was prior to 2003 since there is no car ferry to Stehekin and the only vehicles that would enter the Park belong to Stehekin residents, the NPS, or a shuttle service. There would be few conflicts between motorized and non-motorized users on the reroutes because non-motorized uses would be concentrated on the PCT and other Wilderness trails. User conflicts would have negligible to minor adverse impacts compared to the No Action and Preferred alternatives.

The routine road maintenance and emergency road repairs on the reroutes would be less than pre-1995 or 2003 conditions, when these sections were in the Stehekin River floodplain. However, there has not been any road maintenance or emergency repairs since the road washed out in 2003. Therefore, these would be moderate, long-term adverse impacts on wilderness character, compared to the No Action or Preferred alternatives.

The road reroute between MP 12.7 and MP 15.3 would introduce a new visual affect to the Wilderness, however, the road would not be visible from any vantage point (unlike the old road in the river corridor) except the PCT. The reroute would require much less extensive construction than the original road in the river canyon (riprap, rock blasting, bolts, and concrete), and would have less visual affect than road reconstruction (Alternative C). The new road reroute between MP 20.3 and MP 22.8 would follow the approximate alignment of the current trail, and would be less visible than the old road that was in the 100-year floodplain of the Stehekin River from all possible vantage points. Therefore, Alternative D (Road Reroute) would have minor to moderate, adverse visual affects compared to the No Action or Preferred alternatives (no reconstruction or reroutes), depending on visibility from the PCT.

Wilderness Facilities. Alternative D would reestablish motorized and mechanized access to the Wilderness as far as Cottonwood Camp. Visitors would have vehicle and bicycle access to the Bridge Creek, Park Creek, Flat Creek, and Cottonwood camps, Glory, and to upper valley trails as they did prior to 1995 and 2003. This would be a minor to moderate, beneficial affect for motorized users that have limited road access. It would also be a minor adverse impact for the non-motorized users that typically follow the PCT.

Visitors would not have vehicle access to Dolly Varden and Shady camps. Dolly Varden would be easily accessible to hikers and stock users via the old road. Shady Camp would be easily accessible via the new 0.1-mile long trail from the PCT. Loss of motorized access to these camps would be a negligible affect, since campsites adjacent to the river (Tumwater and Bridge Creek) are located within ½ to 3 miles of these camps, and the level of campsite use in the project area has been historically low.

Wilderness Designation. The road reroute between MP 12.7 and MP 15.3, and the ½-mile reroute between Glory and Cottonwood Camp would require a congressional change in the Wilderness boundary to establish a new non-Wilderness road corridor. The 2.4-mile long non-Wilderness road corridor between Car Wash Falls and MP 15.3 would be eligible for Wilderness designation.

Congress has approved a few minor, administrative Wilderness boundary changes. For example, the boundary of a national forest Wilderness in Utah was adjusted to exclude an active gypsum mine that was within the designated Wilderness (Ekker pers. comm. 2005). Because the Stehekin Valley Road existed at the time of Wilderness designation, the new road would be approximately the same length (9.7 vs. 9.9 miles), and the boundary adjustments would be administrative only, Alternative D would have a minor, adverse impact on Wilderness designation.

7.7.9.2 Cumulative Impacts

There are no expected cumulative impacts that would affect the Wilderness in the project area.

7.7.9.3 Compliance with Laws and Policy

Alternative D (Road Reroute) would require congressional action to change the Stephen Mather Wilderness boundary.

7.7.9.4 Conclusions

Since the 1995 and 2003 floods, erosion and revegetation have given the old road between Car Wash Falls and Cottonwood Camp a more natural appearance and increased its wilderness character. The proposed road rehabilitation between Car Wash Falls and MP 15.3 (culvert, concrete, and bolt removal) would further reduce the visual affects of the remaining road fragments, the same as the Preferred Alternative.

The MP 12.7 and MP 15.3 reroute would increase wilderness character along the river, but would reduce visitor access to and views of the river. Wilderness qualities such as remoteness, solitude, primitiveness, and naturalness would decrease compared to pre-October 2003 conditions when the Stehekin Valley Road was located farther from the PCT because trail users would experience the dust, sight, sound, and smell of vehicles between MP 12.7 and MP 15.3. These affects would be greatest during the 2 to 3 year construction period.

The level of motorized use above MP 12.7 would be low, as it was prior to 2003. There would be few conflicts between motorized and non-motorized users on the reroutes, since non-motorized uses

would be concentrated on the PCT and other Wilderness trails. User conflicts would be negligible to minor adverse impacts compared to the No Action and Preferred alternatives.

The routine road maintenance and emergency road repairs on the reroutes would be less than when these sections were in the Stehekin River floodplain. However, there has not been any motorized use, road maintenance, or emergency repairs since the road washed out in 2003. Therefore, these activities would be moderate, long-term adverse impacts on wilderness character, compared to the No Action or Preferred alternatives.

Alternative D (Road Reroute) would have minor to moderate, adverse visual affects compared to the No Action or Preferred alternatives (no reconstruction or reroutes), depending on visibility from the PCT.

The Stehekin Valley Road existed at the time of Wilderness designation, the new road would be approximately the same length (9.7 vs. 9.9 miles), and the boundary adjustments would be administrative only. Therefore, Alternative D would have a minor, adverse impact on Wilderness designation.

7.7.10 ALTERNATIVE D (ROAD REROUTE) PACIFIC CREST TRAIL

Officially closing the Stehekin Valley Road to all access between Car Wash Falls and MP 15.3, rerouting the Stehekin Valley Road and the PCT between MP 12.7 and MP 15.3, and building a spur trail to Shady Camp (Appendix A3, A4, & A6) would have the following affects to PCT access, trail condition, backcountry campsite availability, and visitor use.

Visitor Access to the PCT. Prior to the 1995 flood, motorized access was available to the PCT trailhead at Bridge Creek (MP 15.9). After the 1996 road reconstruction and before the October 2003 flood, motorized access to Bridge Creek resumed.

Between October 2003 and the fall of 2005, motorized access ended at MP 9.5 near Stehekin Valley Ranch. The *Coon Run Project*, completed in the fall of 2005, restored vehicle access to Car Wash Falls (MP 12.9). The rerouted PCT (MP 12.7 to MP 15.3) would be approximately the same length as the current trail (3 miles), and would have the same trailhead locations.

The majority of stock trips would still originate at the Stehekin Valley Ranch. There would be no stock trailer parking above High Bridge (MP 11.2). These uses would be unchanged since 1995.

PCT hikers approaching from Stehekin would have motorized access to the PCT as far as Bridge Creek, as they did prior to October 2003. Hikers could also access the PCT via the MP 12.7 trailhead from the Car Wash Falls parking area.

PCT hikers approaching Stehekin from the west (Seattle) side may have the option of taking a shuttle from Bridge Creek (MP 15.9) or from High Bridge to Stehekin, as they did prior to October 2003. NPS shuttle service to High Bridge resumed in the fall of 2005, after completion of the *Coon Run Project*.

Local businesses have adjusted their operations since 2003 to provide increased drop camp services to Bridge Creek Camp to accommodate through-hikers. Other permittee services at Bridge Creek include meal service and hostel-style cabin tents. These services may still be in demand and be offered to visitors after implementation of Alternative D (Road Reroute).

PCT Condition. The majority of hikers and stock users used the PCT (rather than the road) prior to 2003, and use patterns have not changed since 2003. The NPS would maintain the new trail to allow this ongoing level of use.

The current PCT has drainage problems associated with the numerous wetland and stream crossings. The rerouted PCT would have better drainage structures and stream crossings to rectify these problems. Therefore, Alternative D would have a moderate, long-term beneficial affect on the condition of the PCT.

Backcountry Campsite Availability. There would be no change in the number of backcountry campsites available for PCT users. Since October 2003, there has been no easy access to Shady Camp. A 0.1-mile long hiking trail would be built from the rerouted PCT to Shady Camp.

Dolly Varden Camp (MP 13) on the Stehekin River and was heavily damaged during the 2003 flood, and future floods could wash away the one remaining tent site. This would have a negligible effect on PCT users, since there are other camps in closer proximity to the PCT (Figure 1).

Visitor Use. The new PCT reroute would be parallel to the existing trail and out of sight distance from the new road wherever practical to maintain continuity of the PCT.

Day trip hiking along the PCT north of Bridge Creek should return to pre-2003 levels if vehicle access is restored to MP 15.9. However, this potential change in use would be negligible.

The number of through-hikers over Cascade Pass from Highway 20 on the west (Seattle) side of the Park should return to pre-2003 levels if shuttle service is restored to Bridge Creek, and/or the post-2003 permittee services at Bridge Creek and Cottonwood continue. Any change is expected to be negligible.

7.7.10.1 Cumulative Impacts

There are no expected cumulative impacts that would affect the PCT in the project area.

7.7.10.2 Compliance with Laws and Policy

In accordance with the National Trail Systems Act of 1968, the PCT must be maintained as "...an extended trail so located as to provide for maximum outdoor recreation potential and for the conservation and enjoyment of the nationally significant scenic, historic, natural, or cultural qualities for the areas through which such trails may pass." Alternative D would maintain access to the PCT in a manner, which offers outdoor recreation opportunities for a broad range of user groups (motorists, hikers, stock users). Alternative D would reroute approximately 2.2 miles of the PCT parallel to the existing trail and out of sight distance from the new road wherever practical so that continuity of the PCT would be maintained.

7.7.10.3 Conclusions

Alternative D (Road Reroute) would have only a negligible affect on PCT use. There would be a minor to moderate affect on facilities used in conjunction with the PCT because there would be improved hiking access to Shady Camp, motorized access, and possible shuttle service to the PCT trailhead at Bridge Creek. The new permittee services at Bridge Creek may continue to be in demand and to provide increased services at Bridge Creek. PCT use levels should return to pre-2003 levels.

The rerouted PCT would have better drainage and stream crossings than the current PCT. Therefore, Alternative D would have a moderate, long-term beneficial affect on the condition of the PCT.

7.7.11 ALTERNATIVE D (ROAD REROUTE) WILD AND SCENIC RIVERS

7.7.11.1 Impacts Analysis

Free-flowing Character. The Stehekin Valley Road between Car Wash Falls and MP 15.3 would be permanently closed and partially rehabilitated (culverts would be removed), the same as the Preferred Alternative. The new road would be rerouted onto the existing PCT between MP 12.7 and MP 15.3, out of sight and influence of the river (Appendix A3).

The former road between Glory and Cottonwood Camp would be reconstructed using the 1996 trail alignment and the remaining old roadbed (Appendix A4). The ½-mile road reroute would be in the current Wilderness, and would require a legislative change in the Wilderness boundary.

Prior floods have already washed away some of the riprap along the Stehekin River. Future flooding is likely to continue to wash away some of the remaining riprap and road fill, allowing the river to choose its natural course and flow unimpeded. The increased bank erosion, channel aggrading and migration, and sediment deposition in floodplains and riparian areas due to periodic erosion of the road fill would cease.

Because of these actions, the free-flowing character of the Stehekin River is expected to improve to a moderate extent over the long-term.

Classification. Alternative D (Road Reroute) would not affect the Scenic WSR classification of Segment 2. According to guidelines for WSR eligibility, classification, and management (FR 1982), river areas classified as Scenic have "...shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by road." The extent of bank modification (riprap) would decrease from conditions when the river was found eligible in 2002. The shoreline would become more primitive from the Car Wash Falls to MP 15.3 because the road would be rerouted to the PCT.

The new road between Glory and Cottonwood Camp would maintain the improved river flow characteristics that occurred because of the 1995 flood.

River Segment 2 would still have motorized access between High Bridge Historic District (MP 11.2) and MP 12.7, and between Bridge Creek and Cottonwood Camp (MP 15.9 to 22.8), making a Scenic classification appropriate.

Outstandingly Remarkable Values. Fisheries, wildlife, scenic, and recreational ORVs would improve to a moderate extent as 3 miles of the river between Car Wash Falls and Bridge Creek continues to attain more natural channel, floodplain, and riparian functions (a process that began with the October 2003 500-year flood). The new 1.5 miles of road between Glory and Cottonwood Camp would maintain the improved channel, floodplain, and riparian functions that occurred because of the 1995 flood.

Alternative D (Road Reroute) would have no effect on the project area's prehistoric resources, historic resources, or geologic ORVs.

7.7.11.2 Cumulative Impacts

The *Coon Run* and *Stehekin Valley Road Improvement* projects (NPS 2005a; 2005b) will have moderate, long-term adverse impacts to river Segment 1 free-flowing characteristics.

Alternative D would have moderate, long-term beneficial affects to the river's free-flowing character and several ORVs. Thus, implementation of Alternative D in river Segment 2 would help offset the

adverse impacts to free-flowing character and ORVs that are expected from the Stehekin Valley Road project in river Segment 1 (NPS 2005a; 2005b).

7.7.11.3 Compliance with Laws and Policy

Alternative D would protect the free-flowing condition and ORVs along Segment 2 of the Stehekin River. This river segment would continue to qualify for inclusion in the National WSR system under a Scenic classification.

7.7.11.4 Conclusions

Alternative D (Road Reroute) would have minor, long-term beneficial affects to the Stehekin River's WSR status. It would improve the river's free flowing character and ORVs in Segment 2, and help offset the adverse impacts to WSR values that would result from other Stehekin Road projects in Segment 1.

7.7.12 ALTERNATIVE D (ROAD REROUTE) AIR QUALITY

7.7.12.1 Impacts Analysis

The new road reroute from MP 12.7 to MP 15.3, road repairs from MP 15.3 to Glory (MP 20.1), and new road reroute between MP 20.3 and MP 20.8 would have moderate to major long- and short-term adverse impacts to air quality (dust, exhaust) from Stehekin to Cottonwood Camp (22.8 miles).

Rerouting the road would require 5 to 10 dump truck making 4 roundtrips per day for 17 to 36 days to bring the barged in fill material from the Company Creek pit to the work sites. This traffic, and other construction traffic and activities would occur for 2 to 3 years during the peak visitor seasons.

Air quality affects would be partially mitigated by limiting the hours of operation (daylight only, no weekends or holidays), watering work surfaces, minimizing soil disturbance, and revegetating disturbed soil areas as soon as practical following construction.

Affects related to motorized visitor use, Park administrative use, and shuttle service would be localized, temporary (dissipating within a few minutes), and infrequent, similar to pre-1995 conditions. There would be less routine maintenance and emergency road reconstruction because the most problematic sections between M 12.9 and MP 15.3, and MP 20.3 to 20.8 would be permanently closed or rerouted above the 100-year floodplain. Overall, the affects related to routine road maintenance and emergency road reconstruction due to flood damage would be minor to moderate, depending on the level of activity.

7.7.12.2 Cumulative Impacts

The new road reroute from MP 12.7 to MP 15.3, road repairs from MP 15.3 to Glory (MP 20.1) and new road reroute between MP 20.3 and MP 20.8 would have moderate to major, short-term adverse air quality impacts between Stehekin and the work sites due to fill material hauling and other construction traffic and activities.

The NPS is also proposing to perform minor reroutes of the Stehekin Valley Road at MP 7 and MP 7.5 in 2006, followed by paving between MP 4 and MP 9.1 in 2010. The road reroutes and reconstruction in Alternative D (Road Reroute) may be concurrent with one or more these other actions. However, it is unlikely that these actions would be concurrent, and no cumulative air quality impacts are expected.

Some negligible adverse air quality impacts would continue to occur throughout the project area from non-motorized visitor use (campfire smoke), stock users (dust), and periodic trail maintenance activities (dust).

7.7.12.3 Compliance with Laws and Policy

The project area would continue to attain all ambient air quality standards and meet management criteria for a Class I airshed.

7.7.12.4 Conclusions

The road reconstruction would have moderate to major, short-term adverse impacts to air quality (dust, exhaust) from Stehekin to MP 20.8 for 2 to 3 years during the peak visitor seasons. The construction related air quality affects would be partially mitigated by weekend and holiday closures, daylight-only operations, and other mitigations (see Alternative D BMPs and Mitigation Measures: Section 5.4.4.11).

Post-project air quality affects related to motorized visitor use, Park administrative use, and shuttle service would be localized, temporary, and infrequent, similar to pre-1995 conditions.

There would be less routine maintenance and emergency road reconstruction than pre-1995 conditions, because the most problematic sections between MP 12.9 and MP 15.3, and MP 20.3 to 20.8 would be permanently closed or rerouted above the 100-year floodplain. Overall, the air quality affects related to routine road maintenance and emergency road reconstruction due to flood damage would be minor to moderate, compared to the No Action and Preferred alternatives.

7.7.13 ALTERNATIVE D (ROAD REROUTE) COMPLIANCE WITH THE LAKE CHELAN NRA GMP

Rerouting the Stehekin Valley Road out of the 100-year floodplain (Alternative D) would *meet* the following direction in the 1995 LACH GMP. Compliance assumes NPS or a permittee would resume shuttle service in the future.

“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.”

“The NPS would not manipulate the Stehekin River to protect federal property except roads and bridges 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) the actions will have less impacts than other alternatives, and 4) the actions are permitted by the county, state, and other federal agencies. No new road construction will be proposed in the active river erosion zone. Previously manipulated sites that do not meet the above criteria for future manipulation would be restored to approximate natural conditions.”

“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.”

“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.”

“...a heavy duty, high clearance shuttle vehicle road would be maintained between High Bridge and Cottonwood Camp.” “The road would have a ‘country lane’ character...”

“Private vehicle use from High Bridge to Bridge Creek would be allowed...”

“Public shuttle service would be provided from the Landing to Cottonwood Camp.”

Rerouting the Stehekin Valley Road out of the 100-year floodplain (Alternative D) would *partially* meet the following direction in the 1995 LACH GMP. However, Alternative D would result in adverse impacts to the western redcedar wetland along the PCT.

“Preserve or restore ecological processes and conditions in wetland, floodplain, shoreline, and riparian areas.”

7.7.14 ALTERNATIVE D (ROAD REROUTE) IMPAIRMENT OF PARK RESOURCES OR VALUES

Alternative D (Road Reroute) would not impair the following Park resources and values within the project area: soils, water quality, hydrology, channel morphology, floodplains, fisheries, aquatic habitat, vegetation, wetlands, terrestrial and amphibious wildlife, visitor experience and access, socio-economics, Wilderness, PCT, and air quality.

CHAPTER 8. CONSULTATION AND COORDINATION

8.1 PUBLIC INVOLVEMENT

On February 8, 2005 NOCA mailed a public scoping letter describing the purpose and need for action on the Stehekin Valley Road to various members of the general public and representatives of local, state, tribal, and federal government, agencies, and organizations. NPS received 52 responses (letters, e-mails, phone calls) to the public scoping. Every public comment received in response to this initial scoping effort was considered when developing this EA.

The EA will be mailed to approximately 200 parties. Additional copies of the EA will be available at Park headquarters in Sedro-Woolley and at the Golden West Visitor Center in Stehekin. The EA will also be available online for review and downloading at the NPS' Planning, Environment and Public Comment web site: <http://parkplanning.nps.gov/noca>. The NPS will also issue news releases to notify the public that the review draft is available if they wish to receive a copy.

The EA will be available for a 60-day public comment period. Substantive comments that are received during the comment period will be considered when determining the proposed action. The NPS will convene three public briefing meetings on April 25-27, 2006 to summarize the EA and answer questions about the proposed project. The briefings will be held from 6 to 8 p.m. at the following locations:

1. Stehekin Community Building, Stehekin, WA (4/25/06),
2. Campbell's Resort, 104 W Woodin St., Chelan, WA 98816 (4/26/06), and
3. Mountaineers Building, 300 Third Ave West, Seattle, WA 98119 (4/27/06).

8.2 AGENCY CONSULTATION AND COORDINATION

8.2.1 ESA SECTION 7 CONSULTATION

The EA analysis determined that implementation of Alternative B would have "No Effect" or minor long-term beneficial affects on federally listed plant, fish, or wildlife species that may occur or have potential habitat in the project area. Consultation with USFWS is not required for "No Effect" determinations.

8.2.2 HISTORIC PRESERVATION OFFICES

The Washington SHPO and the Colville Tribal Historic Preservation Office were contacted during initial public scoping; no comments were received. These offices will receive a copy of the EA.

Following public review and selection of an action alternative, consultation in accordance with the NHPA will be conducted if the undertaking has the potential to adversely impact historic properties.

8.2.3 TRIBAL REVIEW

The initial public scoping letter for the project was sent to the Colville Tribal Historic Preservation Office on February 8, 2005. No comments were received.

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