

U.S. Department of the Interior

National Park Service

General Management Plan/Environmental Impact Statement, Ross Lake National

Recreation Area, North Cascades National Park Service Complex, Skagit and

Whatcom Counties, Washington

AGENCY: National Park Service

ACTION: Notice of Approval of Record of Decision for General Management Plan

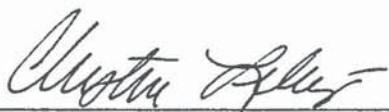
SUMMARY: Pursuant to §102(2)(C) of the National Environmental Policy Act of 1969 (P.L.91-190, as amended) and the regulations promulgated by the Council on Environmental Quality (40 CFR Part 1505.2), the Department of the Interior, National Park Service (NPS) has prepared and approved a Record of Decision for the Final Environmental Impact Statement for the new General Management Plan (GMP) for Ross Lake National Recreation Area, North Cascades National Park Service Complex (Complex). The requisite no-action "wait period" was initiated December 16, 2011, with the Environmental Protection Agency's *Federal Register* notification of the filing of the Final Environmental Impact Statement (Final EIS).

DECISION: As soon as practical the NPS will begin to implement the stewardship strategies, park operations, and visitor service projects identified and analyzed as the *Preferred Alternative* (Alternative B) described in the Final EIS. The NPS will

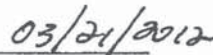
recommend legislation to change the name of this unit of the Complex to North Cascades National Recreation Area (NRA). Other plan elements include: (1) management focus on the NRA as a gateway to millions of acres of wilderness, (2) provision for continued seaplane access with noise abatement procedures, (3) limited expansion of overnight facilities and concessions, and (4) conversion of 3,559 acres of Thunder Creek Potential Wilderness Area to designated wilderness, pursuant to the Washington Park Wilderness Act of 1988. The full range of foreseeable environmental consequences from implementing the proposed actions were assessed, and appropriate mitigation measures identified. In addition, a No Action alternative and two other alternatives were identified and analyzed. Alternative B was determined to be the "environmentally preferred" course of action.

COPIES: Interested parties desiring to review the Record of Decision may obtain a copy by contacting the Superintendent, North Cascades National Park Service Complex, 810 State Route 20, Sedro-Woolley, WA 98284; or via telephone request at (360) 854-7200.

Signed:



Christine S. Lehnertz
Regional Director, Pacific West Region



Date

US Department of the Interior

National Park Service

RECORD OF DECISION

Final Environmental Impact Statement/General Management Plan

Ross Lake National Recreation Area

Skagit and Whatcom Counties, Washington

INTRODUCTION

The Department of the Interior, National Park Service, has prepared this Record of Decision (ROD) for the *Final General Management Plan and Environmental Impact Statement* for Ross Lake National Recreation Area (NRA) in Washington State. This ROD includes a statement of the decision made, synopses of other alternatives considered, the basis for the decision, a description of the environmentally preferred alternative, a listing of measures to minimize environmental harm, and an overview of public involvement in the decision-making process. A determination of non-impairment of cultural and natural resources or park values is attached.

DECISION (SELECTED ACTION)

The National Park Service (NPS) will implement the preferred alternative (Alternative B) as described in the *Ross Lake National Recreation Area Final General Management Plan and Environmental Impact Statement* released in December 2011. There are no changes nor modifications incorporated herein. The selected action focuses on managing Ross Lake NRA as a gateway to millions of acres of wilderness, providing enhanced visitor opportunities along the North Cascades Highway, and making better use of facilities along that corridor while ensuring the long-term stewardship of natural resources, cultural resources, and wilderness.

The selected alternative applies five management zones to the NRA as a framework for management of the area. The management zones include Frontcountry, Backcountry, Wilderness, Skagit River, and Hydroelectric Zones. These zones are identified and applied based on desired natural or cultural resource conditions or character, visitor opportunities, and appropriate facilities.

The North Cascades Highway corridor will be managed to provide a variety of day-use and overnight recreational opportunities for visitors with a range of abilities and interests. Recreation in Ross Lake NRA will be enhanced along the North Cascades Highway corridor through the addition of limited new facilities, including day-hiking trails, reconfigured parking areas (such as the Ross Dam Trailhead Parking Lot), and the modest expansion of overnight facilities and concessions (such as a ten percent capacity increase at the Ross Lake Resort). The NPS will also recommend nomination and designation of the North Cascades Highway as a National Scenic Byway to reflect its nationally significant resources.

Interpretation and education will be a key component of the selected action, emphasizing hands-on experiential learning and stewardship programs delivered by both the NPS and its partners.

Management of wilderness and backcountry areas, including Ross Lake, will focus on ecosystem preservation while ensuring compatible recreational activities. The 3,559 acres of the Thunder Creek Potential Wilderness Area will be administratively designated a part of the Stephen Mather Wilderness now that Seattle City Light has formally abandoned plans for hydroelectric development. Management of recreation use in these areas will focus on providing visitors with opportunities for solitude and connections with the natural world. Self-propelled and non-mechanized recreation will be encouraged throughout Ross Lake NRA. Regulations for motorized water recreation on the reservoirs will work to minimize noise, maintain the character and experience on the lakes and the Skagit River, and promote cleaner motor technologies. The NPS will develop an online permit system option for backcountry and wilderness visitors that would allow for advance trip planning and a streamlined permitting process.

In response to anticipated changes in climate, including projected increases in extreme precipitation, facilities may be substantially damaged or destroyed over the lifespan of the plan. In the event of a catastrophic event and the destruction of visitor facilities, the NPS will adapt and may relocate facilities to reduce risk, and strive as feasible to offer similar visitor facilities in the vicinity of current facilities in order to limit net loss of visitor opportunities (the statement of findings for floodplains is published in Appendix E in the Final EIS/GMP).

The NPS will recommend wild and scenic river designation of Goodell Creek, Newhalem Creek, and the Skagit River from the Gorge Powerhouse in Newhalem to the western boundary of Ross Lake NRA, totaling 33 river miles, based on the findings of the Skagit Wild and Scenic River Eligibility and Suitability Study (published in Appendix D in Final EIS/GMP).

Finally, the NPS will recommend legislation to enable a name change for Ross Lake National Recreation Area to North Cascades National Recreation Area. This name change would enhance public awareness and foster a better understanding of the ecological continuity between the National Recreation Area and North Cascades National Park. Recreational activities authorized in the NRA but prohibited in the park, including hunting and hiking with dogs on trails, would continue.

Additional highlights of the selected alternative include:

- Maintaining existing partnership and international and interagency cooperation for resource protection, recreational opportunities, and operational efficiencies.
- Continuing to work closely with the Skagit Tribes to preserve archeological sites and continue their traditional activities within Ross Lake NRA.
- Constructing facilities, such as dormitory, staff housing, and a boathouse, on the North Cascades Environmental Learning Center (ELC) campus as outlined in the original plan and environmental assessment with funding from the North Cascades Institute. The ELC would continue to provide year-round education services, curriculum-based educational programs and learning opportunities about the North Cascades ecosystem.
- Completing a Habitat Assessment for any proposed development that might affect a Bear Management Unit within Ross Lake NRA, North Cascades National Park, or Lake

Chelan NRA in light of the 2001 North Cascades Ecosystem Grizzly Bear Habitat Assessment. This assessment would provide an analysis of impacts to grizzly bear habitat in addition to any changes to the percentage of core habitat. The NPS will strive to minimize, avoid, or mitigate impacts on high quality spring and fall grizzly bear habitat and would consult with the USFS in any circumstance where the development of potentially high use trails within the national park would affect a shared BMU that is currently below the 70 percent core area ratio or which could reduce the core area ratio below 70 percent overall for a shared BMU.

- Closing the upper one mile of Thornton Lakes Road to vehicular access at the Wilderness Boundary to correct an administrative oversight and comply with wilderness regulations.
- Continuing to allow seaplanes to land and take off on Diablo and Ross lakes except within 1,000 feet of Diablo Dam and Ross Dam, according to 36 CFR 7.69 and 36CFR 2.17. The NPS will work collaboratively with the seaplane pilot community to gather data on seaplane use, create noise abatement procedures and educate pilots about these procedures and general seaplane use on Ross Lake. The NPS will institute noise abatement procedures to minimize noise and establish a long-term acoustic monitoring program to better understand soundscape impacts.
- Authorizing sport climbing to continue in Skagit Gorge between Newhalem and Diablo. Due to the manipulative actions required to establish sport climbing routes, new sport climbing areas would be evaluated on a case by case basis, and will only be authorized by the NPS following appropriate site-specific surveys and assessments. These Climbing Management Areas (CMA's), will be identified in the Superintendent's compendium, and described on the park website along with other climbing-related information.

OTHER ALTERNATIVES CONSIDERED

Three other alternatives for managing Ross Lake National Recreation Area were evaluated in the draft and final EIS including two "action" and the comparative baseline "no action" alternative.

Alternative A:

The No Action Alternative (Alternative A) assumes that existing programming, facilities, staffing, and funding would generally continue at their current levels, and park management for Ross Lake NRA would continue to follow the actions and management zones outlined in the 1988 North Cascades NPS Complex General Management Plan. Resource preservation and protection would continue to be a high priority for the management of Ross Lake NRA, and staff would continue to work with neighboring agencies for collaborative ecosystem management. Management of visitor use and facilities would generally continue through existing levels and types of service and regulation, and additional visitor facilities, such as new buildings, structures, roads, parking areas, camping areas, and trails, would not be constructed. The park would react to catastrophic events and the destruction of visitor facilities on a case-by-case basis, which could result in a net loss of visitor facilities.

Alternative C

Alternative C would emphasize the role of Ross Lake NRA in preserving the greater North Cascades ecosystem, which includes two additional National Park System units, two national forests, and provincial parks and protected areas across the Canadian border. Management and education efforts would focus on broader ecosystem preservation and enhancement through coordinated regional and international environmental stewardship. The focus of visitor experiences would be linked to solitude, tranquility, natural soundscapes, and scenery through traditional outdoor activities. The NPS would actively work to reduce habitat fragmentation throughout Ross Lake NRA by consolidating development, eliminating certain trails, and limiting construction of new facilities in undeveloped areas. Educational and interpretive opportunities would be primarily structured, and the NPS would increasingly rely on partners to deliver educational and interpretive programs both on-site and off-site.

Alternative C would provide visitors with recreational opportunities along the North Cascades Highway. However, there would be no net increase in miles of trail in Ross Lake NRA. In the backcountry and wilderness zones, Alternative C would focus on resource preservation and enhancement while limiting and/or restricting some recreational uses. Seaplanes would not be allowed to land on lakes, and the NPS would recommend restricting commercial scenic air tours within Ross Lake NRA in order to protect and enhance soundscapes and wilderness character, experience, and values. In the event of a catastrophic weather event and the destruction of visitor facilities, natural geomorphological processes would be allowed to occur unimpeded wherever possible and affected facilities, including Colonial Creek and Goodell Creek Campgrounds, would be closed and restored to natural conditions.

Alternative D

Alternative D would focus on improving connections between visitors and the outdoors through a variety of enhanced recreation and learning opportunities. The emphasis of park management would be to diversify Ross Lake NRA's visitor base and build stewardship through more hands-on/experiential recreation and education opportunities. Interpretive and educational programs would be offered by both the NPS and partners, with expanded offerings in the backcountry and limited areas of the wilderness. Park management would continue to protect resources and minimize impacts from visitor use.

Overnight accommodations, several new trails, and additional visitor amenities would expand visitor opportunities in Ross Lake NRA, primarily along the North Cascades Highway corridor. Services provided to the public by the Wilderness Information Center would be moved to an easily accessible location on Highway 20. A wide variety of recreational activities would be allowed throughout Ross Lake NRA, and there would be fewer restrictions on recreational activities than the other action alternatives. An online permit system would allow visitors the opportunity for advance trip planning. Seaplanes would be allowed to land and take off on Diablo and Ross lakes only in the Frontcountry Zone. In the event of a catastrophic event and the destruction of visitor facilities, the NPS would close affected facilities and build new facilities on other locations to ensure no net loss of visitor opportunities.

ALTERNATIVES CONSIDERED BUT DISMISSED

The Council on Environmental Quality guidelines for implementing the National Environmental Policy Act (NEPA) requires federal agencies to analyze all “reasonable” alternatives that substantially meet the purpose and need for the proposed action. Under NEPA, an alternative may be eliminated from detailed study for the following reasons [40 CFR 1504.14 (a)]:

- “technical or economic infeasibility;” the inability to meet project objectives or resolve need for the project
- duplication of other less environmentally damaging alternatives
- conflicts with an up-to-date valid plan, statement of purpose and significance, or other policy; therefore would require a major change in that plan or policy to implement
- environmental impacts too great

The following alternatives or actions were considered during the alternatives development phase of the project, but were rejected because they met one or more of the above criteria.

Internal Boundary Modifications

The NPS dismissed from consideration recommending legislation to convert Ross Lake NRA to North Cascades National Park. Congress created Ross Lake NRA to enable enjoyment of a wider variety of recreational activities, including hunting and hiking with pets that are prohibited in North Cascades National Park. Ross Lake NRA was also created as a separate unit in recognition Seattle City Light’s existing and proposed hydroelectric developments. These hydroelectric facilities (three large dams and reservoirs) were perceived to be out of character with the national park idea because they have dramatically altered the natural landscape and hydrologic systems of the Skagit River and its tributaries. Demand for hunting is very limited, and there are no other consumptive activities occurring within the unit that are causing notable resource management or public safety concerns. Furthermore, the “National Park” name is generally associated with large areas with a wide variety and diversity of natural and cultural resources, including natural resources, functions and processes that are largely unaltered. “National Parks” that do have large-scale hydroelectric facilities were established in the early years of the national park system, such as Yosemite and Grand Teton, and before the “National Recreation Area” designation came into common naming practice. During the era when North Cascades National Park and Ross Lake NRA were designated, other NPS units with reservoirs were generally named “National Recreation Areas,” such as Bighorn Canyon NRA (1966) and Whiskeytown-Shasta-Trinity NRA (1972). Congress chose to designate Ross Lake as a “National Recreation Area” based on its existing hydroelectric facilities and range of superlative resources and recreational opportunities.

The NPS also dismissed from consideration expanding the boundary of Ross Lake NRA into either the north or south units of North Cascades National Park. Such an expansion would reduce the area of the National Park proper, detract from the purposes and significance of the National Park, and afford no additional benefits to the resources and values of Ross Lake NRA.

External Boundary Modifications

The planning team evaluated lands east of Ross Lake NRA that are managed by the U.S. Forest Service, including the North Cascades Highway corridor up to and including Washington Pass, the Pasayten Wilderness, and lands comprising the watershed for the Skagit River (approximately 208,390 acres). The team also evaluated lands west and southwest of Ross Lake NRA which primarily include lands within the lower Bacon Creek watershed, an ecologically significant area and important habitat for anadromous species of fish such as salmon. While the upper portion of the watershed is protected within the confines of North Cascades National Park, substantial portions of the lower Bacon Creek watershed are presently under U.S. Forest Service jurisdiction.

The rationale for considering these areas included:

- (a) responding to public comments that requested consideration of such an expansion of Ross Lake NRA;
- (b) consideration of U.S. Forest Service-administered lands along the highway corridor, including Washington Pass, for access as an eastern gateway to the NRA;
- (c) consideration of the Skagit River watershed as a logical geographic boundary for ecological purposes, recognizing that drawing boundaries along ecological lines such as watersheds helps to protect and conserve various ecological functions and values; and
- (d) the administrative history of the establishment of the North Cascades NPS Complex.

A conclusion was made that boundary modification is unwarranted given other options for addressing issues regarding management and resource protection presently exist. These issues can be addressed effectively through interagency coordination and ecosystem-based planning, without having to change jurisdictional boundaries. For example, when the U.S. Forest Service begins a new forest planning effort for the Mount Baker-Snoqualmie National Forest, including the lands within the lower Bacon Creek watershed, the planning effort will provide an opportunity for NPS to encourage the U.S. Forest Service to address conservation concerns such as the area's importance for salmon and other anadromous fish species.

The NPS recognizes that without these external boundary modifications, Ross Lake NRA and the North Cascades NPS Complex would continue to lack boundaries clearly aligned along ecosystem lines. This lack of an ecosystem-based boundary with a single agency administrator means conservation of the greater North Cascades ecosystem requires a commitment among multiple agency partners, including the NPS, to coordinate and cooperate in a broader conservation vision. Interagency ecosystem management can be more challenging and less efficient than single-agency administration and management, and lack of commitment or engagement of any one agency partner has the potential to inhibit conservation efforts. In spite of these challenges, the NPS believes increased collaboration and cooperation with the U.S. Forest Service and Canadian agencies is the most appropriate course of action for interagency and trans-boundary ecosystem management, and this collaboration and cooperation is integral to the new GMP.

International Park Designation

During the GMP planning process, the planning team also discussed recommending designation of an international park, similar to the model provided by the Waterton-Glacier International Peace Park, which represents the union of Waterton Lakes National Park in Canada and Glacier National Park in the United States. Such designation was considered because it could further solidify cooperation and trans-boundary management through tandem federal legislation in the United States and Canada. Trans-boundary management is beneficial, useful, and often essential for the management of ecosystem processes and functions that do not recognize human imposed boundaries on the landscape. However, this action was dismissed from further consideration because a working relationship between Canadian and U.S. land managers already exists, and cooperative management continues through joint planning, programs, and projects. The designation is not necessary for a long-term collaborative relationship.

Relocating the Public Function of the Wilderness Information Center to Newhalem

The planning team also considered relocating the public function of the Wilderness Information Center to the current North Cascades Visitor Center in Newhalem. The intent of this idea was to concentrate more visitor information functions in fewer locations for operational efficiency and reduce the confusion for visitors who have to obtain permits in what may be perceived as an obscure location. If the public function of the wilderness program was moved to Newhalem, the Marblemount Ranger Station could be converted to administrative use only. This action was dismissed from further consideration and analysis in the action alternatives for several reasons. One concern related to the operational efficiency that would be lost by separating the public wilderness information function from other program functions, such as search and rescue. Staff expressed concern that separating these functions could delay response times for emergencies as many staff work in both program areas. There was also concern expressed about the effect on visitors who use the Cascade River Road as an access point for backcountry travel. Obtaining backcountry permits in Marblemount is more convenient than Newhalem for travelers who are coming from the west side of Ross Lake NRA. While this idea is not evaluated in greater detail in this GMP, should the permit and reservation system for backcountry travel make it feasible to obtain permits remotely or other circumstances change that make this idea viable, this GMP should not preclude consideration of this idea in the future.

BASIS FOR DECISION

The Organic Act established the NPS in order to "promote and regulate the use of...national parks...." The Organic Act defined the purposes of the national parks as "to conserve the scenery and natural and historic objects and wild life therein and to provide for the enjoyment of the same in such a manner and by such means as will leave them unimpaired for the enjoyment of future generations." The Organic Act provides overall guidance for the management of Ross Lake National Recreation Area.

In reaching its decision to select the preferred alternative, the NPS considered the purposes for which Ross Lake National Recreation Area was established, and other laws and policies that apply to lands in Ross Lake National Recreation Area, including the Organic Act of 1916, the

Wilderness Act of 1964, the National Environmental Policy Act, the National Historic Preservation Act, and *NPS Management Policies 2006*. The NPS also conducted an initial assessment of the impacts of the alternatives as well as cost estimates for the various alternatives to guide decision-making in identification of the preferred alternative.

The NPS also sought and carefully considered the full spectrum of public comments received throughout the planning process. Comments received during the period following the release of the Draft GMP/EIS, as well as consultation with government agencies and tribes, resulted in adjustments to the final preferred alternative (incorporated in the Final EIS/GMP). Those comments, and the responses to them, are provided in Volume 2 of the Final GMP/EIS.

All of the alternatives were evaluated with a variety of criteria and considerations to determine which management alternative could provide the greatest advantages to the public and to the NPS. Alternatives were evaluated to determine how well they:

- Support the NRA's purpose, significance, and desired conditions;
- Preserve resources and promote the long-term stewardship of the greater North Cascades;
- Provide a range of quality recreational day-use and overnight experiences and access to recreational opportunities;
- Preserve wilderness character, experience, and values;
- Provide for efficient and sustainable facilities and operations; and,
- Address public concerns.

Compared to all of the alternatives considered for management of the NRA, Alternative B best balances the long-term protection of the natural and cultural resources and wilderness values that support the purpose and significance of the NRA with visitor services and access to these resources. The selected alternative also best represents broad public sentiments about the future of Ross Lake National Recreation Area.

Natural resources, including ecosystem functions and processes, air quality, soundscapes, water resources, vegetation and wildlife will be ensured long-term stewardship and preservation in the context of a functioning ecosystem and impacted areas will receive appropriate restoration to maintain the integrity of the North Cascades ecosystem. For example, goals for maintaining core area of grizzly bear habitat will help enable recovery of a viable population. Commitments to long-term ecological monitoring and expanded collaborative relationships and sustainable programs with partners will enhance understanding and management across the entire North Cascades Ecosystem.

Management of wilderness and backcountry areas will focus on the qualities of wilderness character, ecosystem preservation, and compatible recreational activities. Conversion of the Thunder Creek Potential Area to formal designation and inclusion in the Stephen Mather Wilderness would add 3,559 acres to the National Wilderness Preservation System.

Cultural resources and values, including archeology, historic and prehistoric structures, cultural landscapes, ethnohistory, and the museum collections will be ensured long-term stewardship.

Additional and improved visitor amenities along the North Cascades Highway, such as new day hiking trails, updated interpretive displays at the North Cascades Visitors Center, renovated parking areas, and new camping facilities at established campgrounds, will enhance the visitor experience to Ross Lake National Recreation Area by improving visitor safety, increasing visitor access, and creating a more tangible connection to the North Cascades ecosystem. These development improvements will also concentrate impacts to the NRA along a previously disturbed highway corridor and maximize efficient use of current facilities.

Management of Ross Lake and the other reservoirs entail recreation management strategies, such as implementing clean boating technologies and noise abatement procedures for seaplanes. These measures will also maintain and improve visitor safety, soundscapes, and water quality, while promoting visitor access and encouraging solitude and connection with the natural world.

Ultimately, the selected alternative was deemed to achieve the optimal balance between resource protection and visitor use and enjoyment for the next 15-20 years, the expected lifespan of this planning effort.

ENVIRONMENTALLY PREFERRED ALTERNATIVE

Pursuant to the Council on Environmental Quality's guidance on the determination of the environmentally preferred alternative, such an alternative is that which will promote the national environmental policy as expressed in §101 of the National Environmental Policy Act. This section states that "...it is the continuing responsibility of the Federal Government to:

1. fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;
2. assure for all generations safe, healthful, productive, and aesthetically and culturally pleasing surroundings;
3. attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences;
4. 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;
5. achieve a balance between population and resource use that will permit high standards of living and a wide sharing of life's amenities; and
6. enhance the quality of renewable resources and approaching the maximum attainable recycling of depletable resources."

Expressed more succinctly, the environmentally preferred alternative is the course of action "that causes the least damage to the biological and physical environment" or which conversely "best protects, preserves, and enhances historic, cultural, and natural resources (46 FR 18026 – 46 FR 18038)."

As identified and analyzed in the *Ross Lake National Recreation Area Draft and Final General Management Plan and Environmental Impact Statement*, the environmentally preferable alternative was deemed to be the NPS preferred alternative (Alternative B). This alternative

would focus on the concept that Ross Lake NRA serves as a gateway to millions of acres of surrounding wilderness. The North Cascades Highway corridor serves as a “window to the wilderness” of the North Cascades, but also provides diverse recreational opportunities for visitors consistent with a traditional national park experience. In this alternative, park management would enhance efforts to protect and preserve natural and cultural resources, with an emphasis on wilderness protection, through leadership in integrated resource protection fulfilling resource preservation goals (1, 4) while also providing a range of quality recreation, interpretation, and education opportunities for visitors that are consistent and appropriate in a national park setting, fulfilling visitor experience goals (2, 3, 5). Proactive leadership and enhanced partnerships with other agencies and organizations such as the North Cascades Institute (NCI) and Seattle City Light (SCL) would enhance resource preservation efforts and opportunities for visitors. Operational and facility management strategies that include making better use of facilities along the North Cascades Highway as opposed to new construction as much as possible also provide a more sustainable future for Ross Lake NRA, fulfilling sustainability goals (3, 6). Taken as a whole, this alternative is the environmentally preferred alternative because it best meets all six goals stated in the National Environmental Policy Act.

Alternative A, the No Action Alternative, represents the continuation of current management practices. Ross Lake NRA would continue to be managed in accordance with approved plans and policies. The emphasis of this alternative would be to respond to resource impacts and visitor demands as they occur, without substantially changing staff, programs, facilities, or funding support. No comprehensive plan to address potential issues proactively would be formulated. Many traditional uses in Ross Lake NRA would continue, the wilderness areas would continue to be managed in accordance with the principles of wilderness stewardship, and roads and facilities would be maintained. Some infrastructure would be gradually replaced with more sustainable facilities and infrastructure. Resource preservation goals (1, 4) and sustainability goals (3, 6) would not be met to the same degree as in other alternatives without expanded resource preservation efforts and programs and replacement of facilities and infrastructure with those that are more sustainable and provide added resource protection. Visitor experience goals (2, 3, 5) would be achieved to a lesser degree than under other action alternatives by maintaining existing visitor services, facilities and opportunities.

Alternative C would focus on the role of Ross Lake NRA in preserving the greater North Cascades ecosystem which extends across two additional National Park System units, two national forests, as well as provincial parks and protected areas across the Canadian border. The emphasis of park management and education efforts would focus on broader ecosystem issues through coordinated regional and environmental stewardship, fulfilling resource preservation goals (1, 4). This alternative also emphasizes sustainable facilities and operations, fulfilling sustainability goals (3, 6). However, this alternative would only partially meet the visitor experience goals (2, 3, 5). This alternative provides greater limitations on visitor access and recreational experiences and opportunities through its management zoning of Ross Lake NRA. A greater percentage of Ross Lake NRA is zoned backcountry in this alternative, limiting the range of visitor experiences that are available throughout Ross Lake NRA and on the Gorge, Diablo, and Ross lakes. Therefore, this alternative would not meet visitor experience goals to the same degree as other alternatives.

Alternative D would focus on improving connections between visitors and the outdoors through a variety of techniques, including enhanced recreation and learning opportunities. The emphasis of park management would be on engaging visitors and building stewardship through more hands-on experiential recreation and educational opportunities in Ross Lake NRA. The greatest percentage of frontcountry zoning exists in this alternative, providing greater access to park resources than Alternative C, fulfilling visitor experience goals (2, 3, 5) but greater efforts would be undertaken to maintain recreation facilities in their existing locations and expand utility services, which may not best preserve natural resources.

MEASURES TO MINIMIZE ENVIRONMENTAL HARM

The NPS has investigated all practical measures to avoid or minimize environmental impacts that could result from the selected action. Mitigation measures are the practicable and appropriate methods that will be used under any alternative to avoid and/or minimize harm to natural and cultural resources, wilderness, visitors and the visitor experience, and socioeconomic resources when no other management alternative exists (such as avoidance). The following mitigation measures have been developed using existing laws and regulations, best management practices, conservation measures, and other known techniques from past and present work in and around Ross Lake NRA and are identified and incorporated into the selected action as described in the *Ross Lake National Recreational Area Final General Management Plan and Environmental Impact Statement*.

Management and Protection of Natural Resources

Potential mitigation measures identified as effective in addressing specific impacts of management decisions on natural resources, and applicable to any alternative, are listed below:

Air Quality

- Implement a dust abatement program including the following potential actions: water or otherwise stabilize soils, cover haul trucks, employ speed limits on unpaved roads, minimize vegetation clearing, and revegetate with native species.
- Minimize NPS vehicle emissions by using the best available technology whenever possible.
- Encourage the public and commercial tour companies to employ methods that reduce emissions.
- Employ sustainable designs that reduce energy demands and fossil fuel emissions.

Natural Soundscapes

- Implement standard noise abatement measures during NPS operations, including: scheduling to minimize impacts in noise-sensitive areas, using the best available noise control techniques wherever feasible, using hydraulically or electrically powered impact tools when feasible, and locating stationary noise sources as far from sensitive areas as possible.
- Site and design facilities to minimize objectionable noise.

- Minimize idling of motors when power tools, equipment, and vehicles are not in use.
- Muffle above ambient noise whenever possible to reduce noise impacts.

Lightscares and Night Skies

- Replace existing outdoor lighting with fixtures that do not contribute to nighttime light pollution.
- Install energy-efficient lights equipped with timers and/or motion detectors so that light would only be provided when it is needed to move safely between locations.
- Use low-impact lighting, such as diffused light bulbs, and techniques such as downlighting in outdoor fixtures, to prevent light spill and preserve the natural lightscape and avoid light pollution.

Hydrologic Systems including Wetlands

- Time projects adjacent to or in waterways to occur during the dry season (late summer) or during reservoir drawdown (early spring).
- Use bioengineering, engineered log jams, and other habitat-friendly erosion control techniques instead of rip-rap.
- Implement erosion control measures, minimize discharge to water bodies, and regularly inspect construction equipment for leaks of petroleum and other chemicals to prevent water pollution; minimize the use of heavy equipment in a waterway; wash heavy equipment prior to use in or near water bodies.
- Use bio-based lubricants (such as biodiesel and vegetable oil-based hydraulic fluid).
- Develop and implement a spill plan and acquire supporting equipment.
- Integrate runoff control systems into the designs of larger parking areas near water resources to minimize water pollution.
- Develop sediment control and prevention plans for projects that could impact water quality.
- Delineate wetlands and apply protection measures during projects; perform project activities near wetlands in a cautious manner to prevent damage caused by equipment, or increase erosion, siltation, etc.
- Consult with Washington Department of Fish and Wildlife for work that may affect fish or fish habitat.

Soils

- Build new facilities on soils suitable for development.
- Minimize soil erosion at construction sites by limiting the time that soil is left exposed and by applying other erosion control measures, such as erosion matting, silt fencing, and sedimentation basins in construction areas to reduce erosion, surface scouring, and discharge to water bodies.
- Revegetate construction areas with appropriate native plants in a timely manner.

- Work with the Natural Resource Conservation Service to complete the soil survey of Ross Lake NRA to provide some of the information needed for sustainable soil management.
- Conserve native topsoil in construction projects.
- Consult with U.S. Army Corps of Engineers.

Vegetation

- Monitor areas used by visitors (such as trails and campsites) for signs of native vegetation disturbance and use public education, revegetation of disturbed areas with native plants, erosion control measures, and barriers to control potential impacts on plants from erosion or social trails.
- Designate river and stream access/crossing points, and use barriers and closures to prevent trampling and loss of riparian vegetation.
- Develop revegetation plans for disturbed areas and require the use of genetically appropriate native species (revegetation plans should specify species to be used, seed/plant source, seed/plant mixes, site-specific restoration conditions, soil preparation, erosion control, ongoing maintenance and monitoring requirements, etc.; salvaged vegetation should be used to the extent possible).
- Survey for rare plants prior to any ground-disturbing activities; disturbance to rare or unique vegetation would be avoided to the greatest extent possible.
- Implement an invasive, non-native plant management program. Standard measures could include the following elements: use only weed-free materials for road and trail construction, repair, and maintenance; ensure equipment arrives on-site free of mud or seed-bearing material; certify that stabilization materials (rice straw) are weed-free; identify areas of noxious weeds pre-project; treat noxious weeds or noxious weed topsoil before construction (such as, topsoil segregation, storage, herbicide treatment); soil or gravel should be covered with weed cloth to prevent weed seed introduction when the material is staged prior to using, when depositing ditch spoils along the roads, limit the movement of material to as close as possible to the excavation site; scrupulously and regularly clean areas that serve as introduction points for invasive, non-native plants (campgrounds, staging areas, maintenance areas, and corrals); revegetate with genetically appropriate native species; inspect rock and gravel sources to ensure these areas are free of noxious weed species; and monitor locations of ground-disturbing operations for at least five years following the completion of projects.

Fish and Wildlife

- Employ techniques to reduce impacts on fish and wildlife, including visitor education programs, restrictions on visitor and NPS activities, and law enforcement patrols.
- Implement a wildlife protection program. Standard measures would include project scheduling [season and/or time of day], project monitoring, erosion and sediment control, fencing or other means to protect sensitive resources adjacent to project areas, disposing of all food-related items or rubbish, salvaging topsoil, and revegetating.

- Consult with National Oceanic and Atmospheric Administration (NOAA) Fisheries for projects within essential fish habitat.
- Consult with U.S. Fish and Wildlife Service for projects where listed species and their habitats occur.

Special Status Species

Mitigation actions would occur during normal NPS operations as well as before, during, and after projects to minimize immediate and long-term impacts on rare, threatened, and endangered species. These actions may vary by project area, and additional mitigation measures may be added depending on the action and location. Many of the measures listed for vegetation, wildlife, and water resources would also benefit rare, threatened, and endangered species by helping to preserve habitat. Further mitigation efforts the NPS would perform include the following:

- Conduct surveys for rare, threatened, and endangered species as warranted.
- Locate and design facilities/actions/operations to avoid or minimize the removal of rare, threatened, and endangered species habitat; if avoidance is infeasible, minimize and compensate for adverse effects as appropriate and in consultation with the appropriate resource agencies.
- Plan work in areas in or near suitable threatened and endangered bird habitat as late as possible in the summer/fall.
- Conduct work outside of critical periods for the specific species when possible.
- Develop and implement restoration and/or monitoring plans as warranted; plans should include methods for implementation, performance standards, monitoring criteria, and adaptive management techniques.
- For projects in or near streams, employ appropriate best management practices.
- Implement measures to reduce adverse effects of non-native plants and wildlife on rare, threatened, and endangered species.
- Protect and preserve critical habitat features, such as nest trees, whenever possible.

Management and Protection of Cultural Resources

The protection of Ross Lake NRA's cultural resources is essential for understanding the past, present, and future relationship of people with the North Cascades ecosystem and the expressions of our cultural heritage. The NPS will pursue strategies to protect its cultural resources, including museum collections and archeological, historic, ethnographic, and archival resources, while encouraging visitors and employees to recognize and understand their value. The strategies would allow the integrity of Ross Lake NRA's cultural resources to be preserved unimpaired. They would also ensure that Ross Lake NRA is recognized and valued as an out-standing example of resource stewardship, conservation education and research, and public use.

Some of Ross Lake NRA's cultural resources are within designated wilderness. The Wilderness Act specifies that the designation of any areas of the park system as wilderness "shall in no manner lower the standards evolved for the use and preservation of" such unit of the park system under the various laws applicable to that unit. Thus, the laws pertaining to historic preservation also remain applicable within wilderness. In accordance with *NPS Management Policies 2006*,

cultural resources that have been included in wilderness would be protected and maintained according to the pertinent laws and policies governing cultural resources, using management methods that are consistent with the preservation of wilderness character and values. These laws include the Organic Act, National Historic Preservation Act, the Archeological Resources Protection Act, the American Indian Religious Freedom Act, the Native American Graves Protection and Repatriation Act, and Executive Order 13007 that addresses government-to-government consultation.

Adverse impacts on historic properties listed in, determined eligible for listing in, or not yet assessed for eligibility to the National Register of Historic Places would be avoided, if possible. If adverse impacts could not be avoided, an assessment of effect and a treatment plan, if necessary, will be developed through a consultation process with all interested parties. In accordance with *NPS Management Policies 2006*, proposed adverse effects would be assessed to determine whether the proposed actions constitute impairment of significant fundamental cultural resources.

Archeological Resources

Archeological surveys will precede ground-disturbance required for new construction or removal of eligible historic properties. Known archeological resources will be avoided to the greatest extent possible. If National Register listed, eligible or unassessed archeological resources could not be avoided, an appropriate treatment plan will be developed in consultation with the Washington State Historic Preservation Officer, National Advisory Council, and associated American Indian tribes.

Until 2025, Ross Lake archeological resources will continue to be managed in compliance with the Archeological Resources Mitigation and Management Plan established pursuant to City of Seattle and NPS settlement agreements as a condition of the FERC No. 553 license issued to the City.

If previously unknown archeological resources are discovered during project work, NPS cultural resources staff will be immediately informed, work in the immediate vicinity of the discovery will be halted and the location secured until the resources are identified, evaluated, and documented and an appropriate treatment plan is developed, if necessary, in consultation with the Washington State Historic Preservation Office and associated American Indian tribes.

Historic Buildings and Structures

All project work relating to historic structures/buildings would be conducted in accordance with Director's Order 28 and the guidelines and recommendations of the *Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring and Reconstructing Historic Buildings*. Typical mitigation measures for historic structures/buildings include measures to avoid adverse impacts, such as rehabilitation and adaptive reuse, designing new development to be compatible with surrounding historic properties, and screening new development from surrounding historic resources to minimize impacts on viewsheds, cultural landscapes and ethnographic resources.

Historic structures will be maintained or stabilized until appropriate preservation maintenance could be undertaken. Benign neglect would not be considered an appropriate management strategy. No National Register listed or eligible structure would be removed or allowed to decay

through benign neglect without prior review by park and region cultural resource specialists, including approval by the NPS regional director and consultation with the Washington State Historic Preservation Officer. Before a National Register listed or eligible structure is removed, appropriate documentation recording the structure would be prepared in accordance with Section 110(b) of the National Historic Preservation Act, and the documentation would be submitted to the Historic American Buildings Survey /Historic American Engineering Record or Historic American Landscape Survey program, if deemed appropriate.

Historic structures that are within designated wilderness areas will be protected and maintained according to the pertinent laws and policies governing cultural resources using management methods that are consistent with the preservation of wilderness character and values. Laws pertaining to historic preservation remain applicable within wilderness but must generally be administered to preserve the area's wilderness character. Consultation of treatment would include appropriate measures to mitigate impacts to wilderness character.

Cultural Landscapes

All project work relating to cultural landscapes will be conducted in accordance with Director's Order 28 and the guidelines and recommendations of the *Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes*. Typical mitigation measures for cultural landscapes include measures to avoid adverse impacts, such as designing new development to be compatible with surrounding historic properties and screening new development from surrounding cultural landscapes to minimize impacts on those landscapes and viewsheds.

Ethnographic Resources

The National Park Service would continue to consult with federally recognized Native American tribes with treaty resources in Ross Lake NRA on a government-to-government basis to identify ethnographic resources and develop appropriate strategies to mitigate impacts on these resources. Such strategies could include continuing to provide access to traditional use or spiritual areas and screening new development from traditional use areas to minimize impacts on ethnographic resources. Consultations with American Indians linked by ties of kinship, culture, or history to park lands would address the inadvertent discovery of human remains, funerary objects, sacred objects, or objects of cultural patrimony, and all provisions outlined in the Native American Graves Protection and Repatriation Act of 1990 would be followed.

Museum Collections

Mitigation measures related to museum collections consist of conservation of a collection through proper storage, handling, and exhibit of objects as specified in the NPS Museum Handbook and NPS Director's Order No. 24, NPS Museum Collections Management.

Management and Protection of Wilderness Values

A new wilderness management plan will be developed for the entire North Cascades NPS Complex, which will include Ross Lake NRA, more specific desired conditions for wilderness resources, visitor experiences, and management protocols.

In a broad sense, the NPS will manage the Stephen Mather Wilderness to preserve wilderness character, and will work to establish a monitoring program that measures wilderness character within this wilderness. Recent interagency efforts have defined the four primary elements of wilderness character that link directly to the statutory language of the 1964 Wilderness Act, as follows:

- untrammeled quality: wilderness is essentially unhindered and free from modern human control or manipulation
- natural quality: wilderness ecological systems are substantially free from the effects of modern civilization
- undeveloped quality: wilderness retains its primeval character and influence, and is essentially without permanent improvement or modern human occupation
- solitude or primitive and unconfined quality: wilderness provides outstanding opportunities for solitude or primitive and unconfined recreation

Minimum Requirement Process

The Wilderness Act directs that agencies administer wilderness to preserve wilderness character. The purpose of the minimum requirement process is to ensure that only the minimum actions necessary for administration of the wilderness area are implemented to reduce the effects of management on wilderness character and values. These determinations will continue to be made through a Minimum Requirement analysis, which provides a consistent method for developing, evaluating, and recommending the actions that would be least intrusive on wilderness character and values, while allowing the administration of the wilderness. The concept is applied to all management actions, programs, and activities within Ross Lake NRA that might affect wilderness and potential wilderness.

The minimum requirement concept is applied as a two-step process. The first step determines whether a proposed management action is appropriate and necessary for the administration of the area as wilderness and does not cause a significant impact to wilderness resources and character, in accordance with the Wilderness Act. The second step determines the techniques and types of equipment needed to ensure that impacts on wilderness resources and character are minimized. If the project is found to be appropriate and necessary, then the "minimum" management method (tool or technique) is identified that would result in the least amount of impact to the wilderness resources and character.

The minimum requirement process provides a formalized method for developing alternative ways to address an issue, and to evaluate each alternative's effects on wilderness character and wilderness resources. The minimum requirement process is typically incorporated in the appropriate environmental compliance, usually with opportunity for public review and comment.

Scenic Resources

Mitigation measures designed to minimize human-made visual intrusions include the following:

- Use facilities such as boardwalks and fences to route people away from sensitive natural and cultural resources while still permitting access to important viewpoints.
- Design, locate, and construct facilities in ways that minimize adverse effects on scenic views.
- Provide vegetative screening to mask unwanted visual intrusion of facilities or infrastructure.

Socioeconomic Environment

During implementation of the approved general management plan for Ross Lake NRA, the National Park Service will pursue partnerships with tribes, local communities, and county governments to further identify potential impacts and mitigating measures that would best serve the interests and concerns of both the National Park Service and the local communities.

Sustainable Design and Aesthetics

Sustainable practices will be used in the selection of building materials and sources and building location and siting. Projects will use sustainable practices and resources whenever practicable by recycling and reusing materials, by minimizing materials, by minimizing energy consumption during the project, and by minimizing energy consumption throughout the lifespan of the facility produced.

PUBLIC INVOLVEMENT

The conservation planning and environmental impact analysis process for the Ross Lake National Recreation Area GMP incorporated four formal rounds of public involvement: public scoping, public review of the draft alternatives, public review of the preliminary findings of the Skagit Wild and Scenic River Study, and public review of the draft GMP/EIS.

Public Scoping Process

The public scoping phase was initiated September 29, 2006 and extended through December 30, 2006. The NPS formally announced the public scoping period and invited public comment through newsletters; correspondence; press releases; public workshops; informal meetings; the NPS Planning, Environment, and Public Comment (PEPC) website; and a notice of intent in the *Federal Register* (October 30, 2006). NPS staff produced and mailed a scoping newsletter to approximately 350 individuals and entities on the park mailing list. Agencies, organizations, governmental representatives, and tribal governments were sent letters of invitation to attend the public workshops or individual meetings. Press releases were distributed to local and regional news media. The project was launched on the PEPC website <http://parkplanning.nps.gov/rola>, providing information about the Ross Lake NRA GMP and providing a method for submitting

public comments; in addition, the public was invited to submit comments by regular mail, e-mail, fax, online, and at public workshops and individual meetings.

Seven public scoping workshops were hosted in western Washington and British Columbia in October 2006 to provide the public with an opportunity to learn about the GMP project and to offer comments. Meetings were held in Concrete, Marblemount, Sedro-Woolley, Seattle, and Bellingham, Washington and in Surrey and Chilliwack, British Columbia. 63 people attended the meetings overall. During the public comment period, the NPS received a total of 19 written responses in the form of letters, e-mails, newsletter response forms, and web comments.

Public Review of the Draft Alternatives

The Draft Alternatives public process was an additional planning step to ensure that the public fully comprehended the range of draft alternatives and was able to comment effectively on these draft alternatives. The primary purpose of this planning step was to understand the public's concerns and preferences with regard to the range of draft alternatives and to assist the planning team in refining the draft alternatives and selecting a preferred alternative.

The draft alternatives public information process began in February 2008 with the mailing of the Draft Alternatives Newsletter to approximately 450 contacts on the mailing list; also the review opportunity was announced on NPS websites (<http://parkplanning.nps.gov/rola> and www.nps.gov/rola). The newsletter fully outlined the concepts and actions in the draft alternatives and proposed management zones. A planning schedule including dates, times, and locations for the public workshops invited public participation and comments on the range of draft alternatives. The newsletter also contained a business reply questionnaire that asked the public to comment on the four draft alternatives. Press releases were prepared and mailed to local media in advance of the public meetings by the North Cascades NPS Complex staff.

Four public workshops were hosted in Concrete, Sedro-Woolley, Bellingham, and Seattle during February-March 2008. Seventy people participated in the public workshops and provided oral comments, and 32 individuals, businesses, and/or agencies submitted written responses in the form of letters, e-mails, newsletter questionnaires, and comments submitted on the PEPC website.

Public Review of the Preliminary Findings of the Skagit Wild and Scenic River Study

In the fall 2008, the NPS released a summary newsletter and held two public workshops on the preliminary findings of the Skagit Wild and Scenic River Study. Several members of the general public as well as representatives from organizations such as American Rivers, American Whitewater, Blue Sky Outfitters, Downstream River Runners, League of Northwest Whitewater Racers, Washington Kayak Club, North Cascades Conservancy Council, U.S. Forest Service, The Nature Conservancy, National Park Conservations Association, The Wilderness Society, North Cascade Institute, and SCL attended these public workshops. The NPS also met independently with the Upper Skagit Tribe and the two other land managers in the river corridor, Seattle City Light and Washington State Department of Transportation.

In addition to comments received during public workshops and agency meetings, 46 individuals, businesses, government agencies and/or tribes submitted written responses in the form of letters, e-mails, newsletter questionnaires, and comments submitted on the NPS PEPC website.

While a few agencies and park neighbors expressed concerns related to possible effects of wild and scenic river designation on existing operations or potential new projects in the river corridor, most responding organizations and members of the public voiced their support of the designation, citing permanent protection of the Outstandingly Remarkable Values of these exceptional river systems, completion of the Skagit wild and scenic river designation from Sedro-Woolley to the Skagit Hydroelectric Project and opportunities for holistic watershed management, and prevention of new hydropower facilities and dams in this stretch.

It was also during this public review process that Seattle City Light submitted a letter to the NPS indicating that the agency had abandoned plans for new hydroelectric development on the Skagit River near Copper Creek and another project on Thunder Creek, and that Seattle City Light would not propose any other new hydroelectric developments on the Skagit River.

Public Review of the Draft GMP/EIS

The public review process for the *Ross Lake Draft General Management Plan and Environmental Impact Statement* began on July 1, 2010 and ended September 30, 2010. The NPS intentionally held the public review period during the peak summer visitation season in order to provide opportunities for the visiting public to learn about the NPS's preferred alternative for Ross Lake NRA and provide their comments on the draft plan. The draft plan and information regarding how to provide public comments were made available on the NPS websites (www.nps.gov/rola and <http://parkplanning.nps.gov/rola>); details of the public review process were also announced through the NPS's Notice of Availability published in the *Federal Register* on July 16, 2010 (the EPA's notice of filing was also printed in the *Federal Register* on this date).

In early July 2010, the NPS distributed approximately 160 paper and digital copies of the complete draft GMP/EIS to state congressional offices, local tribes, governmental agencies, and other interested organizations and individuals. The NPS also produced and mailed the Draft GMP/EIS Executive Summary Newsletter to over 900 contacts on the park mailing list. Press releases were prepared and mailed to local media in advance of the public open houses by the North Cascades NPS Complex staff, and a series of posters were distributed to approximately 35 locations throughout Ross Lake National Recreation Area and the region announcing the public open houses and requesting public comment.

The NPS held six public open houses in Sedro-Woolley, Marblemount, Newhalem, Seattle, Bellingham, and Winthrop in July 2010. Seventy-seven people participated in these public open houses and provided oral comments.

The NPS received approximately 1,645 total comments on the draft plan by mail, e-mail, fax, hand delivery, oral transcript, and via the PEPC website. A number of groups and individuals submitted duplicate comments by different means, and several people commented up to four times. Of the comments received, 7 were from agencies and elected officials, 5 from businesses,

and 22 from organizations. Notably the EPA endorsed the preferred alternative in their September 7, 2011 letter conveying the "LO" rating for the Draft EIS. The remaining comments were from individuals. Approximately 1,220 individuals responded by using one of two different form letters.

Release of the Final GMP/EIS

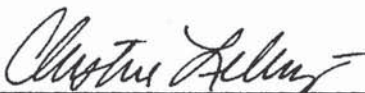
The no-action waiting period for *Ross Lake National Recreation Area Final General Management Plan and Environmental Impact Statement* was initiated by the EPA's publishing of their notice of filing in the *Federal Register* on December 16, 2011 (the NPS's Notice of Availability was printed in the *Federal Register* on December 29, 2011). The full document was mailed to 52 agencies, organizations, and individuals along with a cover letter and brief newsletter that summarized the major actions of the plan. Another 92 recipients received a CD version of the document with the accompanying documents, and 1,189 agencies, organizations, and individuals received the newsletter. The NPS also sent the full document and CD to 11 representatives of local tribes. In response to release of the document, the NPS received eleven comments – none of the respondents provided relevant new environmental information, and past comments already duly considered in preparing the *Ross Lake National Recreation Area Final General Management Plan and Environmental Impact Statement* were reiterated.

Upon approval of the *Ross Lake National Recreation Area Final General Management Plan and Environmental Impact Statement*, the NPS will prepare a presentation format plan documenting the approved GMP. This final document will also contain minor text edits, such as clarification of the wilderness elements of the foundation section of the general management plan based on new NPS guidance for integrating wilderness character into park foundation documents.

CONCLUSION

Among the alternatives considered, the selected alternative (Alternative B) best protects Ross Lake National Recreation Area natural, cultural, and wilderness resources while also providing an optimal range of visitor opportunities. It meets NPS goals for managing the NRA over the next 15 to 20 years and fulfills national environmental policy goals. The official responsible for implementing the selected alternative is the Superintendent, North Cascades National Park Service Complex.

Approved: _____



Christine S. Lehnertz

Regional Director, Pacific West Region

Date: _____

03/21/2012

Attachment 1

DETERMINATION OF NON-IMPAIRMENT

Ross Lake National Recreation Area General Management Plan

The Prohibition on Impairment of Park Resources and Values: NPS Management Policies 2006, §1.4.4, explains the prohibition on impairment of park resources and values:

While Congress has given the National Park Service (NPS) management discretion to allow impacts within units of the national park system, that discretion is limited by the statutory requirement (generally enforceable by the federal courts) that the NPS must leave park resources and values unimpaired unless a particular law directly and specifically provides otherwise. This, the cornerstone of the 1916 Organic Act, establishes the primary responsibility of the NPS. It ensures that park resources and values will continue to exist in a condition that will allow the American people to have present and future opportunities for enjoyment of them.

What is Impairment?

NPS Management Policies 2006, §1.4.5, What Constitutes Impairment of Park Resources and Values, and §1.4.6, What Constitutes Park Resources and Values, provide an explanation of impairment: Impairment is an impact that, in the professional judgment of the responsible NPS manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values.

§1.4.5 of Management Policies 2006 states:

An impact to any park resource or value may, but does not necessarily, constitute impairment. An impact is more likely to constitute impairment to the extent that 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 park's general management plan or other relevant NPS planning documents as being of significance.

An impact would be less likely to constitute impairment if it is an unavoidable result of an action necessary to preserve or restore the integrity of park resources or values and it cannot be further mitigated.

Per §1.4.6 of Management Policies 2006, park resources and values at risk for being impaired include:

- the park's scenery, natural and historic objects, and wildlife, and the processes and condition that sustain them, including, to the extent present in the park: the ecological, biological, and physical processes that created the park and continue to act upon it; scenic features; natural visibility, both in daytime and at night; natural landscapes; natural soundscapes and smells; water and air resources; soils; geological resources; paleontological resources; archeological resources; cultural landscapes; ethnographic resources; historic and prehistoric sites, structures, and objects; museum collections; and native plants and animals;
- appropriate opportunities to experience enjoyment of the above resources, to the extent that can be done without impairing them;
- the park's role in contributing to the national dignity, the high public value and integrity, and the superlative environmental quality of the national park system, and the benefit and inspiration provided to the American people by the national park system; and
- any additional attributes encompassed by the specific values and purposes for which the park was established.

Impairment could result from NPS activities in managing the park, visitor activities, or activities undertaken by concessionaires, contractors, and others operating in the park. Impairment could also result from sources or activities outside the park, but this would not be a violation of the 1916 Organic Act unless the NPS was in some way responsible for the action.

How is an Impairment Determination Made?

§1.4.7 of Management Policies 2006 states, "In making a determination of whether there would be an impairment, an NPS decision maker must use his or her professional judgment. This means that the decision-maker must consider any environmental assessments or environmental impact statements required by the National Environmental Policy Act of 1969 (NEPA); consultations required under section 106 of the National Historic Preservation Act (NHPA); relevant scientific and scholarly studies; advice or insights offered by subject matter experts and others who have relevant knowledge or experience; and the results of civic engagement and public involvement activities relating to the decision."

Management Policies 2006 further define "professional judgment" as "a decision or opinion that is shaped by study and analysis and full consideration of all the relevant facts, and that takes into account

- the decision-maker's education, training, and experience;
- advice or insights offered by subject matter experts and others who have relevant knowledge and experience;
- good science and scholarship; and, whenever appropriate,
- the results of civic engagement and public involvement activities relating to the decision."

Impairment Determination for the Selected Alternative

This determination of non-impairment has been prepared for the Selected Alternative as detailed in the Record of Decision (and described as the agency-preferred alternative in Chapter 4 of the Final EIS). As explained above, this determination of non-impairment does not include the following impact topics analyzed in the Final EIS – visitation, visitor opportunities, recreation opportunities, interpretation and education opportunities, visitor services, visitor facilities, access and transportation, socioeconomic, and NPS management and operations. This is because impairment findings relate back to park resources and values, and the above impact topics are not generally considered to be park resources or values according to the 1916 Organic Act, and cannot be impaired in contrast to other park values and cultural and natural resources.

Air Quality

The selected alternative will to sustain air quality monitoring for visibility, acid deposition, particulates, and criteria pollutants and pursue research and monitoring of atmospheric contaminants in Ross Lake NRA. These data would continue to provide quantitative and qualitative information on the status and trends of air quality within Ross Lake NRA and the surrounding area and help to inform and potentially improve air quality in the greater Puget Sound area.

NPS management activities and visitor use activities would both result in releases of a spectrum of potential air pollutants. Primary sources of emissions would be from motor vehicles, wildfires, and campfires in campgrounds. Impacts would generally be concentrated in high use areas, and along the North Cascades Highway corridor and would generally be negligible to minor and short term. Wildfires could occur anywhere, and vary in scale of area and release of pollutants.

The selected alternative requires exclusive use of either four-stroke engines, or the new direct injection two-stroke engines (or equivalent lower emission technology), for all motorized vessels on all lakes in Ross Lake

NRA by 2015. Compared to current conditions, this management action would have locally beneficial impacts to air quality by reducing emissions of volatile organic carbon compounds (VOC's) and particulates.

Through various methods and means in the selected alternative, the NPS would potentially reduce greenhouse gas (GHG) emissions associated with park operations by approximately 35 percent below 2006 levels by 2016 (National Park Service, 2009). These reductions would have a negligible beneficial effect in terms of directly reducing the adverse impacts of human-forced climate change. However, by seriously addressing climate change impacts associated with park operations and reducing emissions, North Cascades NPS Complex would reduce its local contribution to the global problem of climate change. In addition, by demonstrating leadership through action and education, the NPS may help mitigate climate change far beyond the park's boundaries.

Cumulative impacts to air quality would generally be similar to current conditions, because the air quality within Ross Lake NRA is predominately influenced by human activities outside of Ross Lake NRA, including regional and global sources of air pollution.

There would be no impairment to the NRA's resources or values related to air quality and greenhouse gas emissions because there are no long-term, adverse changes to air quality as a result of implementation of the selected alternative.

Natural Soundscapes

Under the selected alternative, many actions will be taken that would further protect or improve the natural soundscape compared to current conditions. These actions include expansion of the soundscape monitoring program, increasing education and interpretation about protection natural sounds, implementing noise abatement procedures for seaplanes, additional management actions for motorboats on Ross Lake, and prohibiting motorboats on the Skagit River within Ross Lake NRA. Actions that could have an adverse impact on the natural soundscape generally involve expansion of activities or facilities, such as expansion of the Ross Dam Trailhead parking, potential expansion of camping facilities at Newhalem and Goodell group sites, and continued wintertime use of the closed portion of the North Cascades Highway by snowmobile. Cumulative impacts, primarily from ongoing visitor and administrative activities, would be similar to the current condition and range from minor to moderate. There would be no impairment to the NRA's resources or values related to natural soundscapes because there are no long-term, adverse changes to natural soundscapes as a result of implementation of the selected alternative.

Water Resources

Impacts to water quality will be similar to the current condition and primary threats to water quality which continue include non-point source runoff from various developed and impermeable surfaces including roads, parking lots, and facilities. Under the selected alternative, the NPS will seek ways to upgrade treatments or mitigate effluent from point and no-point source threats to water quality. In general, the selected alternative entails very little expansion of park infrastructure, though adverse impacts could continue to be associated with NPS operations and maintenance related activities, including road and facility maintenance, and boating operations, ranging from negligible to minor. There would also be impacts stemming from the industrial uses associated with Seattle City Light, with motor vehicle use, and with maintenance of the SR20 corridor.

There would be impacts to hydrology, generally from ongoing NPS erosion control measures to protect facilities. Impacts to hydraulics would be primarily associated with local manipulation of hydraulics to protect roads, campgrounds and facilities from erosion. The selected alternative will generally consider facility relocation before attempting to defend facilities through management actions such as bank stabilization and channelization. When impacts could occur they would generally be localized, long-term,

adverse and of negligible to moderate intensity. Cumulative impacts to water resources would be from continuation of, without substantive changes to, existing park operations or operations associated with the Skagit River Hydroelectric Project. The impacts from climate change on water resources (water quantity, quality and hydrology) are expected to gradually increase within the 15-20 lifespan of this plan, but then accelerate rapidly beyond the planning horizon (University of Washington Climate Impacts Group, 2009).

Overall impacts to water resources would remain similar to the current conditions because the selected alternative does not propose substantial changes to current management. There would be no impairment to the NRA's resources or values related to water resources because there are no major, long-term, adverse changes to water resources as a result of implementation of the selected alternative.

Geologic Resources, including Soils

The selected alternative proposes various management actions that affect geologic resources and soils such as maintenance of trails and facilities, including minor relocation; flood-damage repairs to facilities and the transportation network; construction of several new trails, mainly in frontcountry areas; and expansion or relocation of trailhead facilities including the Ross Dam Trailhead. Various best management practices are to be employed to minimize soil erosion during construction and maintenance. New or relocated facilities will be sited when possible in areas that have been previously disturbed and/or are not located near geologically unstable areas. Impacts from management and maintenance of facilities and the transportation infrastructure, including the expansion of Ross Dam trailhead parking, would be minor to moderate, long term and adverse. Direct and indirect impacts to soils and geologic resources from recreation-related activities such as social trail formation, would be similar to current condition, occurring in a relatively small portion of the NRA and primarily in areas of high recreational use. These impacts would be negligible to minor, long-term and adverse.

The soils and geologic resources of Ross Lake NRA have been variously modified over the past century by human activities such as mining, dam construction, highway and railroad construction, and construction of various NPS facilities. The Skagit River Hydroelectric Project has permanently altered approximately 12 percent of the natural landscape of Ross Lake NRA. Cumulative impacts from past and reasonably foreseeable future management actions associated with hydroelectric projects, such as a proposed new tunnel from Gorge Dam to Newhalem Powerhouse, and the North Cascades Highway, primarily are beyond the scope of NPS jurisdiction and would be moderate to major and long term.

Overall adverse impacts associated with the GMP would range from negligible to moderate in intensity and would not vary substantially from the current condition. There would be no impairment to the NRA's resources or values related to geologic resources and soils because there are no major, long-term, adverse changes to these resources as a result of implementation of the selected alternative.

Vegetation, including Special Status Species

The selected alternative maintains existing infrastructure with limited facility expansions and improvements that could affect vegetation; however, vegetation in most areas under consideration has been previously disturbed by development. Facilities that are abandoned from flooding and restored could benefit vegetation. The selected alternative also proposes a more holistic approach to ranking and prioritizing areas for restoration, including areas for control of invasive, non-native plants. Fire management activities would involve a mixture of strategies for managing and responding wildfires, including suppression and allowing natural fires to occur to help restore or maintain ecosystem processes.

The NPS will continue to mitigate impacts from various recreation and visitor uses such as trampling and social trail development as well as importation and spread of invasive, non-native plants. The park will also

conduct plant surveys prior to any construction to locate any special status species in the area, and if species were identified, then projects would be modified to avoid harm to those species. The selected alternative may affect, but would not adversely affect special status plant species.

Past and ongoing development within the NRA as well as threats outside the North Cascades Complex (such as logging, forest conversion for development, habitat fragmentation, fire suppression and others) has resulted in cumulative adverse impacts to vegetation. The selected alternative proposes few additional impacts to vegetation that would cumulatively contribute to past adverse impacts that have occurred or may occur within the timeframe of this plan.

There would be no impairment to the NRA's resources or values related to vegetation, including special status species, because there are no major, long-term, adverse changes to these resources as a result of implementation of the selected alternative.

Fish and Wildlife, including Special Status Species

Fishing and hunting activities that affect fish and wildlife populations will continue at levels similar to the current condition. Ongoing recreation and visitor use would continue to have localized impacts on various wildlife species, primarily as a result of human presence in areas frequented by wildlife. However, much of the NRA is untraveled backcountry or wilderness and wildlife in these areas would be less affected compared to high use areas, particularly along the North Cascades Highway corridor. Under the selected alternative, the NPS would seek to reduce motor vehicle noise along the highway by increasing visitor education about noise impacts on wildlife and enforcing vehicle noise standards. Some wildlife may continue to be harmed or killed by motor vehicles traveling along the highway, although the quantity of wildlife killed would not differ substantially from current conditions and is likely to be minor.

Continuing to protect park resources, consolidating development and limiting new facility construction in undeveloped areas will reduce habitat fragmentation and benefit wildlife populations. In addition, improved interagency and trans-border coordination could also result in expanded benefits. Special status species, notably grizzly bear, continue to benefit from large tracts of unfragmented core habitat. Cumulative impacts largely associated with habitat loss and modification outside the NRA would be similar to current condition.

Overall impacts to fish and wildlife would be negligible to minor over the long term, with additional benefits realized. There would be no impairment to the NRA's resources or values related to fish and wildlife, including special status species, because there are no major, long-term, adverse changes to these resources as a result of implementation of the selected alternative.

Archeological Resources

Protection and management of archeological resources will continue similar to the current condition. Increased emphasis on paleoecological investigations and expanded partnership opportunities for research contribute to long-term archeological preservation objectives. The selected alternative also results in a stronger connection between archeological investigations and research and public interpretation and education. Opportunities for archeological site interpretation in the field could be a powerful interpretive experience. Adverse impacts associated with new construction will be mitigated and any effects would likely be minor and localized. Cumulative impacts would be the same as the current condition, mostly resulting from the history of human occupation and development in the area, including dam and reservoir construction.

There would be no impairment to the NRA's resources or values related to archeological resources because there are no major, long-term, adverse changes to these resources as a result of implementation of the selected alternative.

Historic Structures and Cultural Landscapes

Preservation and management of historic structures and cultural landscapes will continue similar to the current condition, and the selected alternative will enhance preservation of historic buildings and cultural landscapes through treatments that emphasize adaptive reuse and education or interpretive potential, enriching visitor understanding of cultural resources and contributing to long-term support for historic preservation. Should the NPS acquire Hollywood from Seattle City Light, additional benefits to historic structures and cultural landscapes could also be realized. Adverse impacts to individual properties depend on the level of significance for the individual property affected and the proposed undertaking. Cumulative impacts would be similar to the current condition and the result of natural processes and wear and tear associated with visitor access, administrative use, and deferred maintenance. The magnitude of cumulative impacts to cultural resources is also dependent on Seattle City Light's future plans historic buildings and landscapes under their care. Seattle City Light will continue to consult with the State Historic Preservation Office as projects are identified.

There would be no impairment to the NRA's resources or values related to historic buildings and cultural landscapes because there are no major, long-term, adverse changes to these resources as a result of implementation of the selected alternative.

Tribal Issues and Ethnohistory

The selected alternative will maintain consultations with the Skagit Tribes, conducting tours and guided trips on request of the Skagit Tribes, research and inventory of traditional uses, and conducting oral histories and research investigations documenting human use of the North Cascades similar to the current condition. Inadvertent visitor use and park-related actions could potentially impact ethnographic resources, however, should such impacts occur, communications among the NPS, affected Tribes, and the State Historic Preservation Officer would be initiated and any adverse effects would be mitigated to a negligible level through a cooperative agreement. Cumulative impacts are similar to the current condition and are largely the result of construction during the 20th century, including dam, reservoir, hydroelectric and park facility construction. Magnitude of these impacts is unknown; inventory and appropriate mitigation will continue.

There would be no impairment to the NRA's resources or values related to tribal issues and ethnohistory because there are no long-term, adverse changes to these resources as a result of implementation of the selected alternative.

Museum Collections

The selected alternative will continue to maintain collections and archives in their existing locations which meet current standards, storing collections in appropriate cabinets and archives in special archival quality boxes. The selected alternative enhances benefits to museum collections by developing the capacity to preserve and protect paleoecological and emerging collections and archives, providing additional access to collections items both online and on site, and expanding the North Cascades Visitor Center exhibit areas to provide open display of museum collection objects. The history of park collections has been one of growth, resulting in the construction of a dedicated collection facility in 1993. A planned collection upgrade will be equipped to maintain the collections for the next 10 to 20 years when completed, resulting in additional long-term benefits.

There would be no impairment to the NRA's resources or values related to museum collections because there are no long-term, adverse changes to these resources as a result of implementation of the selected alternative.

APPENDIX E: STATEMENT OF FINDINGS FOR FLOODPLAINS

Final Statement of Findings for Floodplains

Ross Lake National Recreation Area Final General Management Plan and Environmental Impact Statement

Recommended:

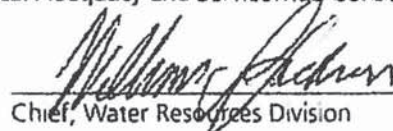


July 15, 2011

Superintendent, North Cascades NPS Complex

Date

Certification of Technical Adequacy and Servicewide Consistency



Chief, Water Resources Division

8/2/2011

Date

Concurrence:



Regional Safety Officer

8/4/2011

Date

Approved:



Pacific West Regional Director

8-9-2011

Date

Introduction

Preferred Alternative

The *Ross Lake NRA Draft Final General Management Plan and Environmental Impact Statement's* preferred alternative would generally have beneficial effects on ecosystem functions and processes, including floodplain and alluvial processes. None of the major park facilities are located in a regulatory floodplain, although three campgrounds are located on alluvial fans and debris cones, which are known for their instability.

Destruction of facilities from catastrophic and natural events is becoming more common in the region due to an increase in the magnitude and frequency of severe storms. For example, in 2003 10 days of heavy rainfall exceeding 20 inches resulted in widespread flooding, landslides, debris flows and creek channel avulsions. This event led to significant shifts in the channels of Goodell and Colonial creeks into campgrounds. Continued aggradation at these sites is expected to cause future flooding and erosion damage problems, although the campgrounds are generally closed during the late fall flood season. The management philosophy of the preferred alternative is to maintain existing camping opportunities, but to adapt and relocate facilities as dictated by the severity and consequences of future flooding. Future management actions would strive to reduce flood hazards and damage on these landforms by potentially abandoning indefensible sites and reconfiguring access.

In this plan, the NPS would strive to minimize conflicts between alluvial processes and visitor and administrative developments by siting new facilities away from eroding stream banks and out of high flood hazard areas. The NPS would also seek to minimize manipulation of floodplain ecosystems and processes where possible through collaborative efforts with Seattle City Light, and other county, state and federal regulatory agencies, including the Washington State Department of Transportation.

Site Descriptions

Colonial Creek Campground

Colonial Creek Campground was constructed in the 1960s on an alluvial fan and debris cone where Colonial and Rhode creeks meet Diablo Lake (See Figure 1). It includes a park housing unit, six comfort stations, and about 160 campsites. During

the summer season, Colonial Creek Campground is the most popular camping destination in Ross Lake NRA. The campground is regularly at capacity on summer weekends and holidays due to easy access from the North Cascades Highway, many wooded lake-front campsites, several day hikes, and access to Diablo Lake.

The entrance to both the north and south loops of Colonial Creek Campground crosses the toe of the Rhode Creek debris cone, which is an active debris torrent system. Rhode Creek, a small, straight, high gradient stream, follows the Thunder Lake fault, which provides massive quantities of rock and gravel. This material is deposited on the debris cone and on the highway and entrance road. Debris is flushed out of the narrow canyon about once every 20-25 years, with significant events in 1984 and 2006.

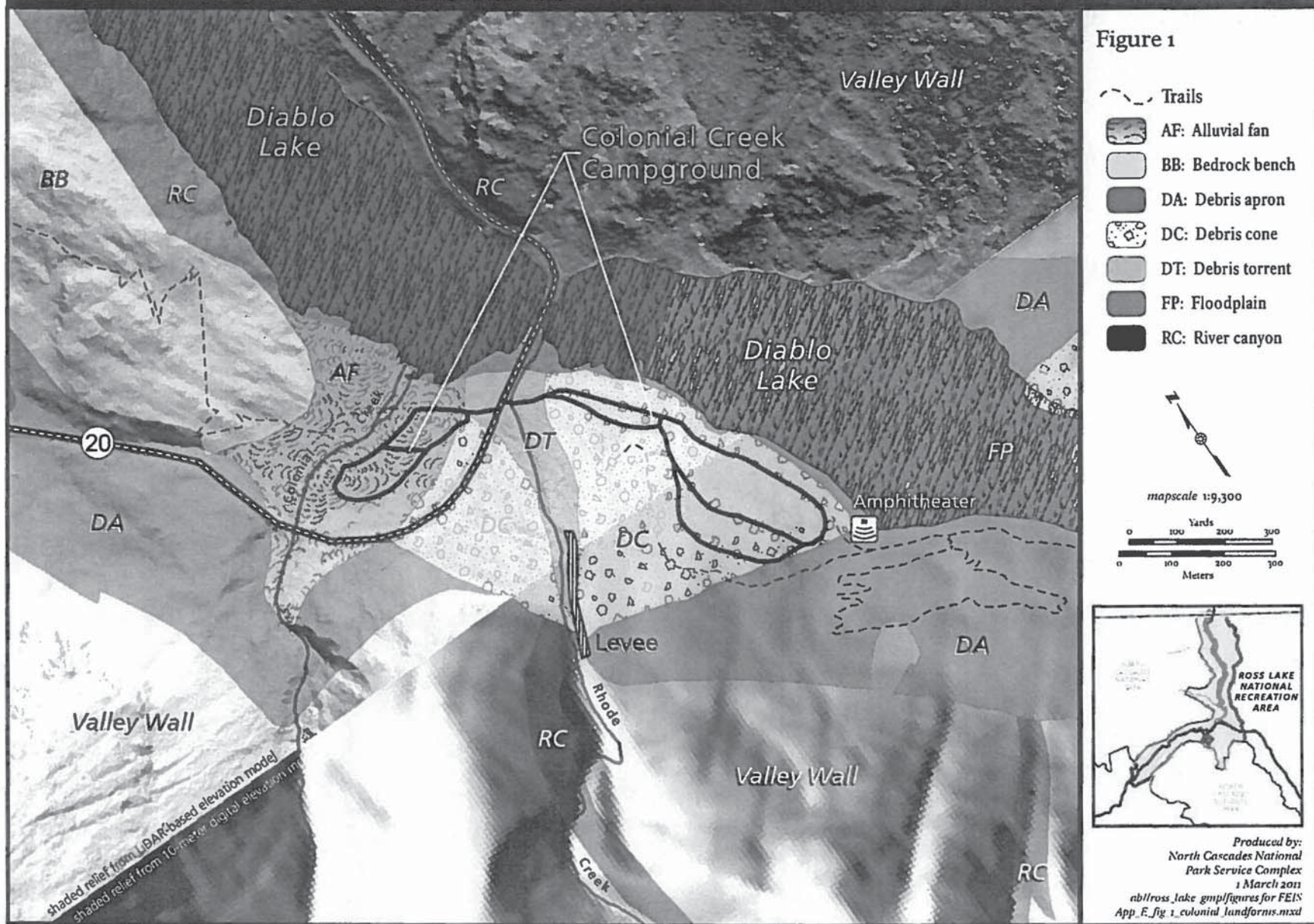
During campground construction in the 1960s, the U.S. Forest Service blocked a channel on the debris cone that led into the campground's south unit. The levee failed in the 2006 flood, sending floodwater into the campground. Gabion grade control structures placed in the channel on the debris cone by the NPS and removal of material from the entrance road have resulted in more frequent deposition of rock on the entrance road. This material has been eroded from the failed debris cone by the extensive widening of Rhode Creek channel in response to the check dams, which have largely failed. The NPS frequently clears out the lower portions of the constructed channel following debris flows, and less frequently reconstructs and armors the bank of the creek when channel aggradation increases the risk of avulsion. The channel of Rhode Creek is now deep and wide, and is clearly visible from the highway.

Erosion and channel aggradation on the left bank also caused damage to the access road to the water system, which includes a 5000 gallon water tank. In response to erosion caused by the 2006 flood, the NPS armored the bank of the stream and provided some relief flow for the reoccupied channel through the south unit of the campground.

The north side of the campground is constructed on the alluvial fan of Colonial Creek. Historically the NPS maintained a short, poorly constructed levee and cabled logs and rock to protect the campground along the right bank of the creek. In about 2002, the NPS constructed a series of small footbridges across tributary channels of Colonial Creek. A large foot log spanned the main channel, and was

Figure 1. Landforms of Colonial Creek Campground

Landforms of Colonial Creek Campground Ross Lake National Recreation Area GMP/EIS



designed to be pulled back during flood events to provide the creek a clear path to Diablo Lake during flood season. The October flood of 2003 occurred before the foot log was removed, and appears to have triggered massive deposition of gravel in the main channel upstream of the bridge. This led the stream to jump out of its channel on the right bank upstream, and it followed one of the campground roads to Diablo Lake. In the process, it destroyed utility lines buried beneath the road, several campsites, and introduced a large amount of asphalt into the stream.

In response to this damage, an engineered logjam was installed just below the highway bridge to block a side channel that, if occupied, would threaten a major part of the north loop. The NPS also constructed a new campground loop road along the new creek channel. Unfortunately, in an attempt to save access to 11 campsites, the new road was constructed too close to the new channel, and the 2006 flood claimed another campsite and threatened the new road.

The north unit of Colonial Creek Campground remains on an active alluvial fan surface, while parts of the south loop are on the Rhode Creek debris cone. Relic flood channels cross both units and indicate that over time additional portions of the campground remain at risk to future flooding.

As a result of gravel, sand and silt deposited by Rhode Creek, the boat launch at Colonial Creek Campground has experienced shoaling since its construction. In response, the NPS has on more than one occasion dredged the boat ramp area. The boat ramp also is periodically unusable when Diablo Lake reservoir is drawn down by hydropower operations. In some instances, boaters who entered the lake during high water cannot retrieve their boats and have been stranded.

Diablo Lake just south of the boat ramp is also threatened by growth of the Thunder Creek delta. As part of the relicensing of the Skagit Hydroelectric Project, the NPS requested Seattle City Light to identify remedial measures to address this problem and incorporate those measures into the City's recreation and erosion control plans for the Skagit Project. Should maintaining the boat ramp become impossible, then the NPS consider several options.

1) ~~R~~would relocate the boat launch to the north side of the highway in the vicinity of the Diablo Lake boathouse, as recommended via previous assessments. Parking would still remain on the

south side. Ancillary facilities in the vicinity of the ramp such as a vault toilet and picnic area could be included. 2) Maintain the launch in its current location by periodically dredging a channel from the launch to deeper water. This action would be done in coordination with Seattle City Light so dredging could be done at low water levels to minimize impacts to water quality. Should such dredging require the dredging of lacustrine wetlands, a Wetland Statement of Findings would be considered at that time. 3) If dredging is not feasible due to accelerated sedimentation rates, then the NPS would no longer attempt to maintain a boat launch in the vicinity of Colonial Campground. The NPS would either seek to establish a launch elsewhere on the reservoir, or abandon providing a boat launch on Diablo Lake. Boating would still be encouraged, but the loss of a boat launch would limit boating to paddlecraft, such as canoes and kayaks, or small motorboats, such as Jon boats, that could be launched without a ramp.

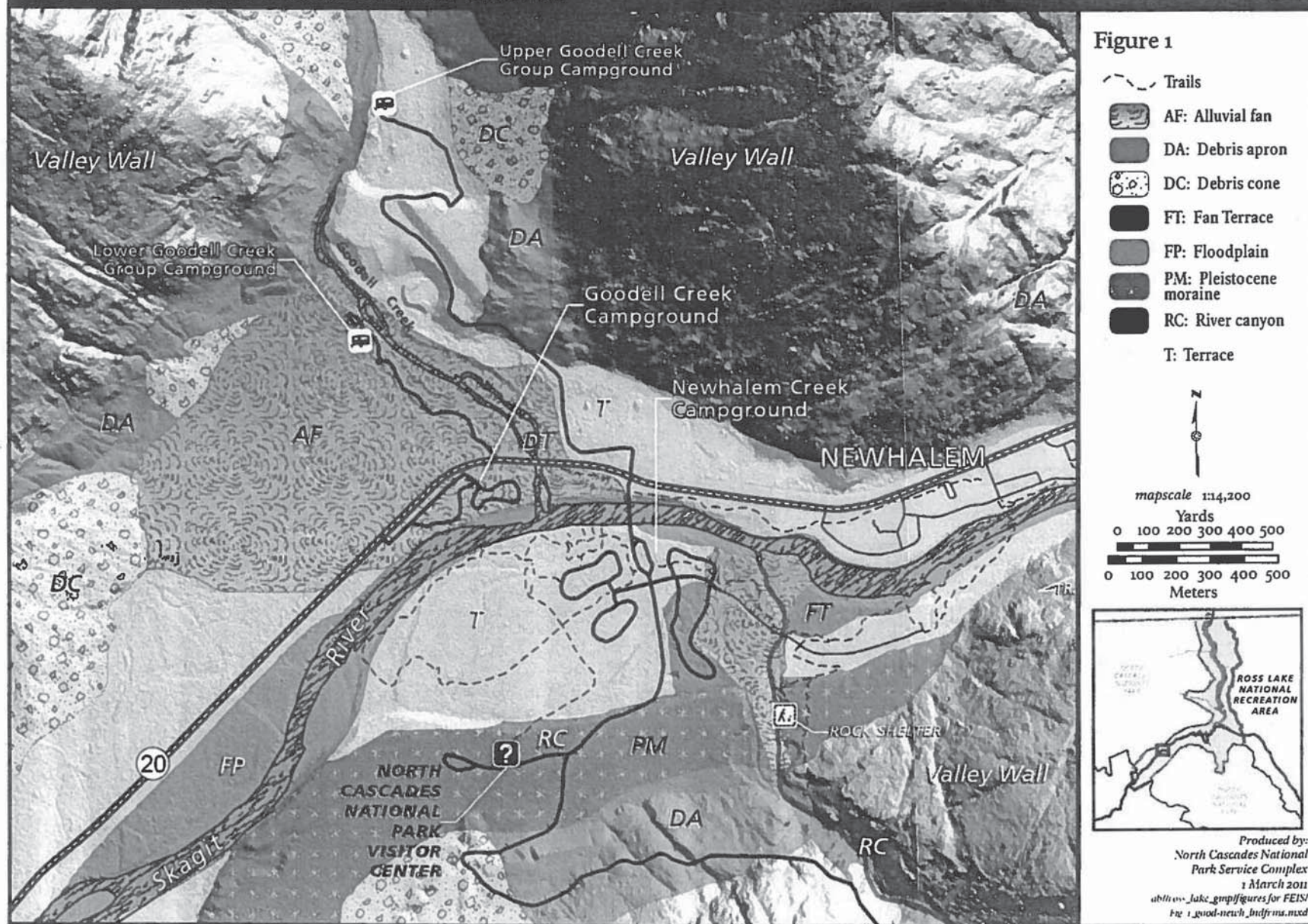
Goodell Campgrounds

The Goodell Creek Campground consists of 21 sites located along the confluence of Goodell Creek and the Skagit River (See Figure 2). It is located on low river terraces and the distal edge of the Goodell Creek alluvial fan, which is marked by a series of old flood channels that have been largely obstructed by Highway 20 and campground roads. There are also two group camping units along Goodell Creek, including a left bank group camp about 1 mile above Highway 20, and two group camps just above the highway on the right bank. The upper group campground is located on a terrace above the creek. The lower group campground and parts of the main campground are threatened by flooding from Goodell Creek. There are a series of small levees that were constructed to protect an old bridge abutment and other developments in the area. On the opposite bank from the lower group camp, Seattle City Light constructed a half-mile long levee to keep floodwater from spreading toward the town of Newhalem.

The flood risk has increased in the last few years due to channel changes on lower Goodell Creek induced by a massive 2003 landslide about one mile above the Skagit River. The landslide deposited approximately 2.9 million cubic meters of debris and completely blocked Goodell Creek and created a 2-acre lake that is approximately 10 meters deep. Since then, debris from the landslide has been working its way downstream, causing channel aggradation and channel instability from Lower Goodell Group Camp to the Skagit River. This process has led to the loss of

Figure 2. Landforms of the Goodell and Newhalem Campgrounds

Landforms of the Goodell and Newhalem Campgrounds Ross Lake National Recreation Area GMP/EIS



two sites at the camp and threatens the access road off Highway 20.

Sites at the east end of the main Goodell Creek Campground also flooded, although flood damage has been limited to scouring of abandoned overflow channels scattered between campsites. Further problems are anticipated at both these campground locations given the continued aggradation of the riverbed and the fact the campground is situated on an alluvial fan.

General characterization of floodplain values and of the nature of flooding and associated floodplain processes in the area

Major flooding in the North Cascades generally occurs during fall rain-on-snow events as a result of heavy precipitation that can exceed several inches a day for a week or more. These events are triggered by a strong and persistent flow of tropical moisture from the equatorial Pacific Ocean, and area known as "pineapple expresses." They generally occur from mid October through December. Floodwaters from these events generally rise and fall rapidly, with flood peaks often occurring in a day or less. This type of flooding dominates lower elevation west-side streams, including the Skagit and its tributaries. In the last 15 years, events in 1989, 1990, 1995, 2003 and 2006 have triggered major changes on streams in the area.

Flooding also occurs in May and June due to rapid melt of heavy winter snowpack. Larger spring floods occur later in spring and can extend over several weeks into early summer. Peak flows for spring floods are typically lower than fall rain-on-snow events. At higher elevations above the rain-on-snow zone, and in colder east tributaries such as Ruby and Devil's creeks, spring flooding is generally dominant.

Occasionally, summer floods occur on small streams as a result of intense, localized convection associated with thunderstorm activity. The intensity and magnitude of these floods is greater in smaller first and second order watersheds.

Within Ross Lake NRA, most flooding problems are associated with tributary streams. One of the major effects of the three large hydroelectric dams on the Skagit River is decrease peak flood flows. While causing major impacts to ecosystem function and floodplain values, the dams provide protection to facilities along the Skagit River west of Newhalem, where the Skagit River regains its unregulated nature.

Justification for Use of the Floodplain

Description of why the proposed action must be located in the floodplain

The mountains of the North Cascades, including Ross Lake NRA, are often referred to as "the American Alps" because they include the steepest and most rugged topography in the contiguous United States. The precipitous topography provides little in the way of relatively flat, stable ground favorable for visitor service facilities and transportation infrastructure. In addition, approximately 94% of the North Cascades NPS Complex is designated as wilderness. Wilderness designation precludes permanent development of roads and facilities, and substantially constrains the amount of land available to provide visitor services and amenities commonly found in national parks. Simply put, there is little flat, defensible ground available, so floodplains, debris cones and alluvial terraces have become the default landforms of choice for establishing roads, campgrounds and associated facilities.

Congress established the lands and waters of Ross Lake NRA by transferring jurisdiction of the area from the U.S. Forest Service to the National Park Service. All the major campgrounds, roads and associated facilities that exist today were constructed by the U.S. Forest Service many decades ago. Developmental decisions at that time generally did not consider concepts such as geologic hazards, sustainability, adaptation to climate change, and deference to natural processes. This relatively static view of natural processes was also influenced by the perception that risks from natural processes such as flooding could be controlled through engineered solutions. Moreover, the natural human tendency to gravitate toward shorelines along lakes, creek and rivers resulted in the establishment of the most popular campgrounds and associated facilities in Ross Lake NRA on alluvial fans (North Unit of Colonial Creek Campground and the lower group camp and main campground at Goodell Creek), and debris cones (south unit of Colonial Campground).

Today these areas remain the most popular locations for frontcountry camping, and there is a high degree of public expectation to maintain camping opportunities in these areas. Demand for maintaining these camping experiences, coupled with a paucity of alternative camping locations that provide similar aesthetic conditions, places the NPS in the difficult

position of balancing the merits of maintaining camping opportunities in these areas against the risk of severe damage from future flooding.

The management philosophy of the preferred alternative is to maintain existing camping opportunities, but to adapt and relocate facilities as dictated by the severity and consequences of future flooding. The goal is to limit net loss of camping opportunities, but to relocate facilities to more geologically stable and less flood prone locations. For Colonial Creek and Goodell Creek Campgrounds, the preferred alternative would enable continued camping in all present areas, but campsites would be closed and relocated should reconstruction following severe flood damage not be feasible or sustainable.

Investigation of alternative sites

Alternative locations exist for relocating campgrounds in response to future flooding.

Hollywood

If Seattle City Light determines that Hollywood is no longer necessary for hydropower operations in the future, the NPS would work to acquire that land. The NPS is presently working with Seattle City Light to acquire either through fee acquisition or land exchange an area known as "Hollywood" in the company town of Diablo (See Figure 3). Hollywood is located on a flat alluvial terrace and alluvial fan where Stetattle Creek meets the Skagit River. It is protected by a levee on the left bank of Stetattle Creek, and by flood storage from Diablo and Ross Dams. It therefore has a relatively low risk of future flooding. Hollywood is not located within a regulatory floodplain. The area has never flooded since Seattle City Light established the levee and built the dams. The area is not considered likely to flood in the future because the levee is very well constructed, stabilized by mature trees along its length, and of sufficient height and strength to withstand the hydraulic scouring forces and flood elevations of Stetattle Creek. There is the possibility that a major landslide upstream could lead to stream aggradation on lower Stetattle Creek and threaten future development. However, there are sites at the east end of Hollywood that are relatively safe from Stetattle Creek.

Newhalem Creek Campground

The two main loops of Newhalem Creek campground were constructed on an alluvial terrace

adjacent to the Skagit River, but the eastern two loops are on the alluvial fan of Newhalem Creek. Several campground loops were planned but never constructed, so there is ample opportunity for further expansion if necessary to offset the loss of camping elsewhere in the NRA.

Description of Site-Specific Flood Risk

Recurrence interval of flooding

Colonial Creek Campground

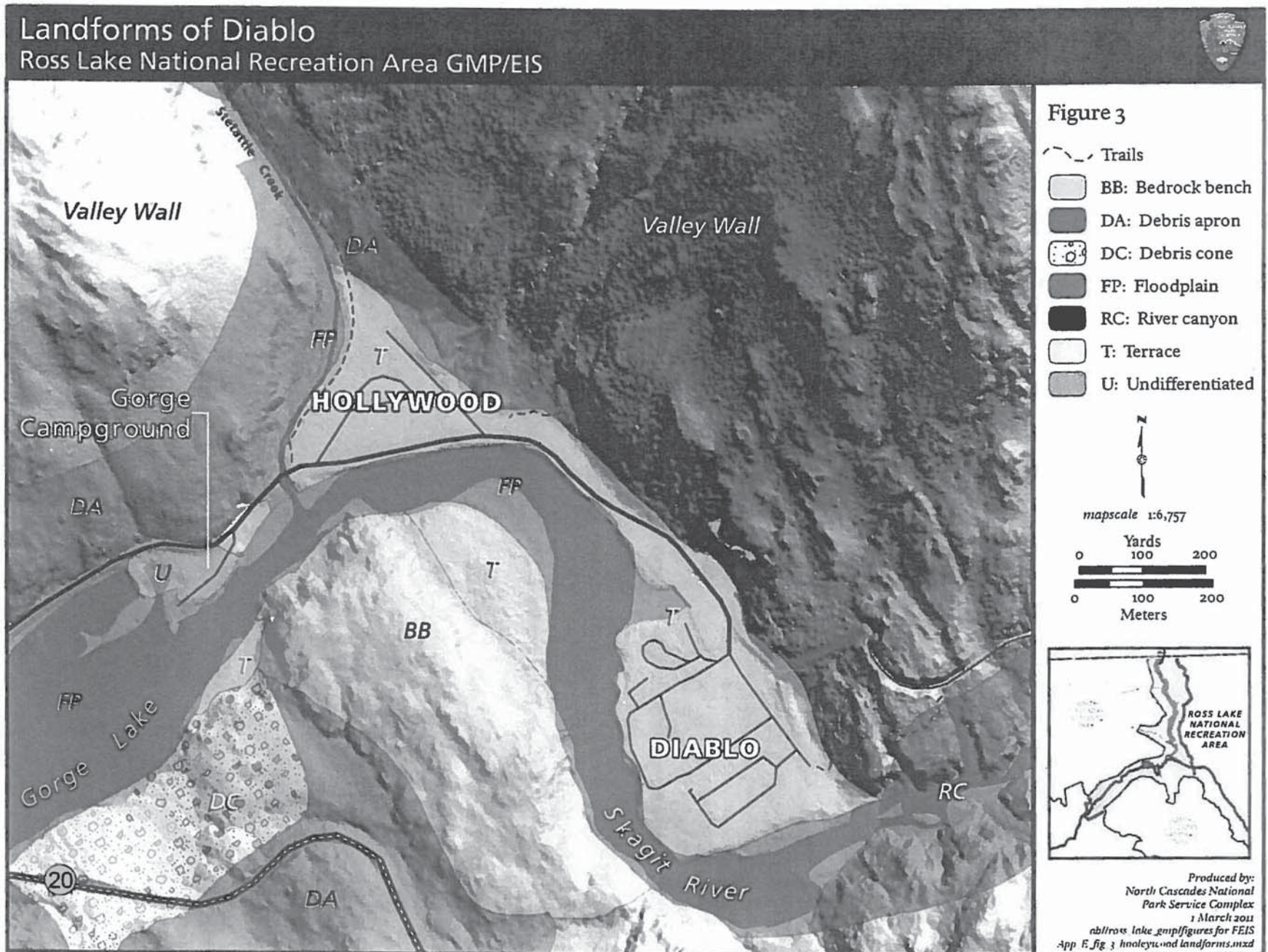
Colonial and Rhode creeks are steep, unregulated mountain streams that are prone to major channel avulsions in response to extreme rainfall events and associated channel aggradation. There is no long-term stream flow data available for Rhode Creek or Colonial Creek to quantify flood recurrence. Based on regression equations, the 100 year discharge for Colonial Creek is estimated at 650 cubic feet per second.

A review of administrative records indicates that floods of a 25 year or greater recurrence interval cause debris flows on Rhode Creek and major channel changes on lower Colonial Creek. This conclusion is supported by damage assessments from the early 1960s and 1984, along with the 2003 event.

Flood damage of the campgrounds at these sites has been exacerbated by management actions that placed facilities such as campground roads in old flood channels and attempted to constrict streams with levees and gabion structures. As a result of the manipulation of Rhode Creek, failure of the channel on the debris cone and damage to the campground entrance occurs every 2 to 5 years in response to 5 year rainfall events. Most of the southern unit of the campground is safe from flooding, although the 2006 flood forced Rhode Creek to occupy a system of old flood channels.

Colonial Creek has caused less damage than Rhode Creek in part because it has not been as heavily manipulated, but also because the watershed is more stable than fault-controlled Rhode Creek. The most recent damage to the north unit was a result of a large event and management actions that failed to clear the bridge from the main channel. Aggradation above the old footbridge since then has led to campground flooding again in 2006. It is anticipated that future floods of 25 year or greater magnitude will cause further damage and necessitate a management response.

Figure 3. Landforms of Diablo



Goodell Creek Campground

Like many rivers in the region, Goodell Creek does not have streamflow records. While Lower Goodell Group Camp has history of flood damage judging by the levees, gravel from the 2003 landslide has now made parts of the campground prone to flooding during smaller annual events, including the spring 2008 and 2009 floods. Flooding of the main Goodell Creek Campground across Highway 20 has also become more frequent due to channel aggradation associated with the landslide and the recent passage of several large floods. In response, in 2008 the NPS installed larger culverts to move water through the campground. However, flooding is expected to worsen over time based on long term trends that show movement of Goodell Creek to the west.

Hydraulics of flooding at the site (depths and velocities)

Colonial and Rhode Creeks

Both Colonial and Rhode creeks drain steep mountain watersheds and are prone to rapid rise of floodwater during both fall and spring flood seasons. Flood waters from Colonial Creek, when it spills over banks and into the campground, are typically a foot or less deep in parts of the campground but can reach depths of 3 to 6 feet or more in side channels. Main channel velocities are on the order of 10 to 12 feet per second with overbank flows on the order of 1 to 3 feet per second.

Unlike Colonial Creek, Rhode Creek is also likely to carry debris flows due to its straight, narrow, steep channel in the Thunder Lake Fault. Within the canyon above the debris cone, flows can reach depths of 10 feet or more and velocities in excess of 30 miles per hour. At these depths and velocities, Rhode Creek is capable of transporting boulders in excess of 3 feet diameter and depositing them on the entrance road.

Goodell Creek

Goodell Creek drains an area of steep, rocky terrain that covers 25,523 acres. Floodwaters in this basin rise quickly due to rapid runoff from extensive bare rock slopes. Floodwaters from Goodell Creek are channelized by the right and left bank levees, as well as the Highway 20 bridge. As a result, floodwater depth and velocity in lower Goodell Creek are deeper and faster than unregulated streams of comparable size. Based

on regional regression equations and comparison with nearby watersheds of similar size, the 100 year discharge for Goodell Creek is about 7,900 cubic feet per second. Stream flow velocity in the main channel is likely on the order of 10 to 12 feet per second, with overbank depths less than 3 feet. Observed overbank flow velocities along the Lower Goodell Group Camp access road are 3 to 4 feet per second.

Rhode and Colonial Creeks, when they spill over banks and into the campground, are typically a foot or less, but velocities are on the order of 10 to 12 feet per second. Where channelized into over bank side channels, flows can reach 5 to 10 feet depths.

Time required for flooding to occur (amount of warning time possible)

Colonial Creek Campground

Rhode Creek has a very small and extremely steep watershed, so severe rainfall over a period of several hours could trigger flooding with relatively little advance notice. Floodwaters could rise at three times a year, including in fall rain-on-snow, spring snowmelt, and summer thunderstorm events. The potential for summer flood activity is of particular concern because it coincides with the main visitor use season. Most debris torrents on Rhode Creek could be reasonably assumed to occur, as they have in the past, during rain-on-snow events in late fall or early winter, during a time of low visitor use.

The watershed feeding Colonial Creek is larger and has a lower gradient than Rhode Creek, and as a result floodwaters rise more slowly. Given the size of Colonial Creek watershed, it is also unlikely that a summer thunderstorm could trigger flooding. It is anticipated that it would take several days or more of sustained rainfall before flooding of the north loop of the campground would commence. Flooding would be highly unlikely to occur during the high visitor use season. Several hours to days of advance notice would most likely be available, and there would be little if any use of the campground at this time.

Goodell Creek Campground

Goodell Creek watershed covers a 25,523 acre area, and because of the size of the watershed it would take several days to a week or more of sustained heavy precipitation for flooding to occur on lower Goodell Creek. Therefore, warning times for fall rain-on-snow or spring snowmelt floods would be a day or more.

The occurrence of several large landslides in the Goodell Creek watershed create the potential for sudden large discharges of water on lower Goodell Creek from sudden failure of the debris dam. Indeed, the 2003 Goodell landslide and debris dam were not discovered until a day after the event occurred. Given that this event was triggered by heavy precipitation, there could be many hours to a day or more warning time for visitors at the campgrounds. However, should a landslide be triggered by an earthquake, it could take only hours for a lake to fill and dam to fail.

Opportunity for evacuation of the site in the event of flooding

Colonial Creek Campground

A debris flow on Rhode Creek would block the campground road and prevent evacuation by motor vehicles. Clearing could take several days to a week depending upon flow volume. Past events have deposited more than 30,000 cubic yards as deep as 6 feet. Other portions of the campground could be evacuated by motor vehicle in all but the most extreme precipitation events. Most visitors would be unlikely to remain in the campground under these extreme conditions. In the south unit of Colonial Campground, evacuation away from flood waters could be relatively easily accomplished on foot by moving to the south end of the campground or up the Thunder Creek Trail. In the north unit, evacuation would be to the south via Highway 20.

Goodell Creek Campground

Floodwaters could block the present entrance road to the Lower Goodell Group Camp and specific sites in the main Goodell Creek Campground. These conditions could prevent evacuation by motor vehicle for a day or more depending upon the severity of road damage. In all instances, evacuation by foot would most likely be possible.

Geomorphic considerations (erosion, sediment deposition, and channel adjustments)

The north unit at Colonial Creek Campground, Lower Goodell Group Camp, and the east end of the main Goodell Creek Campground are located on active parts of alluvial fans. These sites are expected to have frequent deposition of gravel and channel instability. If large amounts of sediment are introduced into the system, such as the Goodell

landslide, bank erosion and channel instability can be expected to increase downstream.

The south unit of Colonial Creek Campground, including the main entrance road and part of Highway 20, are built on a debris cone deposited by Rhode Creek. This debris cone is constructed by massive deposits of rock and gravel as well as by alluvial deposits. Stream channels and the debris cones themselves are known to be unstable features.

Description and Explanation of Flood Mitigation Plans, Including:

A. Measures to reduce hazards to human life and property to the regulatory floodplain level, while minimizing the impact to the natural resources of the floodplain, including the use of non-structural measures as much as practicable;

No detailed floodplain mapping exists for this area. None of the actions included in the preferred alternative are located within regulatory floodplains. However, the campgrounds and entrance roads previously described above are located on alluvial fans and debris cones. These landforms, which have floodplains that are inherently flood prone and unstable, so reasonable measures to reduce hazards to human life and property are needed.

The development of the south unit of Colonial Creek Campground is in a floodprone high flood hazard area on the Rhode Creek debris cone. The most probable risk of flooding in this area is in fall, winter and early spring during severe rain on snow events. The risk to human life and property during these synoptic scale events is very low because the campground is closed, there is little administrative use, and there is usually several days advanced warning of flooding.

Flooding is also possible in the summer following intense convective thunderstorms. These small scale events are often triggered by passage of a cold front or convective instability. When these events occur, the risk to human life and property is somewhat greater because (a) the campground is open and often at full capacity; and (b) the lead time for the risk of flooding is reduced due to uncertainty of the event location and intensity.

A reasonably foreseeable flooding scenario in the summer season would involve several hours of lead time for a debris torrent event. Potential impacts

would include the possibility of partial or complete loss of vehicle access to the campground and flooding of some campsites due to a channel shift at the head of the debris cone. These conditions could also trigger old-growth tree fall (e.g. from flood-scoured tree roots or from severe wind). It is during these summertime events that reasonable mitigation measures would be needed to reduce risk to life and property.

To mitigate risks to human life and property, Given the sudden and catastrophic nature of flooding on the Rhode Creek debris cone and the potential for this on lower Goodell Creek by landslides, the NPS will enact the following mitigation measures for Colonial Creek Campground:

1. Install warning signs to notify visitors of the potential risks. The signs would be posted at the Camptender kiosk, boat launch, and other prominent areas. consider signing of the area near the mouth of the Rhode Creek and at lower Goodell Creek camps to the creek to warn visitors about the sudden and somewhat unpredictable flood hazard.
2. Develop a flood warning and campground evacuation plan. This concise plan would specify roles and responsibilities for response actions by park staff including measures for public notification and evacuation.
3. Identify and implement proactive steps to mitigate flood risk. To maintain camping opportunities at Colonial Creek Campground, the General Management Plan states the NPS would take proactive management actions at Rhode Creek to prevent campsites from being impacted by flooding, debris flow, and erosion. If campsites are affected in the future, the NPS would attempt reconstruction in the same area. If reconstruction of campground infrastructure following severe flooding is not feasible (or too impactful), the damaged areas would be abandoned and rehabilitated and new camping opportunities would be provided elsewhere in more sustainable locations.

B. Acknowledgement 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).

The camp-tender housing and comfort stations at Colonial Creek Campground are not currently flooding, but several are located on active landforms where future changes could change conditions overnight. There are no other facilities in the

preferred alternative that are within regulatory floodplains.

Summary

The Skagit River is the main stream in Ross Lake NRA, but it is not the main source of flooding since flood flows are regulated by three large hydroelectric projects. The preferred alternative does not propose any new administrative and visitor use facilities in regulatory floodplains. Several existing facilities would, however, remain in flood prone areas on alluvial fans and debris cones. These include the major park campground at Colonial Creek, as well as smaller campgrounds along Goodell Creek. Flooding at these sites has been exacerbated by occurrence of slope instability within watersheds and the occurrence of several large floods in the past 20 years. While flood conditions are not particularly severe at three of the four sites and warning times of several days are likely, Rhode Creek presents a special flood hazard due to the possibility of debris flows triggered by thunderstorms during the main visitor use season.