

FINDING OF NO SIGNIFICANT IMPACT
Carbon River Access Management Environmental Assessment
Mount Rainier National Park
January 2011

This Finding of No Significant Impact (FONSI) documents the decision of the National Park Service (NPS) to adopt a minor modification of the agency-preferred alternative, as presented in the Carbon River Access Management Environmental Assessment (EA), and the NPS's determination that neither significant impacts on the quality of the human environment, nor impairment of park values, will occur from implementing this course of action.

Purpose and Need

In November 2006, extreme flooding damaged several portions of the Carbon River Road, altering the course of the Carbon River and Ipsut Creek, and removing sections of existing roadway. An early December windstorm increased damage to the area. Since that time, some water from the Carbon River has continued to flow around Ipsut Creek Campground in a new Ipsut Creek channel, adjacent to instead of under the Ipsut Creek Bridge near the campground. Additional damage occurred in November 2008, increasing damage to some areas and affecting new areas, including the Carbon River Maintenance Area and Milepost 4.8.

Deep gullies amounting to approximately 0.95 mile, or 19 percent of the road's 5.0 mile length were formed in two different locations, at Falls Creek and beyond the Chenuis Falls Picnic Area. Another approximately 600 feet (0.11 mile) (in three different areas) were damaged by removal of part or all of one lane. In addition, other portions of the road, amounting to approximately another mile were scoured such that grading and culverts would be needed if the road was stabilized or fixed. Altogether 1.06 mile is severely damaged, with approximately an additional mile scoured. The Federal Highway Administration (FHWA) Damage Survey Report described specific locations where repair is warranted, noting that more of the forest buffer between the river and the road is gone and that, in some places, the river is as high as or higher than the road (FHWA 2007).

Although some emergency repairs were undertaken in spring 2007 to provide for administrative and visitor access, and in fall 2007 (as soon as it was possible to stabilize the Carbon River Road cultural resource while avoiding impacts to endangered species), the current condition of the road is similar to its condition after flooding in fall 2006.

The Carbon River Road, which in some areas is lower than the aggrading Carbon River bed, has been damaged by flooding many times over its history, and increasingly so over the last few decades. The 2006 flood was the largest recorded at the downstream Fairfax stream gauge. As a result of long-term flooding effects, the park General Management Plan (GMP) Record of Decision (Feb.7, 2002) states that the park would eventually "*close the Carbon River Road to private vehicles when there is a major washout of the road and convert the Ipsut Creek Campground to a walk-in / bike-in camping area.*" The 2006 fall flooding is considered to be the major washout contemplated in the GMP.

This FONSI decision implements the Mount Rainier GMP. Envisioning a "triggering event", the GMP set the framework and the end result for the future of the Carbon River Road, but did not define specific criteria for road closure. The Mount Rainier National Park GMP calls for the preservation of the Carbon River Road corridor so as to have no adverse effect on the Mount Rainier National Historic Landmark District (NHLD) (NPS 2002: 255 see also pages 84 and 113). Although the GMP calls for closure of the Carbon River Road to private vehicles following a major washout, it also provides for continued use by administrative vehicles and conversion of the road to a hike and bike trail. The GMP also identified expansion of the park boundary in the Carbon River area to accommodate replacement facilities for those that would eventually be left inaccessible to private vehicles as a result of the conversion of the Carbon River Road to a hike and bike trail. (This proposed expansion is outside the scope of the Carbon River

Access Management EA because proposed expansion lands have not fully been acquired by the NPS as noted under *Preliminary Options Considered But Dismissed* summarized below).

Because of severe impacts to the Carbon River Road from recent flooding, exacerbated by effects from changes in fall precipitation patterns, the remaining roadway may be unable to be maintained as a trail without the use of motorized vehicles. The effect of recent flood-induced changes to the roadway and actions needed to maintain the corridor as a hike and bike trail were not fully understood during the planning process for the GMP.

Alternatives Analyzed

Environmental analysis was needed to determine how to implement the GMP closure of the Carbon River Road to private vehicles while continuing to provide public access to the area for the next 10-15 years until a more comprehensive plan for visitor facilities and services within the corridor is developed and implemented. In planning for the future of the area, the park's goal (developed by the planning team) is "to preserve year round public access to the northwest corner of the park and to the unique and popular natural, historical and recreational features of the Carbon River Valley." The EA alternatives defined the nature and extent of public and administrative access to the Carbon River area, including for hikers, bicyclists, vehicles, camping, parking and trails, and evaluate the ability to both protect endangered species and the NHLD consistent with the Mount Rainier GMP.

The following five alternatives were analyzed in the Carbon River Access Management EA:

- Alternative 1: No Action (Continue Current Management);
- Alternative 2: Hiking and Bicycling Trail in Historic Carbon River Road Corridor;
- Alternative 3: Public Vehicle Access to Chenuis (3.6 miles): Hiking and Bicycling Trail Beyond;
- Alternative 4: Seasonal / Weekend Shuttle Access for 4.4 Miles: Hiking and Bicycling Trail Beyond; and
- Alternative 5: Wilderness Hiking Trail Reroute.

All of the alternatives meet all or a portion of the primary management direction found in the GMP, including conversion of the road to a hike and bike trail, preservation of the Carbon River Road corridor and its contribution to the Mount Rainier NHLD, creating trail access to the features of the Carbon River area, allowing for shuttle use of the road, or maintaining public vehicle access as long as possible. Although some alternatives would not fully meet the intent of the GMP, such as creating a wilderness trail outside the Carbon River Road corridor that would not preserve the NHLD or allow for bicycle use, these are included below to allow for consideration and analysis of a wide range of options for the area.

Alternative 5 would have modifications not anticipated by the general analysis in the GMP by eliminating bicycle use in the Carbon River area and adding a new trail within the pristine zone (in Wilderness). All alternatives – even the GMP compliant selected alternative – have been determined to have an *adverse effect* on the contribution of the Carbon River Road to the Mount Rainier NHLD through the conservation planning process (see p.16 for additional discussion).

Selected Alternative

Improved Hiking and Bicycling Trail in Historic Carbon River Road Corridor (Preferred / Environmentally Preferred)

Note: References to tables and figures supporting the following discussion have been removed but can be found in the EA.

Consistent with the vision set forth in the 2002 GMP, the Carbon River Road will be reopened to private vehicles only as far as a turnaround at the Old Mine Trailhead (1.2 miles). As noted below, several minor modifications to Alternative 2 are incorporated, based public comments. Between the Old Mine Trailhead

and Ipsut Creek Campground, intact sections of the road will be used as improved trail and new formal improved trail would be constructed through or around flood damaged sections. The improved trail will be constructed 10 feet wide and would have a firm base with good sight distance to accommodate hikers and bicyclists. The sections of improved trail between the intact sections of road generally follow the Carbon River Road, rehabilitating either the existing unimproved trail, rerouting sections to improve sight distance or following the existing intact sections of road up to the Ipsut Creek Trailhead (5.0 miles). The trail would therefore be located within or adjacent to the historic road corridor.

As future flooding occurs and additional sections of the roadway are damaged, more reroute trail would be constructed around the newly damaged sections, with individual, site-specific analysis as appropriate. Where the historic Carbon River Road remains intact (between washout sections), the road would be retained until damage occurred. The formal trail will be built and maintained to provide public access for 10-15 years or until a formal trail can no longer be maintained due to future flooding, cost, engineering limitations, and/or unacceptable environmental impacts.

The width of the trail safely accommodates hikers and bicyclists and occasional administrative ATVs (including a small trailer to transport supplies and materials). Depending on the width and capacity of trail bridges, other small administrative vehicles could potentially also be accommodated. Because the road and trail sections would continue to be affected periodically by flooding, it is likely that access may not be continuously available.

Over time, the two lane roadway now extant in some sections will be converted to formal hiking and bicycling trail as additional flood damage occurs. There would be no formal conversion of undamaged sections of roadway to a trail. Where flood damage has occurred, any remaining roadway would be scarified (broken up) to allow for a 10-foot-wide trail. For some time to come, the Carbon River corridor will include sections of former roadway connected by new sections of improved hiking and bicycling trail. As additional portions of the Carbon River Road wash out in subsequent flooding, they too would be modified and reconstructed as part of the proposed formal trail if feasible. If formal trail could not be constructed, informal trail with similar characteristics would be constructed around or through the new flood-damaged area(s).

Although it is anticipated that new trail sections could continue to be constructed and maintained within 100 feet of the center line of the existing road corridor for the short-term (i.e. out of designated Wilderness), there is a possibility that the trail could no longer be maintained as a formal trail, at which time it would become unimproved, similar to the existing trail in Alternative 1. It is anticipated that future movement of the Carbon River could also eventually preclude bicycle use if, to maintain access, trail sections around or through washed-out areas needed to be constructed in Wilderness. Bicycles are not permitted in Wilderness.

1. Parking, Road and Trail

Parking: Parking will be available at the Carbon River Entrance and the former Carbon River Maintenance Area. Approximately 68 cars may be accommodated (expanded parking for 18 at entrance, 30 along the road, and 20 in the former maintenance area). Non-sanctioned overflow parking that currently occurs outside the entrance would be discouraged. If possible, a new parking area would be identified and constructed outside the Carbon River Entrance on land intended for the boundary expansion or parking would be accommodated via agreement with park partners.

Road: The historic Carbon River Road will be retained between the entrance and the Old Mine Trailhead (a distance of 1.2 miles). Private vehicles would be allowed to drive this section of road up to a turnaround, however, private vehicles would not be able to park at this location or along the narrow, winding road back toward the entrance because of safety concerns, including poor sight distance and problems with space for visitors to exit vehicles and walk along the roadway (without road widening) and potential root or other damage to large, old growth trees. (Some of the largest trees occur along this section of roadway.)

Road culverts between the entrance and the Old Mine Trailhead will be maintained (including periodic cleaning). To protect native char and salmon that occur, or potentially occur within the area, road culverts that have been exposed or that could be disturbed by project work may be removed where they link intermittent or perennial streams, and these crossings replaced with larger fish-friendly (open-bottom or box) culverts or trail bridges.

The intact section of two-lane road between the entrance and Old Mine Trailhead (1.2 miles) will be reconstructed (where needed) and maintained to historic road standards, with a crown and side ditches. Surfacing between the entrance and the Old Mine Trailhead would be compacted, crushed gravel. Over time it is likely that road characteristics, such as the crown and side-ditches could be lost in other currently intact sections of roadway beyond the Old Mine Trailhead, because the heavy equipment needed to maintain these would not be able to access the area.

Old Mine Trailhead Vehicle Turnaround: The Old Mine Trailhead parking area, which currently contains parking for five vehicles, will be converted to a vehicle turnaround area. The turnaround area could accommodate passenger vehicles and include a designated passenger drop-off / pick-up area. The turnaround allows drop-off and pick-up of passengers, but the driver would need to return the vehicle to the maintenance area, entrance or beyond to park before rejoining their group.

Trail: Public access beyond the Old Mine Trailhead turnaround on an improved formal hiking/bicycling trail surface will be within or adjacent to the Carbon River Road historic corridor up to the Wonderland Trailhead. Periodic maintenance of the trail entails fixing and replacing tread when additional washouts occur, and during normal operations.

As needed, when more sections of trail or historic road are damaged by flooding, these would be gradually replaced with improved hiking and bicycling trail (10 feet wide). The intent is to maintain a formal improved trail as long as possible. As noted above, replacement of the trail sections, however, would be dependent on the severity of flood damage, cost, engineering limitations, and/or unacceptable environmental impacts to maintain access within or adjacent to the historic road corridor and outside wilderness. Because the Wilderness boundary is 100 feet from the centerline of the unpaved road, there is only room to implement minor reroutes that would continue to allow for bicycle use in problem areas.

The formal improved multiuse (hiking and bicycling) trail (10 feet wide) will have a constructed base and surface. Appropriate erosion control, drainage and other features, including erosion protection measures, such as grade control structures and check dams created by hanging logs spanning the former road channel would be used where needed. In addition a series of other erosion protection measures, including log crib walls, could be constructed to help to retain the remaining portions of old road and proposed newly constructed formal trail.

Constructing the reroute trail sections 10 feet wide is consistent with recommended guidelines from the American Association of Safety and Highway Transportation Officials (AASHTO) for hiking/bicycling trails. Initially constructed reroute trail around washed-out sections would be similar in width to the Foothills Trail but would not be paved. Instead the tread will be comprised of compacted crushed gravel, suitable for hiking and most bicyclists.

To minimize hiker / bicyclist conflicts and safety issues, design considerations will reduce blind curves and/or abrupt turns in the reroute trail sections as much as possible. The composition of the trail through or around washout sections would have a substantial base constructed of large native rock and/or gabion mattresses. New trail bridges, some with constructed abutments, would be built over streams and low spots prone to future flooding. Approximately 60 cubic yards of fill from nearby gravel bars of the Carbon River would be needed to construct the trail through or around washout sections (in gabion mattress, turnpike and low areas). Additional fill (imported and/or taken from nearby gravel bars) would be needed to construct the road humps, log crib walls, toe-roughened structures and the buried groin (see erosion protection measures section).

There are three washed-out sections in the Falls Creek area where the trail substrate is currently mostly made up of silt and sand with very little native rock with which to build the trail base. In these areas, wide, flat rock filled gabion mattresses would be built. The permeable design structure of the gabion mattresses would both allow for a more substantial trail surface and would allow water to flow within it.

Turnpikes are used to elevate the trail above wet ground. The technique uses fill material from parallel side ditches and from offsite to elevate the trail above the surrounding water table and to allow water to flow underneath the trail. Turnpike construction is used to provide a stable trail base in areas of high water table and moderately- to well-drained soils. Several areas of turnpike will be constructed.

2. Buildings and Structures

Carbon River Entrance: Existing buildings, except vault toilets, are to be removed. The area formerly occupied by these buildings will be reconfigured and replaced with formal parking and picnicking, and a one-room visitor contact station constructed on the south side of the road. The Carbon River Entrance Arch will also be reconstructed.

Carbon River Maintenance Area: All buildings and structures (with the possible exceptions of the weather station and radio tower/shed) will be removed and replaced with formal parking and picnicking. If the radio tower / shed and weather station are retained, a security fence would be constructed. The historic CCC garage would be relocated to boundary expansion lands (two miles west of the entrance; its exact location to be determined by future planning).

Ipsut Creek Campground Area: Both vault toilets will be removed and replaced with suitable backcountry (likely composting) toilets. All asphalt, bumper-stops, buildings, some picnic tables and campsites, and most signs are to be removed. The former chlorinator building and amphitheater storage shed will also be removed. The campground is to be reduced in size and configuration to avoid potential flood hazards, but will continue to contain designated sites and toilets. Bear-proof food storage lockers will be added. The Ipsut Creek Bridge, constructed in 1979-1980 and measuring 62 feet by 17.5 feet is to be retained as long as it is viable for public trail use and doesn't impede hydrological conditions. If either of these two exceptions occurred, it would be removed and replaced (if needed) with a suitable trail bridge.

Ipsut Creek Patrol Cabin: Ipsut Creek Patrol Cabin will be reconstructed on higher ground in one of the two former parking areas at Ipsut Creek (to be determined by future planning).

3. Erosion Protection Measures

Engineered Logjams (ELJs) at Entrance and Maintenance Area: Erosion protection structures (a series of two rock barbs / four ELJs) will be constructed along the riverbank at or near the Carbon River Entrance and former maintenance area (logs acquired from the riverbed and/or imported).

To maintain the remaining entrance portion of the historic Carbon River Road, up to four ELJs may be constructed between the entrance and the maintenance area (Milepost 0 to Milepost 0.152). Depending on timing, equipment and materials, two of the ELJs near the maintenance area would first be constructed as rock barbs and then converted to logjams (with rock ballast).

Carbon River Entrance (Milepost 0): To protect the Carbon River Entrance from additional bank erosion that could threaten the vault toilets, parking and other facilities, the edge of the river nearest the Carbon River Entrance facilities will be stabilized to minimize future erosion. In this area, which has been protected by placed riprap and a natural logjam, the natural logjam would be augmented by two log reinforcing structures, upstream and downstream of the natural log jam – creating one large log jam.

Approximately 10 logs, with intact root-wads if possible, would be added and would be anchored to the bank (acquired from the riverbed if possible or imported if needed). The logjam would be approximately 40-60 feet long by 20 feet wide and four feet high above the riverbed. The structure shall extend below

the riverbed approximately 10-15 feet to the point of maximum scour, as determined by an engineer, to resist future flood flows. Approximately 20 cubic yards of river cobble would also be used as ballast. Another logjam could also be constructed in this area or upstream, closer to the maintenance area.

Carbon River Maintenance Area (Milepost 0.152): To protect the maintenance area from additional bank erosion threatening buildings and parking, approximately three additional logjams may be constructed:

- 1) **One** new log reinforced structure and **one** temporary rock groin (barb) – to be converted to ELJ ballast;
- 2) **One** temporary rock groin (barb) – to be converted to ELJ ballast and one log reinforcing structure downstream of the natural log jam, currently upstream of the maintenance area – creating one large log jam; and
- 3) **One** new flow deflection ELJ upstream of the natural log jam (will use rock from temporary barbs as ballast).

Each logjam requires approximately 104 logs ranging in length from 8-45 feet long and with diameters of 8-24 inches, including some logs with root-wads attached (acquired from the riverbed if possible or imported if needed). Each also require approximately 30 cubic yards of slash for infill and 50-100 cubic yards of river cobble and soil per logjam for ballast and topping material.

Construction and maintenance of two temporary rock barbs and four ELJs would enhance the deposition of sediment and debris in front of the barbs or logjam and effectively deflect flow away from the eroding riverbank. Water around the structures would create an eddy in front of them enhancing fish habitat (in the long-term) by providing areas of rest from otherwise strong currents in the river and overhanging wood for cover. The ELJs would encourage deposition behind the structure, providing bank protection in areas downstream of the structure itself. These structures would also be enhanced with bioengineering (native woody plant cuttings) to improve their habitat value and survivability. The extended in-water work season for the main stem Carbon River is July 9 to August 22 to protect salmonid eggs and fry incubating within stream gravels. This applies to work associated with placement of engineered logjams or other bank protection structures along the Carbon River.

Road Humps (rock-cored log cribs with and without pilings, rock-cored humps, and gravel covered log humps): A series of 5-9 road humps would be constructed between the entrance and the Old Mine Trailhead in locations to be determined. Another approximately an additional 15 road humps would be constructed up to Milepost 4.4.

The road humps are to be built within the existing road to transport flood water from tributaries of creeks that run across the road and to channel snowmelt. Road humps constructed of rock, wood or both, and placed across the road at an angle or perpendicular to the direction of flow and are intended to stop head-cutting erosion of the road surface. This head-cutting erosion has occurred where tributary streams combine with Carbon River flow during flooding down or alongside the road surface.

Road humps capture water flowing down the road and direct it across the road. Each rock-cored hump requires imported large rock (2-3 foot diameter) and native soil; amounts depend on size and location. Log humps require 1-2 logs covered with native cobble rock and gravel; amounts would depend on size and location.

Grade Control Structures (Drop Structures): These consist of emplaced logs that allow for fish passage and would effectively prevent head-cutting erosion from the release of stored sediment on creeks where large culvert removal is planned. The selected alternative calls for removal of two very large culverts and their replacement with either trail bridges or fish friendly culverts, an undertaking that may potentially release a large amount of sediment into the stream channels where these culverts are located. Road fill removed from these locations would be staged nearby and used to create road humps. To minimize the potential effects of this release of sediment a series of approximately 2-3 grade control structures will be constructed in Ranger Creek and on an unnamed tributary to the Carbon River near Chenuis Falls

(hanging culvert location), upstream of the culverts prior to their removal. There is also the potential for these grade control structures to be constructed on a Falls Creek tributary to minimize the effects of the same kind of erosion release. In-water work is restricted to the period of July 16 to August 15 for all Carbon River tributaries streams to protect salmonid eggs and fry incubating within stream gravels.

Prior to removal of the hanging culvert in the unnamed tributary, one or two grade control structures may be constructed upstream to prevent future head-cutting. The unnamed tributary channel is located toward Ipsut from Ranger Creek, west of the Chenuis Picnic Area. If head-cut erosion causes the tributary culvert to capture upper Ranger Creek flow after the culvert is removed, this may eliminate the need for one of the drop structures. The structures would consist of a series of three logs. As with the log-span check dams in the Falls Creek channel, these accommodate fish passage.

Use of Logs from Ipsut Creek Road Bridge: Some consideration would also be given to removing logs from the logjam at the Ipsut Creek Bridge to reduce importation of logs for erosion protection measures.

Erosion protection measures initially recommended by Geomax Engineering, Inc. and ENTRIX, Inc. consultants have evolved as additional information about the Carbon River corridor and susceptibility to flooding has become available. Proposed erosion protection measures were not intended to provide protection from flooding, which may continue to occur. Rather, some measures are intended to change the character of the flooding that occurs from deep scouring and head-cutting to sheet flow, quickly diverted off the road. Other measures are intended to correct or minimize wide-scale riverbank erosion along the edge of the road.

The following types of erosion protection measures are included in the project work: additional road humps, span-log check dams, toe-roughened crib walls or toe-roughened gabions, and a buried groin.

Milepost 0 to Milepost 1.4 Carbon River Road and Milepost 1.379 – 4.252: A portion of the Carbon River Road between the entrance and the Old Mine Trailhead (1.2 miles) would be maintained to protect entrance area facilities and preserve an intact section of the Carbon River Road. To protect this area between the entrance parking area and the Old Mine Trailhead, a series of five to nine rock-cored road humps would be added to divert water flow off the road and to avoid increased damage to this section. This part of the road would also be repaired by reestablishing drainage ditches along both sides of the road. Another approximately 15 road humps would be constructed between Milepost 1.379 and Milepost 4.252. Each road hump would require 5-10 logs and would be designed in the field. It is possible that up to 500-1,000 cubic yards of rock could also be needed, depending on the location.

Additional Potential Log Humps: In the future, as large trees fall over the intact road or sections of reroute trail, leaving the fallen tree in place may occur. Gravel could be brought in and used to create a gradual ramp up and over the log, thereby creating a log hump in the road/trail. These log humps would function as a flood damage protection feature to reduce the velocity of future floods, to divert floodwater from the road/trail corridor, and to minimize flood damage from scouring and over-topping. These ramps would be designed to comply with accessibility standards to the greatest extent possible to allow for ongoing use of hiking, bicycling, and administrative ATV access, but may not be fully accessible.

Falls Creek (Milepost 1.457 – 1.959) Span-log Check Dams: Neither Geomax Engineering, Inc or ENTRIX, Inc. had recommendations that could alter the character of flooding in the Falls Creek washout area over the long-term because this area is up to 16 feet lower than the river and there are numerous points of entry from the river channel toward the road. Both consultant firms recommended rerouting the road (see *Alternatives and Preliminary Options Considered but Dismissed* summarized below). ENTRIX consultants, however, also suggested that some protection and possible refilling of the channel, could potentially be provided by creating check dams from existing downed trees (logs) spanning the road in locations where the road is now an active channel of the Carbon River. Log check dams within the gully may reduce additional head-cutting and trailside bank erosion and promote sediment deposition.

To implement this measure, fallen trees spanning the channel would be trimmed to a width larger than the channel and the cut end pulled upstream and then chocked or anchored into the stream bank (root wad side) from the confluence of this side channel of the Carbon River to the avulsion of the main stem of the Carbon River.

This gully, which is up to 10 feet deep in places, was caused by the Carbon River flowing down the road and eroding it away. Approximately 29 existing logs span the old roadway in the Falls Creek area. The logs vary from 1-foot-dbh to 5-6 feet dbh. These logs would be cut to lie across the new channel but would allow for fish passage by cutting a notch in the span log. Log ends with root wads still on or embedded in the river bank would be moved to lie across the channel leaving the root wad in place if possible. Cut ends of the logs would be set into the bank or wedged into the bank with machinery to prevent them from washing down the channel. Gaps under logs would be filled with wood and or larger rock on the upstream side of the log. Logs would be placed at intervals to allow natural aggregate from river flows to accumulate behind the logs. Log placement would help to dissipate flood water energy at check dams and, ideally to deposit material between the dams to reduce river bank erosion within the gully and ongoing erosion of the former road. Equipment would be limited to use in the new channel from July 9 – August 22, unless the channel is dry. It is also possible that future flows in the channel may erode the north bank of the channel, widening it and preventing damage to the south bank.

Because of bull trout presence, construction of these check dams would be modified to allow fish passage at the lower end of the spanning log. According to the USFWS, eight inches is the maximum drop for the span log to enable fish passage.

Toe-roughened Gabion or Toe-roughened Log-crib Wall: There are four sections where a portion of the road (either one lane or two) has been eroded away between Milepost 3.463 and 4.470. At three of these locations (Milepost 3.463, Milepost 3.939, and Milepost 4.470), erosion protection structures would be constructed. At the fourth location (Milepost 3.769) where the road and the river are at the same level, a hump would be constructed to redirect flow back to the Carbon River and/or away from the road.

The three log-crib walls or toe-roughened log-crib walls would span the washed out sections of road ("bites") that are experiencing continuous bank erosion. They would be constructed lengthwise through the washouts and would then be filled with rock and soil to form the foundation for the new trail, while providing bank protection. The three bite locations are intermittently dry during the year.

Quantities of rock and log are estimated below. For the log-crib wall, the number and size of logs would depend on length and height of the structure but would be approximately 542 cubic yards. This would be taken from nearby gravel bars on the Carbon River (above the ordinary high water mark). More than 400 feet of logs would also be needed for the cribbing for a 100-foot long structure. Although some logs would be secured locally, others would be imported.

Proposed log-crib wall:

- Milepost 3.459 (250 feet long x 15 feet wide) (1500 cubic yards rock) (95 logs)
- Milepost 3.463 (240 feet long x 15 feet wide) (1,300 cubic yards rock) (90 logs)
- Milepost 4.470 (380 feet long x 15 feet wide) (2,060 cubic yards rock) (150 logs)

Proposed log crib wall or toe-roughened crib:

- Milepost 3.939 (200 feet long x 15 feet wide) (1,084 cubic yards rock) (75 logs)
- Milepost 4.802 (100 feet long x 15 feet wide) (542 cubic yards rock) (40 logs)

Proposed complex log-crib wall or toe-roughened log-crib wall:

- Milepost 4.658 (50 feet long x 15 feet wide) (704 cubic yards rock) (20 logs)

Launchable (Buried) Groin (Milepost 4.621): This structure would be constructed in a dry area approximately 60 feet from the Carbon River. Because it is anticipated that the Carbon River would

eventually erode the area between where it is now and the proposed structure, the groins would be buried in the existing (dry) road, and would likely later be exhumed by floodwaters. The buried groins would protect approximately 590 feet of trail / road and would not require diversion of the Carbon River to construct.

Together the erosion protection measures (including engineered logjams, road humps, span log check dams, log crib walls or toe-roughened crib walls, and a buried groin) are intended to retain the formal improved trail; however these types of structures implemented to this degree have not been tested in a dynamic environment. Nonetheless, it is likely that the character of the damage from future flooding would be reduced by implementation of these measures.

4. User Groups Accommodated

Public Access: Private vehicles can continue to drive to the Carbon River Entrance, where expanded parking will be available. Private vehicles could also continue to drive to a turnaround at Milepost 1.2 to pick-up or drop-off passengers. From there, hikers and bicyclists would access an improved hiking and bicycling trail to Ipsut Creek Campground.

Accessibility: The first 1.2 miles of the Carbon River Road and portions of the Carbon River Rainforest Trail (boardwalk areas) would continue to be suitable for assisted wheelchair access for as long as possible. Use of small electric motorized wheelchairs along the first 1.2 miles is to be accommodated subject to existing conditions.

In addition, trail construction and maintenance is intended to comply with the federal Architectural Barriers Act standards to the greatest extent possible up to Ipsut Creek Campground, but may not fully meet these standards. Over time, however, as more flooding occurred and conditions changed in the corridor, accessibility is likely to gradually worsen. Although the intent would be to maintain a formal improved trail throughout the corridor for as long as possible, over time some reroute sections may become informal unimproved trail, making these more difficult to traverse by people with limited mobility.

5. Visitor Use Activities

Hiking: Hiking continues to be accommodated. The Chenuis Falls footlogs across the Carbon River are normally in place June to September but are periodically unavailable because they are routinely washed out once to several times each year during normal high spring runoff.

Distances to facilities and attractions will vary. Without drop-off / pick-up at the turnaround, distances would be 1.2 miles longer in each direction. Access to some areas may be delayed for a few days to a few weeks or months during future flood damage.

Bicycling: Under the selected alternative, visitors can bicycle along a trail or road to Ipsut Creek Campground. Bicycle racks will be placed at Carbon River Entrance and Carbon River Maintenance Area and at area trailheads (Old Mine, Green Lake, Chenuis and Wonderland).

Picnicking: Picnic tables will be available at both the entrance and the former maintenance area. Picnicking is also retained near the Chenuis Falls Trailhead and at Ipsut Creek Campground.

Camping: To accommodate ongoing camping, Ipsut Creek Campground will be converted to a hike-in / bike-in backcountry camp with a minimum of 15 individual and three group sites (the latter are to be created either by combining former individual sites or by establishing new sites in former parking areas).

6. Orientation / Fee Collection / Interpretation / Administration

Orientation: Some visitor orientation functions would continue to be provided at the Carbon River Entrance area because this site is not connected to the boundary expansion lands and it is highly likely that many visitors would arrive at the Carbon River Entrance without stopping at the boundary expansion area. Remaining visitor orientation functions would be provided at the new Carbon River Ranger Station (to be developed) in the boundary expansion area. Visitor orientation at the entrance would occur from

the newly constructed visitor contact station (see *Buildings and Structures* above). In addition, there would be additional orientation in the campground area available at the Ipsut Creek Patrol Cabin through seasonal use by employees and volunteers.

Fee Collection: Entrance fees would continue to be collected at the entrance. This may occur either in person when a Park Ranger is on duty or via a self-pay fee collection canister (similar to the self-pay fee collection at the Paul Peak trailhead on the road to Mowich Lake). Entrance fees could also be collected at the new Carbon River Ranger Station (formerly the Thompson home) along the main road within the nearby boundary expansion area.

Interpretation: In addition to interpretive signs at the entrance to highlight the condition of the Carbon River Road / Trail, there will be exhibits at a new overlook in the former maintenance area, where erosion protection measures and Carbon River changes would be highlighted. Only minimal visitor facilities are to be located at the Carbon River Entrance due to its ongoing vulnerability to flood damage. These facilities include visitor information, as well as picnicking and restrooms. There will also be new interpretive exhibits at the Old Mine Trailhead, Chenuis Falls Picnic Area and at Ipsut Creek Campground as well as floodplain and volcano evacuation route signs.

Emergency / Administrative Access: To the extent possible, administrative vehicle (ATV with trailer or equivalent) access will continue in the non-wilderness corridor for law enforcement, trail crew materials and supplies and emergencies. (Note: All administrative operations may initially or eventually include more use of helicopters than has occurred in the past, particularly for emergencies.)

The improved trail could be used for all-terrain vehicle access to transport materials and supplies for trail repair and for emergency access. Over time, however, this capability could diminish as additional washouts occur or because of inability to effectively maintain sections of improved trail.

Hazard Tree Management: Hazard trees identified through field surveys at Ipsut Creek Campground would be treated through implementation of the Hazard Tree Management Plan (Finding of No Significant Impact April 15, 2010) based on evaluating tree failure potential and risk to campsites retained or developed.

7. Carbon River Road and Facility Maintenance / Restoration

The width of the historic road corridor will be retained where possible, including the existing canopy width and roadside vegetation, however to facilitate restoration, scarification of approximately 10 feet within the remaining 20-foot wide sections of roadway may occur in areas of flood damage. Where needed, cross-ditch culverts may be retained and intermittent and perennial stream culverts replaced with trail bridges. The Green Lake, Chenuis and Ipsut Creek trailhead parking areas will retain space for bicycle racks and administrative ATV parking. Remaining portions of these areas would be obliterated.

8. Link to Future Use

Upon completing acquisition of boundary expansion lands, the park would begin planning for reestablishment of frontcountry (drive-in) camping and administrative facilities outside the Carbon River Entrance, as called for by the GMP. Access to these facilities and the existing Carbon River Corridor area would then be linked.

Changes from Alternative 2 in the Carbon River Area Access Management EA

In response to public comment, the following modifications have been incorporated into Alternative 2 (as presented in the EA) in crafting the selected alternative. There are no new substantive elements – each of the changes derive from the original range of alternatives analyzed in the EA and which were subject to public review. Moreover, there is no substantive change in magnitude of impact in comparison with original determinations made.

- Accessible parking was dropped from the Old Mine Trailhead to provide for increased space for vehicles dropping off or picking up passengers. Accessible parking will be provided in designated parking areas at the entrance and in the former maintenance area.
- The Old Mine Trailhead Turnaround will be used for passenger drop-off only. Unloading of bicycles would be done at designated parking areas.
- Ipsut Creek Campground for the foreseeable future will consist of 15 individual campsites and three group sites. Depending on future flood events or need to manage hazardous tree conditions or wildlife habitat, this number could slightly increase or decrease (but the current capacity of 31 sites will not be maintained).
- A backcountry campsite (containing four individual sites and one group site) will be located along the Wonderland Trail toward Mowich Lake (about one mile from Ipsut Creek Campground).
- Flexibility in managing the gate closure at the entrance will be provided based on observed congestion. If excessive congestion at the Old Mine Trailhead Turnaround occurs either regularly or during peak use, the gate at the entrance may be closed to improve the visitor experience.
- Because vehicle, bicycle and hiker uses commingle on the first 1.2 miles of roadway, speed limits will be strictly enforced.
- Depending on results of investigation into accessibility guidelines, ADA access may include the use of small, ambulatory motorized devices.
- Day use opportunities close to the entrance, including the currently unmaintained Boundary Trail which provides nearby access to subalpine areas and distant views, will be highlighted through interpretive publications.
- Interpretation and covered benches are to be added at the Old Mine Trailhead Turnaround.
- Future planning for the boundary expansion area may include a peak use shuttle to take visitors from the boundary expansion area, parking outside the Carbon River Entrance and/or parking at the entrance to the Old Mine Trailhead Turnaround, and evaluation of potential partnerships regarding additional access opportunities in the Carbon River corridor.

Summary of Other Alternatives Considered

Four other alternatives were fully considered in the EA.

Alternative 1: No Action (Continue Current Management)

Public access would continue to be via the current unimproved hiking / bicycling trail (4-6 feet wide) within the Carbon River Road historic corridor between the Old Mine Trailhead and Wonderland Trailhead. The road would continue to be gated just beyond the maintenance area. Parking would be allowed at the entrance and along the road up to the maintenance area. Informal and non-NPS sanctioned parking would also likely continue to occur on county easement and USFS land outside the entrance. The Carbon River Road between the Carbon River Entrance and the Old Mine Trailhead (1.2 miles) would be retained to protect entrance area facilities. As called for by the GMP, upon completion of acquisition of boundary expansion lands, planning for relocation of camping and administrative facilities outside the Carbon River Entrance would occur.

There would be no major repair of the damaged sections on the Carbon River Road. Instead, the current unimproved hiking / bicycling trail (4-6 feet wide) within the Carbon River Road historic corridor between the Old Mine Trailhead and Wonderland Trailhead would be maintained and reconstructed as necessary following flood damage to a similar condition. The Ipsut Creek Road Bridge would be retained for hiking access. No public vehicle access would be permitted beyond the gate at the maintenance area.

Alternative 3: Public Vehicle Access to Chenuis (3.6 miles): Hiking and Bicycling Trail Beyond

The Carbon River Road would be reopened to public vehicles up to Chenuis (3.6 miles). Beyond Chenuis, there would be an improved trail up to Ipsut Creek Trailhead (1.4 miles). The trail between Chenuis and the Ipsut Creek Trailhead would be the same as in the selected alternative. Also as in the selected alternative, because the road could be affected by future flooding, a public vehicle turnaround at

the Old Mine Trailhead (1.2 miles) would also be constructed. In the interim, however, this area could be used for trailhead parking.

The road and trail corridor would be open to and would accommodate hikers and bicyclists to its end and public vehicles up to Chenuis. Washed out sections of road would be reconstructed as a one-lane road (12 feet wide) with turnouts (between the Old Mine Trailhead turnaround and Chenuis). Beyond Chenuis, the formal hiking and bicycling trail (10 feet wide) would be constructed within or adjacent to the historic Carbon River Road corridor. To allow for future modifications to the road below Chenuis, where the road is intact between washout sections, the full-width of the historic road corridor (20 feet) would be retained where it exists. Above Chenuis, only approximately 300-400 feet of road is intact and this would be reconstructed as trail. Because this alternative would allow heavy equipment to reach the Ipsut Creek Bridge, the bridge would be demolished and removed.

As in other alternatives, because the road and trail sections would continue to be affected periodically by flooding, it is likely that, as in the past, private vehicle access would not be continuously available. Over time, the two lane roadway would be converted to one lane road with turnouts as additional sections washed out. There would be no conversion of the intact portions of roadway unless current or future damage precluded maintaining them.

Although the intent would be to maintain a drivable road corridor up to Chenuis for as long as possible, if future damage occurred that precluded this, the road could revert to a trail, similar to the selected alternative.

Alternative 4: Seasonal / Weekend Shuttle Access for 4.4 Miles: Hiking and Bicycling Trail Beyond

Public access from the Old Mine Trailhead turnaround would be via a road open to seasonal / weekend shuttles up to Milepost 4.4 and then via an improved trail between Milepost 4.4 and Wonderland Trailhead (0.6 miles). As in Alternatives 1-3, the corridor would continue to be open to hikers and bicyclists year-round. Being an element common to all of the action alternatives (2-5), the first 1.2 miles of the Carbon River Road would be used to allow seasonal passenger drop-off / pick-up at a turnaround constructed near the Old Mine Trailhead for hiking and bicycling. As in the selected alternative and Alternative 3, the trail portion of the access route would accommodate hiking and bicycling and administrative ATVs as long as possible.

In washout sections, a one-lane road (10 feet wide) would be constructed within the historic Carbon River Road corridor up to Milepost 4.4. Beyond Milepost 4.4, the formal hiking and bicycling trail (10 feet wide) would be constructed within or adjacent to the historic Carbon River Road corridor up to Ipsut Creek. Its construction would be the same as in the selected alternative. As in Alternative 3, where the road is intact between washout sections, the full-width of the historic road corridor (20 feet) would be retained. As in Alternative 3, this would allow for future modifications to the road. Remaining road above Milepost 4.4 would be reconstructed as 10-foot wide trail, including scarification (mixing of the top 6-8 inches of gravel and soil) of any remaining sections of 20-foot wide roadway to facilitate revegetation.

Approximately 10,000 cubic yards of fill would be required to reconstruct the one lane road to Milepost 4.4. As in the selected alternative and Alternative 3, the facility (road and trail) would be constructed with appropriate erosion control, drainage and other features, including erosion protection measures, such as grade control structures and rock barbs where needed (elements common to all action Alternatives).

As in Alternative 3, over time, the two lane roadway would be converted to one lane access road as additional sections washed out. There would be no conversion of the roadway unless current or future damage precluded maintaining it. Although the intent would be to maintain a shuttle access road corridor up to Milepost 4.4 for as long as possible, if future damage occurred that precluded this, the road could revert to a trail, similar to the selected alternative. As in other alternatives, because the road and trail sections would continue to be affected periodically by flooding, it is likely that, as in the past, vehicle

access would not be continuously available. As in Alternative 3, the Ipsut Creek Bridge would be demolished and removed.

Alternative 5: Wilderness Hiking Trail Reroute.

Long-term public access would be via a wilderness hiking reroute trail (36-inches wide) from the Carbon Rainforest Loop Trail to the Ipsut Creek Trailhead (approximately 5.14 miles). While the wilderness reroute trail was under construction, the existing Carbon River Road unimproved trail (4-6 feet wide) would continue to provide interim access to Ipsut Creek (5.0 miles) and would continue to be used for hiking and bicycling. Until the reroute trail was complete, this unimproved trail would continue to be repaired as necessary following winter storms or future flood damage. Once the wilderness reroute trail is complete the unimproved trail would be closed, ending bicycle access in the area.

Until the wilderness trail was constructed, the Old Mine Trailhead turnaround could be used for access to the unimproved trail. Later, this turnaround could be used for access to the wilderness trail via the Old Mine Trail between the road and the wilderness trail. Following construction of the wilderness reroute trail; use of the unimproved hiking and bicycling trail would be discontinued pending future damage. Eventually, a new backcountry camp would be planned and developed and the use of Ipsut Creek Campground would be discontinued as a backcountry camp.

The wilderness reroute trail would offer a new loop trail opportunity from the entrance to the Old Mine Trail and then back on the new wilderness reroute trail. It would also offer spur trail hiking opportunities on intact sections of road, such as the section from beyond Falls Creek up to the Chenuis Falls Trailhead. As with the road, it would continue to offer access to the Old Mine Trailhead, Green Lake Trailhead, Chenuis Falls Trailhead and Ipsut Creek Trailhead. A small portion of the reroute trail (0.25 miles) would follow existing road (narrowed to trail width) around the bedrock knob below Chenuis.

Preliminary Options Considered But Dismissed

Under NEPA, an alternative may be eliminated from detailed study for the following reasons [40 CFR 1504.14 (a)]:

- Technical or economic infeasibility;
- 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; and therefore, would require a major change in that plan or policy to implement; and
- Environmental impacts too great.

The following alternatives and actions or variations were considered during scoping and the design phases of the project, but because they met one or more of the above criteria, they were not carried forward for full analysis. Detailed explanation for rejecting each of these was provided in the EA.

1. Road Access to Ipsut Creek Campground via North Side of Carbon River
2. Partial Closure of the Carbon River Road (Other Locations)
3. Delayed Closure: Keep the Carbon River Road open as long as possible for public vehicle access (rehabilitate washouts and maintain sustainable road to Ipsut Creek Campground). Reconstruct the Carbon River Road as a two lane road, one lane road with turnouts or one lane road for shuttle access.
4. Replacement-in-Kind of the Carbon River Road: Maintenance of the Full Historic Road Corridor
5. Reroute the Carbon River Road
6. Wilderness Boundary Adjustment to Reconstruct Carbon River Road Outside of the Floodplain
7. Road Reconstruction Options
8. No Relocation of the Ipsut Creek Cabin
9. Relocate Ipsut Creek Patrol Cabin to Green Lake Trailhead Area
10. Equestrian Use of the Carbon River Road
11. Reestablish Ipsut Creek in its Old Channel / Prevent Carbon River from Flowing into Ipsut Creek
12. Allow parking along the Carbon River Road up to the Old Mine Trailhead

13. Preserve a section of historic road and acknowledge its significance on the ground and in an interpretive display in the new boundary expansion visitor center
14. Allow the public to use electric bikes, motor bikes, scooters, and all terrain vehicles (ATVs) on the Carbon River Road
15. Reestablish frontcountry camping
16. Provide vehicles on the other side of the washouts to facilitate access
17. Erosion Protection Measures Not Incorporated into Alternatives 2-5 suggested by Geotechnical Consultants

Environmentally Preferable Alternative

In accordance with NPS Director's Order 12, Conservation Planning, Environmental Impact Analysis and Decision-making, the NPS identified the environmentally preferred alternative in the EA. There is no change in this determination.

The environmentally preferred alternative is determined by applying the criteria suggested in the National Environmental Policy Act (NEPA) of 1969, which is guided by the Council on Environmental Quality (CEQ). The CEQ (46 FR 18026 – 46 FR 18038) provides direction that *"the environmentally preferable alternative is the alternative that will promote the national environmental policy as expressed in NEPA's Section 101 (b)"*, which considers:

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

The environmentally preferred alternative is *"the alternative that causes the least damage to the biological and physical environment; it also means the alternative which best protects, preserves, and enhances historic, cultural, and natural resources"* (46 FR 18026 – 46 FR 18038). According to NPS NEPA Handbook (DO-12), through identification of the environmentally preferred alternative, the NPS decision-makers and the public are faced with the relative merits of choices and must clearly state through the decision-making process the values and policies used in reaching final decisions.

Generally, these criteria mean the environmentally preferred alternative is the alternative that causes the least damage to the biological and physical environment and that best protects, preserves, and enhances historic, cultural, and natural resources (46 FR 18026 – 46 FR 18038).

Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations

All alternatives would meet this criterion; however those that have greater long-term impacts on the environment would meet it less fully. As a result, Alternatives 1 and 2 would best meet this criterion. Alternatives 3, 4, and 5 would have more adverse effects on more resources. In Alternatives 3 and 4 these would be from partial reconstruction of the road and in Alternative 5 from loss of GMP pristine zone resources from construction of five miles of new trail.

Assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings

All alternatives would meet this criterion. Alternatives 3 and 4, however, would best meet this criterion because they would allow for retention of more of the historic Carbon River Road corridor and would therefore have more beneficial effects on cultural resources.

Attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences

The selected alternative would best meet this criterion because there would be a balance between reducing adverse effects combined with a broad range of visitor use opportunities. Although visitor use opportunities would be greater in Alternatives 3 and 4, impacts would also be greater. Alternatives 1 and 5 would provide fewer visitor use opportunities by reducing opportunities to some visitors (no accessibility in Alternative 1 and hiking only opportunities in Alternative 5).

Preserve important historic, cultural and natural aspects of our national heritage and maintain, wherever possible, an environment that supports diversity and variety of individual choice

Although all alternatives would have an adverse effect on the contribution of the Carbon River Road to the National Historic Landmark District, Alternatives 3 and 4 would best preserve cultural resources. Similarly, although all alternatives would adversely affect marbled murrelets, northern spotted owls and bull trout, Alternatives 1, 5 and the selected alternative would have the fewest of adverse effects and would best preserve natural resources. Alternatives 3 and 4 allow for more visitor use opportunities because in comparison the selected alternative has less drivable road and Alternative 5 is minimally accessible and ends bicycle use. Alternatives 3 and 4 would best meet this criterion.

Achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities

Alternative 3, followed by Alternatives 4, the selected alternative, Alternative 1 then 5 would allow the most use of the Carbon River area, while Alternative 1, followed by Alternatives 5, the selected alternative, Alternative 4 and 3 would use the fewest resources. The selected alternative would best meet this criterion because it would both allow for visitor use and balance impacts on resources.

Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources

The selected alternative would best meet this criterion because it would improve resource conditions over Alternative 1 and would do so while importing the fewest additional resources, compared to Alternative 5 which would also import the fewest additional resources but would have impacts on an undisturbed area.

Conclusion: Alternative 1 would best meet one criterion. The selected alternative would best meet four criteria. Alternatives 3 and 4 would best meet two criteria. Alternative 5 would not best meet these criteria. Therefore, the selected alternative is the environmentally preferable alternative.

Why the Selected Alternative Will Not Have a Significant Effect

The NPS has determined that the Selected Alternative can be implemented with no significant adverse effects on soils, water quality, vegetation, wildlife, special status species, prehistoric and historical archeology, ethnographic resources, historic structures and cultural landscapes, visitor experience, or park operations. NEPA requires that decision-making regarding the analysis of significance be based on analysis of the proposed action with respect to the following factors:

- The selected alternative has a wide range of beneficial and adverse effects (see *Measures to Minimize Environmental Harm* below).
- The selected alternative will not adversely affect public health or safety.
- The selected alternative will not significantly impact the unique characteristics of the area, including prime farmlands, wetlands, wild and scenic rivers or ecologically critical areas. Adverse

effects and mitigation measures for floodplains and wetlands have been identified and are documented in the two Statements of Findings attached to this FONSI.

- The effects on the human environment are known, and controversial aspects of the proposed project that surfaced during the environmental analysis process were initially examined as part of the General Management Plan.
- The selected alternative neither establishes an NPS precedent for future actions with significant effects, nor represents a decision in principle about a future consideration.
- The selected alternative will have an adverse effect on contributing features to historic properties (the contribution of the Carbon River Road to the Mount Rainier National Historic Landmark District) that is mitigated by conditions established in a Memorandum of Agreement (MOA, Attachment B) with the State Historic Preservation Officer and the Advisory Council for Historic Preservation. Adverse effects from the deconstruction and reconstruction of the Ipsut Creek Patrol Cabin are identified and would be mitigated based on conditions in a separate MOA (Attachment C). The cultural resources within the area of potential effect in the Carbon River Corridor will not be impaired through implementation. Upon implementation of the selected alternative, the cultural resources and values of the Carbon River Corridor will continue to exist in a condition that will allow the American people to have present and future opportunities to enjoy them. The historic Carbon River Road corridor will continue to exist in a condition that can be experienced and enjoyed as both a scenic route and as one segment of the NPS's first master planned infrastructure. The Ipsut Creek Patrol Cabin will be reconstructed according to the Secretary of the Interior's Standards for Reconstruction in a nearby and similar context to the original site, where it will still be used for park ranger operations and visitor contact. In addition, the selected alternative will be implemented according to the stipulations of two Memoranda of Agreement developed in consultation with the State Historic Preservation Office and the Advisory Council for Historic Preservation to successfully resolve adverse impacts.
- The selected alternative may affect and is likely to adversely affect some listed species and their habitat. As a result, additional conservation measures have been designed to limit these potential effects based on consultation with the USFWS and the NMFS. Direct or indirect adverse and beneficial effects may occur, but are not expected to cause a change in abundance or distribution of local populations that would lead to a decrease in the viability of the species and regional populations.
- No significant cumulative effects and no highly uncertain, unique or unknown risks were identified during preparation of the EA or during the public review period.
- The selected alternative will not violate any federal, state or local environmental protection laws.

Measures to Minimize Environmental Harm

The following summary identifies the impacts and mitigation required for satisfactory implementation of the selected alternative. This summary assigns responsibility for ensuring the measures which minimize, eliminate or avoid these impacts are implemented.

All mitigation measures described in this section will be implemented. Further mitigation measures may be developed in response to ongoing formal and informal consultation on this project and may also augment the measures described below. The measures identified below are designed to ensure that impacts to park natural and cultural resources, visitor use/experience and park operations are avoided, eliminated, or minimized.

Resource	Impact	Measures to Avoid, Minimize or Mitigate Impacts	Responsibility
Air Quality	The selected alternative would have a long-term minor adverse impact from continued travel to the area and when visitors are redirected or displaced to other areas as well as from long-term maintenance of the trail, parking areas and short section of roadway. Long-term beneficial effects would occur from decreased dust emissions related to decreased travel on unpaved roads and from a continuation of reduced vehicle traffic in the park. Short-term adverse effects would occur from construction and maintenance, including erosion protection measures, new trail and removal or construction and maintenance of buildings and structures.	• Chipping or mulching vegetation on site rather than disposing of it offsite or burning it. • Spraying water over exposed soil, particularly during dry conditions to minimize fugitive dust. • Covering trucks transporting cut or fill material along highways to reduce or eliminate particle release during transport. • Encouraging contractor and NPS employees to travel in groups to and from the project site to the extent possible (rather than in multiple separate vehicles). • Revegetating bare and staging areas as soon as possible (upon final grading or when staging area is no longer in use). • Minimizing the extent of vegetation removal. • Encouraging the use of local labor sources and large-volume material delivery where possible to minimize trip generation during construction activity. • Using low VOC paints, solvents and other chemicals in building construction. • Restricting idling of construction vehicles and equipment to no longer than 15 minutes when not in use. • Using a biodiesel fuel mix rather than traditional diesel fuel. • Minimizing use of administrative ATVs.	Project Manager Biologist
Conclusion	Overall adverse impacts from the selected alternative would be minor and would primarily be related to short-term construction and maintenance activities. Long-term beneficial effects would occur from restoration and a reduction of vehicles on the roadway. Compared to existing conditions, these impacts would remain localized and would not be detectable over ambient conditions except in the vicinity of the roadway. There would be no major adverse effects to air quality or air quality related values from the implementation of the selected alternative.		
Geology / Soils	Negligible to minor adverse effects from compacting, grading and leveling of the road during maintenance and for the Old Mine Trailhead turnaround and from construction and maintenance of the new trail. Impacts also include excavation for the foundations of the entrance arch, visitor contact station and patrol cabin; facility removal; construction and maintenance of erosion protection measures; placement of backcountry toilets, and establishment of parking in the former maintenance area. Beneficial effects would occur	• Locating staging areas where they will minimize new disturbance of area soils and vegetation. • Minimizing ground disturbance to the extent practicable. • Using mats or plywood to minimize soil compaction impacts in sensitive fine-grained or other soils. • Salvaging topsoil from excavated areas for use in re-covering source area or other project areas. • Not leaving excavated soil at the base of trees, and providing tree protection if needed for specimen trees. • Restoring project areas through scarifying, and/or native seeding or planting. • Importing weed-free clean fill. • Clearing and grubbing only those areas where construction would occur. • Using vegetable oil in place of hydraulic fluid in heavy equipment. • Minimizing construction along water courses during periods of heavy precipitation. • Minimizing driving over or compacting root-zones.	Project Manager Geologist

Resource	Impact	Measures to Avoid, Minimize or Mitigate Impacts	Responsibility
	from restoration of some former campsites and parking areas.		
Conclusion	Short-term negligible to moderate adverse effects, long-term minor adverse effects, localized long-term beneficial effects. Short-term moderate and long-term minor adverse effects would be associated with construction and maintenance of new facilities. There would be no major adverse effects on geology or soils from implementation of the selected alternative.		
Water Resources: Hydrology	Negligible to minor long-term adverse effects from replacement of culverts with other water passage devices on perennial and intermittent streams. Long-term minor localized adverse effects from altering movement of floodwaters from barbs and logjams. Additional localized water flow on and around improved trail minimized by a permeable trail sub-base, allowing some infiltration of water underneath the trail where it passes through unstable areas near the river, such as in through Falls Creek and in sections where the trail is lower than the river. Minor to moderate adverse effects from placement of road humps from changing the way stormwater moves over and off the road. Long-term minor to moderate adverse effects on stream flow from construction and maintenance of seven erosion protection structures, including six channel lining log cribs and one cross-road buried groin, preventing expansion of the channel and additional flow on the road. Additional potential long-term adverse effects from obstructing water flow during flooding from retention of Ipsut Creek Bridge, especially if water flow changed again.	• Army Corps of Engineers (ACOE) recommended Best Management Practices would be followed to minimize potential impacts to water quality. • Environmental Protection Agency (EPA) <i>Permanent Culvert Installation, Replacement and Removal Provisions</i> would be followed to reduce sedimentation impacts from construction activities. • Locating staging and stockpiling areas located away from the Carbon River. • Delineating staging areas to prevent incremental expansion of the staging area. • Covering stockpiled fine-grained soil and rock near surface water and if overwintered with a breathable, water repellent fabric, such as silt fence, anchored around the perimeter. • Using temporary sediment control devices such as filter fabric fences, sediment traps, or check dams as needed during culvert removal / replacement. • Identifying the area to be cleared to define extent and clearing only those areas necessary for construction. • Minimizing the amount of disturbed earth area and the duration of soil exposure to rainfall. • Using bioengineering to stabilize riverbanks where erosion protection measures are employed. • Minimizing soil disturbance and re-seeding or revegetating disturbed areas as soon as practical. • Retaining silt fencing in disturbed areas until stabilization (by reseeding or revegetation). • Using native duff and topsoil to cover exposed soil as soon as practical. • Installing protective construction fencing around, adjacent to, or near wetland and/or riparian areas that are to be protected or other erosion control measures to protect water resources in the project area. • Avoiding machinery use below the wetted perimeter of water bodies (work would be done from the bank) where possible. If not possible, dewatering of the channel would occur according to measures specified in the threatened and endangered species section. • Using vegetable based hydraulic fluid in heavy equipment. • Limiting the duration of the in-stream work as much as possible. • Timing in-stream work to occur at lower flow periods (i.e., work would not occur during heavy river flows). • Using a Storm Water Pollution Prevention Plan (SWPPP) for construction activities to control surface run-off, reduce erosion, and prevent sedimentation from entering water bodies during construction and maintenance.	Project Manager Geologist Plant Ecologist

Resource	Impact	Measures to Avoid, Minimize or Mitigate Impacts	Responsibility
		Continued under Water Quality below	
Water Resources: Water Quality	Ongoing effects from retaining public facilities and public access alongside the Carbon River (altering the passage and infiltration of water) will increase turbidity and sedimentation during construction and maintenance; the potential for petroleum contaminants from former public use of the road and from public vehicle use of the first 1.2 miles of the road; potential erosion of the road /trail along riverbanks or from head-cutting during flooding (causing sedimentation); dust generation from driving the first 1.2 miles of road and from other ongoing public use (washed into water during storms); natural background sedimentation; as well as localized sedimentation from poorly functioning or located drainage structures. Additional negligible to minor or moderate localized adverse effects from construction of improved trail, later maintenance to it and later reconstruction of additional washout areas.	- Implementing a comprehensive spill prevention/response plan that complies with federal and state regulations and addresses all aspects of spill prevention, notification, emergency spill response strategies for spills occurring on land and water, reporting requirements, monitoring requirements, personnel responsibilities, response equipment type and location, and drills and training requirements. Using an oil and hazardous materials spill prevention, control, and countermeasure plan to address hazardous materials storage, spill prevention, and responses. - Conducting daily inspections of equipment used in the proposed project for fuel, oil, hydraulic fluid and other potential leaks. - Additional consideration would be given to closing Ipsut Creek Campground during fall rain-on-snow periods.	Project Manager Chief of Maintenance Biologist
Water Resources: Wetlands	The following trail and erosion protection measures would affect wetlands: <i>Trail Construction</i> Approximately 4,224 feet (0.97 acres) of trail would be constructed outside the existing footprint of the road. Replacement of five culverts with trail bridges and replacement of another four log bridges with wider bridges; and Retention of Ipsut Creek Bridge.	Mitigation measures are identified in the Wetlands Statement of Findings and beginning under Hydrology above.	Project Manager Biologist Plant Ecologist

Resource	Impact	Measures to Avoid, Minimize or Mitigate Impacts	Responsibility
	<i>Erosion Protection Measures</i> The following measures constructed within the road corridor would not constitute new impacts to wetlands except associated with some fill (0.5 acres): Construction and maintenance of span-log check dams in the Falls Creek and potentially Ipsut Creek road corridor channels; Use of gravel and cobble from above the ordinary high water mark in the Carbon River bed. Long-term beneficial effects from removal of the Ranger and unnamed creek culverts from allowing for fish passage up both tributaries to the next closest natural fish barrier, opening approximately 1.3 acres of habitat due to 0.5 miles of stream for fish use on Ranger Creek, 0.25 miles of stream for fish use on the unnamed tributary, as well as 0.25 miles in the Falls Creek area, plus the increase in large woody debris habitat (0.5 acres) for a total of 1.8 acres. This would compensate for the loss of wetlands from the logjams and new trail construction.		
Water Resources: Floodplains	Minor to moderate adverse effects on floodplain values from rock barbs and logjams and a series of two rock barbs converted to a logjam; and from farming of rock and cobble in the active channel of the Carbon River for use in erosion protection structures. Impacts from installing new bank erosion measures would limit channel migration and floodplain utilization. Additional minor to moderate adverse effects from construction of	Mitigation measures are identified in the Floodplains Statement of Findings and beginning under Hydrology above.	Project Manager Geologist Biologist

Resource	Impact	Measures to Avoid, Minimize or Mitigate Impacts	Responsibility
	and maintenance of erosion protection measures, including Falls Creek span-log check dams. Of these, the logjams, spanning trees, some of the cribwalls, and the gabion basket trail would be within the floodplain / channel migration zone. Other portions of the cribwalls, and the road humps would be within the channel migration zone but not in the floodplain. Floodplain values would be enhanced and adverse effects from an improved trail in the floodplain would be mitigated by 1) focusing NPS facilities and contact areas at the entrance and (later) on boundary expansion lands rather than along and within the active floodplain; 2) removal of vault toilets and formal car camping facilities and replacement with a smaller campground footprint; 3) conversion of up to 3.8 miles (of the roadway to a trail within the floodplain; and 4) removal of undersized culverts and stabilization of stored mobile sediment upstream of the culverts. Although portions of the improved trail would continue to be within the regulatory floodplain, no statement of findings would be needed to allow it to remain because it is an excepted action (trails in or adjacent to floodplains). A <i>Floodplains Statement of Findings</i> however is appropriate for the entrance facilities and continued use of Ipsut Creek Campground, even though these facilities are technically outside of the 100- and 500-year regulatory floodplains because they have previously experienced impacts from flooding.		

Resource	Impact	Measures to Avoid, Minimize or Mitigate Impacts	Responsibility
Conclusion	Hydrology: Short- and long-term negligible to minor with the potential for adverse effects, long-term beneficial effects, with additional short- and long-term minor to moderate adverse effects and additional beneficial effects. Water Quality: Long-term minor and short-term negligible to moderate adverse effects, long-term beneficial effects. Wetlands: Short- and long-term minor adverse effects on 0.5 acres (fill from ELJs) plus minor long-term adverse effects on an additional 0.97 acres. Long-term beneficial effects on 1.8 acres (sum of 1.3 acres opened habitat, plus 0.5 acres wood added for ELJs). Floodplains: Short-term minor to moderate and long-term moderate to major adverse effects, long-term beneficial effects. There would be no major adverse effects on water resources from the implementation of the selected alternative.		
Vegetation	Negligible to minor adverse effects from construction of visitor contact station, turnaround, expansion of parking, and reconstruction of patrol cabin. Minor to moderate adverse effects from construction of erosion protection measures, including road humps, check dams and grade control structures; and from construction and maintenance of improved trail. Long-term beneficial impacts from removal of infrastructure, former roadside parking areas; and from decreasing bank erosion from erosion protection measure construction.	- Minimizing construction limits and areas to be cleared, where possible. - Clearly identifying the construction limits, to prevent expansion of construction operations into undisturbed areas. - Retaining specimen trees (as identified by park staff) where possible along improved trail. - Salvaging plant material, prior to construction, from areas to be disturbed. - Restoring vegetation in staging and other temporarily impacted areas following construction. - Minimize vegetation disturbance during project operations by staging on road and/or shoulder or other disturbed areas. - Do not gather or use native mineral material from exotic plant infested areas. Only importing freshly exposed subsurface materials or materials certified as weed free. - Covering trucks when transporting materials to reduce or eliminate the potential for exotic plant seed contamination - Washing all vehicles having contact with soil or materials that may contain noxious weed seed prior to working in the project area or transporting weed free materials - Separating contaminated soil from weed free soil and using it for subsurface fill. - Conducting annual monitoring for potential weed infestation. - Identifying and controlling exotic plant species infestations prior to construction.	Project Manager Plant Ecologist
Conclusion	Long-term negligible to moderate adverse effects, localized beneficial effects. Beneficial effects would be from restoration of the road in the river corridor with adverse effects from physical modification of undisturbed vegetated landscape. There would be no major adverse effects on vegetation or habitat values from the implementation of the selected alternative.		
Wildlife	Short- and long-term minor to moderate localized adverse impacts from noise and activity during construction of buildings, erosion protection measures and other project actions. Long-term minor to moderate adverse effects from erosion protection measures and trail within channel migration zone. Long-term localized beneficial effects from restoration actions.	- Scheduling construction activities with seasonal consideration of wildlife lifecycles to minimize impacts during sensitive periods (e.g., bird nesting and breeding seasons). The timing of the construction of rock barbs and other channel or bank stabilization measures, as well as extraction of large woody debris, could be limited to avoid spawning and other sensitive periods for fish and aquatic wildlife. - Minimizing the degree of habitat removal (vegetation clearing) by delineating construction limits. - The park biologist would be notified of the presence of fish or amphibians in the vicinity of project work. - Instream excavation and use of heavy equipment would be limited to the minimum amount needed. - Limiting the effects of noise on wildlife habitat through controls on construction equipment and timing of construction activities, such as limiting construction to daylight hours. - Using spill prevention measures to prevent inadvertent spills of fuel, oil, hydraulic fluid, antifreeze, and other toxic chemicals that could affect	Project Manager Wildlife Ecologist Biologist

Resource	Impact	Measures to Avoid, Minimize or Mitigate Impacts	Responsibility
		wildlife. • Maintaining proper food storage, disposing of all food waste and food-related waste promptly, in a bear-resistant receptacle and removing all garbage off-site at the end of each working day. • Placing the rock barbs or logjams from the bank and/or outside the wetted channel.	
Conclusion	Short-term minor to moderate, long-term minor to moderate adverse effects, some long-term beneficial effects. There would be no major adverse effects on wildlife or wildlife values from the implementation of the selected alternative.		
Special Status Species	Fish: A range of negligible to major adverse effects from direct and indirect effects to fish species and their habitats (Bull trout, steelhead, coho and Chinook salmon) from: • Fish capture and handling, • Construction of erosion protection measures including log crib walls, • Construction of raised trail with gabion mattresses • In-water work, • Excavation of river rock for use in erosion protection measures, • Movement and use of large woody debris from the river, • Bank disturbance, including vegetation loss, • Culvert removal / replacement, and • Future flood damage to structures. Long-term beneficial effects from removal of barriers to high quality habitat. Birds: Noise and disturbance that would affect special status birds, including northern spotted owls and marbled murrelets from: • Use of heavy equipment during construction, • Ongoing use of the entrance and first mile of	See Attachment A	Project Manager Wildlife Ecologist Biologist

Resource	Impact	Measures to Avoid, Minimize or Mitigate Impacts	Responsibility
	the road by public vehicles, • Administrative use of the road by ATVs, • Helicopter materials transport, • Blasting, and • Recreational use.		
Conclusion	No effect: gray wolf, grizzly bear, lynx, fisher May affect, not likely to adversely affect: • Steelhead • Puget Sound Chinook salmon • Puget Sound Chinook salmon critical habitat, May affect, likely to adversely affect: • northern spotted owl • marbled murrelet • bull trout • bull trout critical habitat The project will also have adverse effects on essential fish habitat for Chinook and coho salmon throughout the action area, including in the Carbon River, Ipsut, June, Falls and Ranger creeks. There would be no unacceptable impacts on special status species from implementation of the selected alternative.		
Ethnographic Resources	Long-term minor adverse and long-term beneficial effects (no adverse effect). Beneficial effects could occur from expanded parking, improvement of fish habitat, improvement of parking and access. Potential long-term minor adverse impacts would occur from expansion of parking outside the current Carbon River Entrance. Minor changes that would affect use, including Native American use, of the area.	• Additional consultation with affected Native American Indian tribes as plans for parking outside the Carbon River Entrance develop. • If additional concerns or areas of use were later identified, consultation with the affected Native American tribe(s) and, as appropriate, the Washington State Office of Archeology and Historic Preservation, would occur to determine how to proceed. • Fish and fish habitat mitigation measures are noted above in the Special Status Species section.	Project Manager Archeologist
Conclusion	There would be no adverse effect on ethnographic resources or values from implementation of the selected alternative.		
Prehistoric and Historic Archeological Resources	Potential impacts to previously unidentified archeological resources from building construction, erosion protection measures, and improved trail construction.	• Before modifications were made to Ipsut Creek Campground or the Old Mine Trail, a determination of eligibility for the National Register of Historic Places would be undertaken. Continued below and stipulations in Attachments B and C	Project Manager Archeologist
Measures to Avoid, Minimize or Mitigate Impacts	• If the can dump was later relocated, a determination of eligibility for the National Register of Historic Places would be made and measures would be designed to limit adverse effects to it. • Because of the potential for adverse effects to undetermined or unknown archeological resources to occur, archeological survey,		

Resource	Impact	Measures to Avoid, Minimize or Mitigate Impacts	Responsibility
	monitoring (and/or testing as determined necessary) would be conducted associated with the following proposed actions (notify archeologist in advance of proposed work): - o Reconstruction of the entrance arch - o Removal of ranger station and removal of historic CCC garage and reconstruction in the boundary expansion area and replacement with parking and picnicking at the entrance and maintenance areas, - o Construction of a visitor contact station at the entrance. - o Reconstruction of the Ipsut Creek Patrol Cabin r in the Ipsut Creek area, - o Construction of the turnaround, - o Trail work in the Falls Creek area, - o Potential removal of the Ipsut Creek Bridge, - o Changes in Ipsut Creek Campground, - o Construction of the proposed backcountry camp. • Additional interpretation would be designed for the Old Mine Trail and the trail would be maintained because of potential increased use. • Should unknown archaeological resources be uncovered during construction, work would be halted in the discovery area, the park archeologist contacted, the site secured, and the park would consult according to 36 CFR part 800.11 and, as appropriate, provisions of the Native American Graves Protection and Repatriation Act (NAGPRA) of 1990. In compliance with NAGPRA, the National Park Service would also notify and consult concerned tribal representatives for the proper treatment of human remains, funerary, and sacred objects should these be discovered during the course of the project. • If necessary or possible, relocation of work to a non-sensitive area would occur to enable site testing and documentation. Long-term actions could include reinitiating the project in the same area (upon effective data collection) or relocating the action (if possible). There would be an emphasis on taking actions that would avoid further disturbance to the site(s).		
Conclusion	No adverse effect on Washington Mining and Milling Company Adit, potential adverse effect on can dump. Adverse effect on Ipsut Creek Campground. Other potential impacts to archaeological resources would be avoided by additional survey and analysis. There would be no major adverse effects on archeological / ethnographic resources or historic structures or their values from the implementation of the selected alternative.		
Historic Structures and Cultural Landscapes	Major changes in the width, alignment, grade and use of the historic Carbon River Road. Although the log crib walls, logjams and buried groin and road humps would help to prevent deterioration of the remaining intact portions of the road and additional damage to the damaged portions of road, these actions would not be enough to preserve the character-defining features of the Carbon River Road. Over time, additional floods would likely continue to damage the intact portions of the Carbon River Road and the road would continue to lose historic integrity. Moderate adverse effects on natural systems and features, moderate adverse effects on circulation, minor adverse effects on vegetation, minor adverse effects on views and vistas and	• Ongoing consultation with the State Historic Preservation Office regarding preparation of a Memorandum of Agreement. • Detailed deconstruction notes and photographs would be used to reconstruct Ipsut Creek Patrol Cabin. • CCC garage deconstruction would entail the preparation of detailed deconstruction notes and photographs to enable its later reconstruction. • There would be periodic woody plant removal (trees and large shrubs) to preserve some of the character of the Carbon River Road corridor, however low growing shrubs and forbs would remain. • There would be preservation maintenance of the first 1.2 miles of the road, including periodic gravel replacement and culvert cleaning. • There would be preservation maintenance of the relocated Ipsut Creek Patrol Cabin and the CCC Garage. • There would be interpretation of the history of the Carbon River corridor to park visitors, to include the prehistoric use of the valley, post-contact mining use, early park development guided by NPS Director S. Mather, and Civilian Conservation Corps period constructed works.	Project Manager Historical Landscape Architect Historical Architect

Resource	Impact	Measures to Avoid, Minimize or Mitigate Impacts	Responsibility
	minor to moderate adverse effects on archeological sites. The factors contributing to the integrity of these characteristics would also be adversely affected.		
Conclusion	Adverse effect on Mount Rainier National Historic Landmark District (NHLD) requiring a Memorandum of Agreement (MOA) with the State Historic Preservation Office (SHPO) and Advisory Council for Historic Preservation (ACHP). The adverse effect would be as a result of the decision to not maintain the Carbon River Road to the Secretary of the Interior's Standards for the Treatment of Historic Properties and from incompatible alterations to this portion of the NHLD. The selected alternative would change the characteristics of the Carbon River Road that make it eligible for inclusion on the National Register of Historic Places as part of the NHLD. Not maintaining the road would continue to result in the loss of landscape characteristics (natural systems and features, spatial organization, land use, circulation, topography, vegetation, buildings and structures, and archeological sites) and the integrity associated with them (design, materials, workmanship, feeling and association of the road). There would be moderate to major adverse effects but no impairment from changes in the contribution of the Carbon River Road to the Mount Rainier National Historic Landmark District from implementation of the selected alternative.		
Visitor Experience (Visitor Access, Opportunities and Safety)	Moderate adverse effects from continued limited parking and continued lack of motor vehicle access beyond Old Mine. Beneficial effects from access to improved accessible hiking and bicycling trail and new facilities as well as from improvements in provision of information and non-personal interpretation. Additional beneficial effects on safety from improved facilities. Short-term adverse impacts from reduced access, delays or closures during construction.	• Avoiding evening, weekend and holiday work by requiring approval in advance. Longer construction delays or total road closures would also be approved in advance. • Using a public information program to warn of construction related road closures, delays, and road hazards. • Managing vehicle traffic and contractor hauling of materials, supplies, and equipment within the construction zone to minimize disruptions to visitors. • Developing a safety plan prior to the initiation of construction to ensure the safety of visitors, workers, and park staff.	Project Manager District Ranger
Conclusion	Access and Transportation: Short-term minor adverse effects, long-term minor to major adverse effects, long-term beneficial effects. Opportunities: Long-term moderate to major adverse effects, long-term beneficial effects. Information and Education: Long-term beneficial effects. Safety: Long-term minor adverse and long-term beneficial effects. There would be no unacceptable impacts on scenic resources or soundscapes from implementation of the selected alternative.		
Wilderness	Short-term minor to moderate adverse effects from noise and activity near the wilderness boundary, especially from helicopter, machinery or heavy equipment use.	• No physical modifications initially proposed would occur within wilderness (generally below Chenuis more than 100 feet from the centerline south of the road, above Chenuis more than 100 feet from the centerline of the road on either side). • Potential physical impacts to wilderness from moving the trail away from the road corridor would result in the need for additional environmental analysis.	Project Manager District Ranger

Resource	Impact	Measures to Avoid, Minimize or Mitigate Impacts	Responsibility
Conclusion	There would be no major adverse effects on wilderness from the implementation of the selected alternative.		
Wild and Scenic Rivers	Actions would affect some values called out in the eligibility report; however there would be no effect on the eligibility of the Carbon River for designation as part of the wild and scenic rivers system.	Measures that would be part of the proposed project (as appropriate to the alternative actions) to minimize impacts on wild and scenic rivers are noted in other sections.	Project Manager Chief, Natural and Cultural Resources
Conclusion	There would be no major adverse effects on the Carbon River as an eligible wild and scenic river due to implementation of the selected alternative.		
Park Operations	Short- and long-term minor to moderate adverse effects from planning, managing, constructing and maintaining new facilities, including buildings, erosion protection measures and the improved trail and from removing infrastructure. Short and long-term minor to moderate effects from monitoring natural and cultural resources associated with the Carbon River access management actions.	• Additional analysis of importing materials vs. gathering native materials would be made to determine which has fewer impacts and costs. • Analysis of potential displacement of park visitors to other areas would be made and, if appropriate, actions taken to improve communication about visitor use opportunities in this and other areas to limit its effects. • Ongoing monitoring would occur in the Mowich Lake area to assess potential effects of increased visitor use in summer. • Mitigation measures for ESA listed species, especially for fish species and development and implementation of long-term monitoring associated with structures constructed to protect the road/trail areas.	Project Manager Chief of Maintenance Chief Ranger Chief, Natural and Cultural Resources
Conclusion	There would be no major adverse effects to park operations from implementation of the selected alternative.		
Socioeconomics	Long-term minor adverse effects from a continued reduction in the overall numbers of visitors to the area combined with short- and long-term beneficial effects from construction and use.	• Where possible, projects would be combined or phased to allow for cost-savings measures related to staging remaining in place, rather than setting up and taking down staging areas for sequential implementation activities. • New buildings would be constructed to silver or greater LEED standards to minimize long-term operations costs. • New buildings and facilities and other improvements would use native, and recycled or reused materials to minimize potential long-term adverse effects from consumption. • Where removal of facilities occurred, these would be deconstructed to the extent possible, and materials used in other areas of the park or recycled.	Project Manager Chief of Maintenance Chief Ranger
Conclusion	There would be no major adverse effects on socioeconomics from implementation of the selected alternative.		

Public Involvement

The public outreach called for by Section 106 of the National Historic Preservation Act (NHPA) was integrated into the NEPA process in accordance with the *NPS Programmatic Agreement and Management Policies* (2006).

Public Scoping Phase

Internal scoping, as well as advance planning for public engagement, began soon after the major November 2006 flood damage occurred along the Carbon River Road, and throughout Mount Rainier NP. During flood briefing-response meetings, a variety of concerns were identified by park staff in wildlife, vegetation, maintenance, water resources, and visitor planning.

Internal scoping linked NPS staff with other agencies such as the Federal Highway Administration and the U.S. Fish and Wildlife Service. Preliminary public comments also emerged during this time at a series of information meetings held to address temporary park closure, flood impacts, and recovery options (Enumclaw, Nov.16; Eatonville, Nov.16, Packwood, Nov.20).

Formal public scoping was initiated June 23, 2008 via issuance of a press release (news items published in various outlets including Tacoma News Tribune), direct mailings, and website postings. The official public scoping period for the environmental assessment (EA) extended through July 30, 2008.

Altogether 121 people participated in the scoping phase, including public meeting participants and those who submitted written comments. Two open house public meetings were hosted in Enumclaw (June 30, 17 attendees), and Tacoma (July 1, 30 attendees); there were 43 oral comments at the Enumclaw meeting, and 82 oral comments at the Tacoma meeting. In addition, approximately 125 comments were also recorded on flip charts.

In addition to public meeting participation, 80 scoping letters were received: 76 from individuals, 3 (one duplicate) from non-profit organizations (National Parks Conservation Association, Washington Trails Association), and one from Tacoma News Tribune. The combined scoping comments from both meetings and letters (575) were sorted into 43 different categories - these ultimately derived into 160 concern statements that informed preparation of the EA (and 27 concerns that were considered but dismissed or outside the expressed purpose and need for federal action).

Summary of EA Review Phase

The *Carbon River Access Management EA* was released for a 45-day public review period from September 17, 2010 through November 3, 2010. During this period, three public meetings were held (September 27 in Buckley, September 28 in Tacoma, and September 29 in Seattle).

Approximately 91 copies of the EA were distributed, including to individuals, agencies, non-profit organizations and government officials. The EA was also available these public libraries: Bonney Lake Library, Buckley Library, Eatonville Library, Enumclaw City Library, Graham Library, Orting Library, Packwood Timberland Library, Parkland-Spanaway Library, Puyallup Library, Seattle Central Library, South Hill Library, Summit Library (Tacoma), Sumner Library, Tacoma Public Library, Tacoma Branch, and Yakima Valley Regional Library.

News accounts in response to the press release announcing the EA review period was published in: Eatonville Dispatch (October 7, 2010), Eatonville News.net (September 17, 2010), The Tacoma News Tribune (September 18 and 21, 2010 and October 3, 2010), The Olympian (September 18, 2010), Seattle Outdoor Recreation Examiner (September 20, 2010), National Park Traveler (September 21, 2010), the Washington Trails Association (September 27, 2010), and The Mountaineers Currents (November 1, 2010), and posted on the park and PEPC websites. Copies were sent or emailed to 108 media contacts and 91 partners.

Approximately 649 comments were identified from approximately 198 letters and emails from 186 individuals, eight groups (Enumclaw Ski and Mountain Sports, International Mountain Guides, Mount Rainier National Park Associates, National Parks Conservation Association, Tahoma Audubon Society, The Mountaineers, Washington Trails Association, and the Washington State Cascade Chapter of the Sierra Club), the town of Wilkeson, and three agencies (Washington State Office of Archaeology and Historic Preservation, U.S. Fish and Wildlife Service, and National Marine Fisheries Service) during the formal public review period. These included 100 form letters from the National Parks Conservation Association. The 649 comments (including comments that applied to more than one category) were sorted into approximately 70 concern categories, of which 26 comprised substantive concern statements.

The following categories of concerns within the scope of the project were raised (all comments are fully documented in the project's administrative record):

1. There should be more opportunities for day hikes nearer to the road closure.
2. There should be additional impact analysis regarding the Old Mine Trailhead Turnaround
3. Parking should be provided at the Old Mine Trailhead Turnaround.
4. A trail alongside the road up to the Old Mine Trailhead Turnaround would minimize safety hazards of walking on the road.
5. The road up to the Old Mine Trailhead Turnaround should only be open for handicapped placarded vehicles.
6. Add interpretive panels to the proposed trail.
7. Bicycle use may result in unauthorized use of wilderness trails.
8. Closure of Ipsut closes off year-round car camping opportunities in the park.
9. Money is being spent to improve other park areas, a fraction of which would improve access to the Carbon River area.
10. The EA states: "The former Thompson home site is currently being rehabilitated to replace the Carbon River Ranger Station for visitor contact, staff offices, employee housing and maintenance facilities." There is no housing at the new Carbon River Ranger Station.
11. The EA incorrectly states that the Chenuis Falls Trail is 0.4 miles one way.
12. Improve the Old Mine, Green Lake and Chenuis Trails to allow for increased use.
13. Consider a narrower trail with fewer impacts on old growth trees.
14. There would be additional impacts on other areas due to reducing traditional access to the Carbon River area.
15. There would be additional effects on the Mowich Lake area from reduced access to the Carbon River area.
16. The air quality impact analysis is missing information regarding displacement of visitors from the Carbon River area to Paradise.
17. Erosion protection measures should consider the placement of log retention structures instead of gabion / wood structures.
18. Avoiding the use of gabions for bank protection would reduce the level of river rock excavation needed from the Carbon River channel, and would further reduce impacts to fish habitat associated with channel excavation and the long-term impacts associated with the placement of non-biodegradable structures in the Carbon River floodplain.
19. Conduct reach, topographic and channel migration assessments to determine which sections of the trail could be moved to areas less susceptible to flood damage and that would not require bank protection.
20. If bank and channel stabilization techniques are required, use of gabion baskets should be avoided.
21. Replace the Chenuis and Ranger creek culverts sooner than 2013 if feasible so fish have access to the upstream habitat as soon as possible.
22. The EA does not analyze the potential that land use practices in the Carbon River watershed may be influencing Carbon River flooding.
23. Alternative 2 would have significant impacts on visitor experience.

24. There would be additional impacts on park operations from staffing and from road maintenance.
25. The range of alternatives does not meet the goal of preserving year-round access to the Carbon River Valley.
26. Loss of day hiking access to the Carbon Glacier should be compensated for by providing improved access to a glacier terminus elsewhere in the park.

In addition to these concerns, an Errata has been prepared as an attachment to the EA. This consists of text edits to make minor corrections and clarifications, and also provides responses to substantive comments.

There were 103 comments that recommended or opposed one of the alternatives. Not counting 100 form letters received in favor of Alternative 2, comments accepting access provided by the alternatives were approximately 43 percent in favor of increased access and 52 percent accepting of reduced access or opposed to increased access. Including the form letters, approximately three times as many were accepting of the conversion to a trail, compared to the number remaining opposed. There were 56 comments about the range of alternatives, most recommending options that were considered but dismissed.

Public Comments Eliminated from Further Consideration

The following concerns were raised but were eliminated from further consideration (and also not discussed nor analyzed in the EA) either because they were outside the scope of the proposed project, proposed options that are not reasonable and/or feasible, or were alternatives rejected during the planning process and/or do not meet the expressed purpose and need:

- Closure of the Carbon River Road should be delayed.
- Fix and open the road.
- Reroute the road.
- Alternatives should include use of unconventional vehicles by the public.
- Elevate the road.
- Use chairlifts or gondolas or another creative means to bypass the washed out areas.
- Armor the road.
- Build the road through washed out areas as a dike.
- Building bridges through washed out areas.
- Provide motorized access from USFS land on the north side of the Carbon River.
- Allow parking along the road past the maintenance area.
- Reopen Ipsut Creek to car camping.
- Expand parking with the Carbon River area.

Comments Outside the Scope of the Environmental Assessment

- Improve park campgrounds.
- Fix Longmire.
- Don't widen the Fairfax Road.
- Provide nonmotorized access to the park.
- Fix or reroute Westside Road.
- Promote economic development.
- Provide hike/bike hostels in the Carbon River corridor.
- What effect do air tours have on the Carbon River soundscape?
- The cost of the park entrance fee is too high.
- The national park system is financially impractical.
- Improve the Mowich Lake Road.
- Modify the wilderness boundary.

Agency Consultation

U.S. Fish and Wildlife Service (Endangered Species Act)

Federal agencies must consult with the U.S. Fish and Wildlife Service (USFWS) to ensure their actions will not jeopardize continued existence of any federally listed or proposed threatened or endangered species, or designated or proposed critical habitat [ESA, § 7 (a)(2), 16 USC 1531 et seq.]. If listed species are present, the federal agency must determine if the action will have *no effect*, *may affect*, [but is] *not likely to adversely affect* or *may affect, likely to adversely affect* those species. The Park made the determination of effect for the selected alternative following guidance outlined in the *Endangered Species Act Consultation Handbook: Procedures for Conducting Section 7 Consultations and Conferences* (USFWS 1998).

In accordance with local implementing procedures for § 7 of the Endangered Species Act, the NPS and USFWS consulted the websites for the USFWS and the National Marine Fisheries Service (NMFS) to obtain a current list of federally-listed species in the project action area. There are currently 32 fish and wildlife species that are federally-listed as threatened, endangered, proposed, or candidate species in western Washington. The NPS/USFWS reviewed species occurrence records maintained by the Park and the Washington Department of Fish and Wildlife. A list was developed of species known to occur or that potentially occur in Mount Rainier National Park, and that may also occur in the project area.

Preparation of the Biological Assessment (BA) (Appendix 9 in the EA) and supplemental BA by the USFWS in cooperation with the park was concurrent with the latter part of preparation of the EA. It resulted in *No Effect* determinations for grizzly bear, gray wolf, Canada lynx and fisher; *May Affect, Not Likely to Adversely Affect* determinations for Chinook salmon and essential fish habitat, and *May Affect, Likely to Adversely Affect* determinations for bull trout and bull trout critical habitat, steelhead, marbled murrelet, and northern spotted owl. These determinations applied to all alternatives, including no action. A request for formal consultation and concurrence with these determinations of effect was sent on July 28 and July 29, 2010 to both the NMFS and the USFWS. An Incidental Take Statement with associated Terms and Conditions from the draft Biological Opinion (BO) was prepared by the USFWS and received on January 13, 2011. A letter from the NMFS was sent on October 4, 2010 documenting concurrence with determinations of effect on listed fish and for effects associated with the Magnuson-Stevens Fisheries Act on essential fish habitat.

Washington State Historic Preservation Officer / Advisory Council for Historic Preservation

The NPS has determined and the State Historic Preservation Officer (SHPO) has concurred with the *adverse effect* on historic properties pursuant to Section 106 of the National Historic Preservation Act (NHPA) in accordance with the *NPS Programmatic Agreement*. For the purpose of NEPA and NPS policy, an impact to a historic property that is eligible or listed under the National Register of Historic Places would be considered significant if an adverse effect could not be resolved through agreement with the SHPO, Advisory Council on Historic Preservation (ACHP), American Indian tribal governments, or other consulting and interested parties and the public.

Previous pertinent SHPO consultation occurred in 2000-2002 as a result of the General Management Plan process associated with determining the future of the Carbon River Road. At that time the SHPO concurred with a determination of *no adverse effect*. A representative of SHPO, however, participated in the Choosing By Advantages workshop on July 21-23, 2009, to select the preferred alternative. As a result of that participation analysis of all of the alternatives resulted in a determination of *adverse effect*. This determination applies to all alternatives, including no action.

Two Memoranda of Agreement are applicable to this decision. One documents the adverse effect on the Ipsut Creek Patrol Cabin (accepted by the Washington Department of Archaeology and Historic

Preservation on August 2, 2007 and concurred with by the ACHP on August 8, 2007) and the other documents the effects on the contribution of the Carbon Road to the Mount Rainier National Historic Landmark District (signed by the Washington Department of Archaeology and Historic Preservation on December 23, 2010 and concurred by the ACHP on January 12, 2011).

American Indian Consultation

NPS consultation with culturally associated American Indian groups occurred during development of the *Carbon River Access Management EA*. Letters were sent to six associated Native American Indian Tribes: Muckleshoot Indian Tribe, Puyallup Tribe of Indians, Cowlitz Indian Tribe, Nisqually Indian Tribe, Squaxin Island Tribe, and Confederated Bands and Tribes of the Yakama Nation. Direct follow-up consultation took place in 2008 with the two tribes most directly concerned with the Carbon River area – the Puyallup Tribe of Indians (July 21, 2008), and the Muckleshoot Indian Tribe (August 4, 2008). In 2010, announcements were also sent to Puyallup and Muckleshoot tribal representatives soliciting attendance at public meetings held in nearby Tacoma and Buckley. In addition, a special tribal consultation meeting was held at the Park on May 6, 2010 to discuss and solicit opinion on a variety of issues of mutual concern; including the Carbon River Road alternatives. Invitations to this meeting were sent to the six traditionally affiliated tribes noted above. Attendees included representatives from Muckleshoot, Cowlitz, Puyallup, and Nisqually tribes. The most consistently expressed opinions derived from the discussions were that: 1) whatever alternative is adopted, access should be maintained for Indian people desiring to enter the park at the Carbon River entrance; and 2) parking congestion should be avoided on lands extending beyond the present park boundary.

Non-Impairment of Park Resources

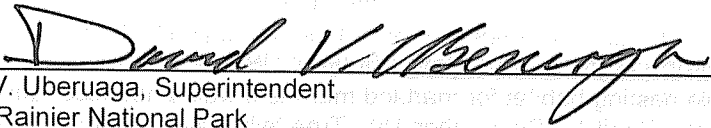
Pursuant to the 1916 Organic Act, the NPS has a management responsibility “to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.” Therefore, the NPS cannot take an action that would “impair” park resources or values. Based on the analysis provided in the *Carbon River Access Management EA*, the NPS concludes that implementation of the selected alternative will have no significant adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purpose and significance of Mount Rainier National Park; (2) key to the natural or cultural integrity of Mount Rainier National Park or to opportunities for enjoyment of the park; or (3) identified as a goal in the General Management Plan or other relevant National Park Service planning documents. Consequently, implementing the selected actions will not violate the NPS Organic Act.

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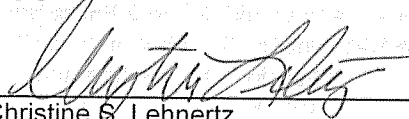
Finding

On the basis of the information contained in the Environmental Assessment as summarized above, it is the determination of the National Park Service that the proposed project is not a major federal action significantly affecting the quality of the human environment. Nor is it an action without precedent or similar to an action that normally requires an Environmental Impact Statement. The conclusions of non-significance are supported by the conservation planning and environmental impact analysis completed and the capability of listed mitigation measures to reduce or eliminate impacts. No adverse effects to cultural or historical resources will occur; there are no unacceptable impacts, nor will any impairment of cultural or natural resources or park values occur. This determination also included due consideration of the minor nature of public comments, agency, tribal and county recommendations. Therefore, in compliance with the National Environmental Policy Act, an Environmental Impact Statement will not be prepared, and portions of the selected project may be implemented immediately, while others will be implemented as soon as practicable, pending other requirements, funding and staffing.

Recommended:

 January 13, 2011
David V. Uberuaga, Superintendent
Mount Rainier National Park Date

Approved:

 02-03-2011
Christine S. Lehnertz
Regional Director, Pacific West Region Date

Carbon River Access Management Finding of No Significant Impact
Attachment A: USFWS Conservation Measures/Terms and Conditions -
Requirements for Protection of Threatened / Endangered Species and
NMFS Essential Fish Habitat Conservation Recommendations

USFWS CONSERVATION MEASURES

The measures described below are non-discretionary, and must be undertaken by the National Park Service so that they become binding conditions of any grant or permit issued to any applicant, as appropriate, for the exemption in section 7(o)(2) to apply. The National Park Service has a continuing duty to regulate the activity covered by this incidental take statement. If the National Park Service 1) fails to assume and implement the terms and conditions or 2) fails to require applicants to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the National Park Service must report the progress of the action and its impact on the species to the U.S. Fish and Wildlife Service as specified in the incidental take statement [50 CFR 402.14(i)(3)].

- a. **Minimize Disturbance to Nesting Marbled Murrelets:** (Source: USFWS 2007)
- Felling of large trees in suitable nesting habitat for marbled murrelets would not occur during the marbled murrelet nesting season (April 1 – September 15). Tree felling would not be permitted from April 1 through September 15 to protect nesting murrelets, eggs, and young in stands that are identified as suitable murrelet nesting habitat. Large trees are defined as conifers with a dbh of 16 inches or greater.
 - All project activities would only occur 2 hours after official sunrise, and would cease 2 hours prior to official sunset during the murrelet nesting season (April 1 to September 15). This restriction avoids potential disruption to murrelets during their daily peak activity periods for feeding and incubation exchanges.
 - Helicopter flights at Ipsut Campground will be scheduled to occur after September 15 to avoid potential impacts associated with rotor wash during the nesting season
 - Helicopter flight path will follow the course of the Carbon River as much as practicable to avoid flights directly over old-growth forest habitat.
 - Helicopter operations below 500 feet above ground level will be minimized to the maximum extent practicable.
 - Transport flights will maintain a minimum altitude of 1000 ft above ground level as much as practicable.
 - Blasting activities would not occur between April 1 and August 5. This restriction avoids potential disruption of murrelets during their early nesting season which includes incubation and brooding of hatchlings.
 - All food items would be stored inside vehicles, trailers, or trash dumpsters except during actual use to prevent unnatural attractants to crows, jays, and other wildlife which have been identified as predators of murrelet eggs and young.

Exceptions:

Project activities that require in water work (e.g., culvert removal) may occur during the murrelet nesting season¹ to comply with seasonal restrictions for in water work (July 16 to August 15) and extended in-water work season for the main stem Carbon River (July 9 to August 22).

¹A typical conservation measure is to avoid all construction activities located within the defined disruption distances during the murrelet early nesting season (1 April to 5 August). This measure has not been included here because the park has determined that compliance with this measure is not feasible.

b. **Minimize Disturbance to Nesting Spotted Owls:** (Source: USFWS 2007)

- Felling of large trees in suitable nesting habitat for spotted owls would not occur during the spotted owl nesting season (March 15 – September 30). Tree felling would not be permitted during the nesting season to protect nesting spotted owl, eggs, and young in stands that are identified as suitable nesting habitat. Large trees are defined as conifers with a dbh of 16 inches or greater.
- Blasting activities would not occur between March 15 and July 30. This restriction avoids potential disruption of spotted owls during their early nesting season which includes incubation and brooding of hatchlings.
- Helicopter flights at Ipsut Campground will be scheduled to occur after September 15. At Ipsut Creek Campground, the helicopter disturbance buffer slightly overlaps the 0.7 mile-radius core area circle for the Ipsut Creek spotted owl site.

Exceptions:

Seasonal restrictions may be waived if current spotted owl surveys indicate no spotted owls are nesting within the defined disruption distances from the project construction area.

Project activities that require inwater work may occur during the spotted owl nesting season to comply with seasonal restrictions to protect fish for inwater work (July 16 to August 15)) and extended in-water work season for the main stem Carbon River (July 9 to August 22).

c. **Minimize Impacts to Bull Trout:** (Sources: USFWS 2007, WDFW and USFS 2005)

Follow the appropriate Washington Department of Fish and Wildlife (WDFW) guidelines for the timing of in-water work. These guidelines are intended to avoid in-water work during periods when salmonid eggs and fry incubate within stream gravels.

- In-water work is restricted to the period of **July 16 to August 15** for all Carbon River tributaries streams such as Ranger Creek (WAC-110-206).
- The extended in-water work season for the main stem Carbon River is **July 9 to August 22** and applies only to work associated with placement of engineered logjams or other bank protections structures along the Carbon River.
- Fish within construction sites that would be dewatered or isolated from the main water body shall be captured and safely moved from the job site. Fish capture and transportation equipment shall be available on the job site during all in-water activities.
- Any pump used for diverting water from a fish bearing water body shall be equipped with a fish guard to prevent passage of fish into the pump. The pump intake shall be screened with 3/32 inch or smaller mesh. Screen maintenance shall be adequate to prevent injury or entrapment to juvenile fish and shall remain in place whenever water is withdrawn from the water body through the pump intake.

Exceptions:

In-channel work below the ordinary high-water line may occur outside the specified in-water work period in areas that are dry during the proposed work period. Many side-channels and other fish-bearing streams within the Carbon River floodplain are seasonally dry from mid-summer into fall.

d. **Fish Passage Criteria for Instream Structures:** (Sources: WDFW 2004 – *Stream Habitat Restoration Guidelines* and WAC-110-070)

Hydraulic drop is the difference in elevation between the water surface upstream and downstream of the structure. To maintain fish passage for juvenile salmonids, the following hydraulic drop criteria apply:

Drop structures or grade-control structures: The maximum hydraulic drop for instream structures is 0.7 feet (8 inches). This drop height can be achieved by placing notches in structures, or by setting the structure at

an angle such that the desired drop height is achieved. The maximum hydraulic drop criteria must be satisfied at all flows between the low and high flow design criteria.

e. **Fish Removal and Dewatering Protocol:** (Source: USFWS 2007)

The following procedures would be used to isolate and dewater sites which require in-water work with heavy equipment. All fish capture, removal, and handling activities shall be conducted by an experienced fisheries biologist or technician.

1) **Isolate the Construction Site and Remove Fish**

Install block nets at up and downstream locations and leave in a secured position to exclude fish from entering the project area. Leave nets secured to the stream channel bed and banks until fish capture and transport activities are complete. If block nets or traps remain in place more than one day, monitor the nets and or traps at least on a daily basis to ensure they are secured to the banks and free of organic accumulation and to minimize fish predation in the trap.

2) **Fish Capture Alternatives**

- Collect fish by hand or dip nets, as the area is slowly dewatered.
- Seining – Use seine with mesh of such a size to ensure entrapment of the residing fish.
- Minnow traps – Traps would be left in place overnight and used in conjunction with seining.
- Electrofishing – Prior to dewatering, use electrofishing only where other means of fish capture may not be feasible or effective.

The protocol for electrofishing includes the following:

- If fish are observed spawning during the in-water work period, electrofishing shall not be conducted in the vicinity of spawning adult fish or active redds.
- Only Direct Current (DC) or Pulsed Direct Current (PDC) shall be used.
- Conductivity <100: use voltage ranges from 900 to 1100. Conductivity from 100 to 300: use voltage ranges from 500 to 800. Conductivity greater than 300: use voltage to 400.
- Begin electrofishing with minimum pulse width and recommended voltage and then gradually increase to the point where fish are immobilized and captured. Turn off current once fish are immobilized.
- Do not allow fish to come into contact with anode. Do not electrofish an area for an extended period of time. Remove fish immediately from water and handle as described below. Dark bands on the fish indicate injury, suggesting a reduction in voltage and pulse width and longer recovery time.

3) **Fish Handling and Release**

Fish must be handled with extreme care and kept in water the maximum extent possible during transfer procedures. A healthy environment for the stressed fish shall be provided—large buckets (five-gallon minimum to prevent overcrowding) and minimal handling of fish.

Place large fish in buckets separate from smaller prey-sized fish. Monitor water temperature in buckets and well-being of captured fish. As rapidly as possible (especially for temperature-sensitive bull trout), but after fish have recovered, release fish upstream of the isolated reach in a pool or area that provides cover and flow refuge. Document all fish injuries or mortalities and include in annual report.

4) **Dewater the Construction Site**

Upstream of the isolated construction area, divert flow around the construction site with a coffer dam (built with non-erosive materials) and an associated pump or a by-pass culvert. Diversions constructed with material mined from the streambed or floodplain is not permitted. Small amounts of instream material can be moved to help seal and secure diversion structures.

Pumps must have fish screens with 3/32 inch or smaller mesh. Dissipate flow energy at the bypass outflow to prevent damage to riparian vegetation or stream channel. If diversion allows for downstream fish passage (i.e., is not screened), place diversion outlet in a location to promote safe reentry of fish into the stream channel, preferably into pool habitat with cover.

When necessary, pump seepage water from the de-watered work area to a temporary storage and treatment site or into upland areas and allow water to filter through vegetation prior to reentering the stream channel.

- 5) *Fish Removal and Dewatering Protocol Exception:* Native alluvium may be used in the Carbon River floodplain to construct a diversion intended to dewater the construction site, and the diversion may be left in place if it is determined that this practice will create fewer direct effects to spawning bull trout. This is only allowed in the Carbon River on the aggrading and braided floodplain, and does not apply to instream work on tributaries, or where isolated side channels may contain superior habitat.

- 6) **Rewater the Construction Site**

Upon project completion, slowly re-water the construction site to prevent loss of surface water downstream as the construction site streambed absorbs water and to prevent a sudden increase in stream turbidity. Monitor downstream during re-watering to prevent stranding of aquatic organisms below the construction site.

Pumping equipment must be staged away from the rivers; except for the pump hose, which may extend down to the edge of the rivers. Pump intakes must be screened with 3/32 inch or smaller mesh on the end of pump hose to filter-out aquatic organisms. This screen should be cleaned of debris periodically.

Place a spill containment enclosure around the pump and or generator to contain gas, oil or other fluids.

- f. **Minimize Heavy Equipment Impacts to Aquatic and Riparian Habitats:** (Sources: USFWS 2007, WDFW and USFS 2005)
 - Establish staging areas (used for construction equipment storage, vehicle storage, fueling, servicing, hazardous material storage, etc.) at least 150 feet away from streams in a location and manner that would preclude erosion into or contamination of streams or wetlands.
 - All equipment used for instream work shall be cleaned and leaks repaired prior to entering the project area. Remove external oil and grease, along with dirt and mud prior to construction. Thereafter inspect equipment daily for leaks or accumulations of grease, and fix any identified problems before entering streams or areas that drain directly to streams or wetlands.
 - Heavy equipment used for in-water work would use biodegradable hydraulic fluids.
 - If the project includes excavation of the streambed or banks, those work areas shall be isolated from flowing waters to protect water quality and minimize turbidity.
 - All equipment shall be cleaned of all dirt and weeds before entering the project area to prevent the spread of noxious weeds.
 - Equipment used for instream or riparian work shall be fueled and serviced in an established staging area located at least 150 feet away from streams. When not in use, vehicles shall be stored in the staging area.
 - Minimize the number and length of stream crossings and access routes through riparian areas. Stream crossings and access routes should be at right angles.
 - Heavy equipment would follow planned routes of access, would travel across dry, un-wetted substrates to the extent possible, and would only cross wetted channels at designated locations.
 - Existing roadways or travel paths would be used whenever reasonable. Minimize the number of new access paths to minimize impacts to riparian vegetation and functions.
 - Project operations must cease under high flow conditions that inundate the project area, except for efforts to avoid or minimize resource damage.

- Initiate rehabilitation of all disturbed areas in a manner that results in similar or better than pre-work conditions through spreading of stockpiled materials, seeding, and/or planting with locally native seed mixes or plants. Planting shall be completed no later than fall planting season of the year following construction.
- g. **Minimize Water-Quality Contamination from Concrete and Treated Wood:** (Sources: WDFW and USFS 2005)
- Fresh concrete, concrete by products, or other chemical contaminants shall not be allowed to enter water bodies. Structures containing concrete shall be sufficiently cured to prevent leaching prior to contact with the water body.
 - Treated wood used for bridges or other structures shall meet or exceed the standards established in the most current edition of "*Best Management Practices For the Use of Treated Wood in Aquatic Environments*" developed by the Western Wood Preservers Institute.
- h. **Project Criteria for Culvert or Trail Bridge Placements:** (Sources: USFWS 2007, WDFW and USFS 2005, WAC-220-110-070)
- Structure types may include closed-bottomed culverts, open-bottomed arch or box culverts, or bridges.
 - The structure width shall never be less than the bank full channel width. The stream width inside the culvert or between bridge footings shall be equal to or greater than the bank full width.
 - Culverts in fish-bearing streams shall be designed, installed, and maintained to provide passage for all fish species and all life stages that are likely to be encountered at the site.
 - Stream crossing structures (culverts or bridges) must accommodate a 100-year flood flow while maintaining sediment continuity (similar particle size distribution) within the culvert as compared to the upstream and downstream reaches.
 - Culvert removal or placement sites shall be dewatered or isolated from flowing waters to protect water quality and minimize turbidity.
 - Culvert removal or replacement projects in fish-bearing streams would only occur during the approved inwater work season (July 16 – August 15).
 - Structures containing concrete must be cured or dried before they come into contact with stream flow.
 - Bridge abutments must be placed outside the bank full channel width.
 - Embedment – If a closed culvert is used, the bottom of the culvert shall be buried into the streambed not less than 20% and not more than 50% of the culvert height. For open-bottomed arches and bridges, the footings or foundation shall be designed to be stable at the largest anticipated scour depth. Substrate and habitat patterns within the culvert should mimic stream patterns that naturally occur above and below the culvert. Coarser material may be incorporated to create velocity breaks during high flows, thereby improving fish passage, and to provide substrate stability.
 - Grade Control Structures – Grade control structures are permitted to prevent head-cutting above or below the culvert or bridge. Grade control typically consists of wood or boulder structures that are keyed into the banks, span the channel, and are buried in the substrate. Grade-control structures must accommodate fish passage for all species and life stages of fish present.
 - When removing woody debris from the road-crossing inlet, place the debris downstream of the road crossing.
- i. **Project Criteria for Permanent Culvert or Bridge Removal (WAC-220-110-070):** (Sources: USFWS 2007, WDFW and USFS 2005, WAC-220-110-070)
- All fill material and man-made structures shall be removed from stream channels. The natural stream channel profile shall be restored. Bottom width opening of the fill removal at stream channel crossings shall be equal to, or greater than, the natural bank full channel width.
 - Streambanks shall be shaped to blend in to the existing natural banks upstream and downstream from the crossing removal.

- Streambed substrates shall mimic the natural streambed characteristics upstream and downstream of the crossing removal. Large woody material and/or large rocks may need to be placed within the crossing removal site to accomplish this objective.
- The toe of the excavation shall be stabilized with large wood, appropriately sized rock, and/or vegetation as necessary to prevent excessive erosion of the new streambanks.
- When removing culverts on fish-bearing streams, construction sites shall be dewatered or isolated from flowing waters to prevent generation of sediment and minimize turbidity.
- Dewatering is not required for culvert or ford removals on non-fish bearing streams unless substantial excavation of stream channel or culvert bedding materials would be required after the existing culvert or structure is removed.

j. Project Criteria for Inchannel Gravel Removal

Limited excavation of river gravels and cobbles for project fill is permitted. Gravel excavation is limited to dry gravel bars within the main Carbon River channel only. The following technical provisions apply to gravel removal projects (Source: WAC-110-140):

- Gravel removal from a watercourse shall be limited to removal from exposed bars and shall not result in a lowering, over time, of the average channel cross-section profile through the project area or downstream.
- Gravel removal from the Carbon River would only occur during the approved in water work season (July 9 – August 22).
- An "excavation line" shall be established. "Excavation line" means a line on the dry bed, at or parallel to the water's edge. The excavation line should be established at a distance that would avoid excavation disturbance within the wetted channel. The excavation line may change with water level fluctuations.
- An "excavation zone" shall be defined as the area between the "excavation line" and the bank or the center of the bar. The "excavation zone" shall be identified by boundary markers placed by the applicant and approved by the department prior to the commencement of gravel removal.
- Excavation shall begin at the excavation line and proceed toward the bank or the center of the bar, perpendicular to the alignment of the watercourse.
- Bed material shall not be removed from the water side of the excavation line.
- Equipment shall not enter or operate within the wetted perimeter of the watercourse.
- Gravel may be removed within the excavation zone from a point beginning at the excavation line and progressing upward toward the bank or the center of the bar on a minimum two percent gradient. It may be necessary to survey the excavation zone upon completion of the gravel removal operation to ensure the two percent gradient is maintained and that no depressions exist.
- The depth of gravel excavation from exposed bars is limited to the depth of the adjacent water level.
- No excavation of gravels from within wetted channels is allowed in tributaries or side channels.
- At the end of each work day the excavation zone shall not contain pits, or potholes, or depressions that may trap fish as a result of fluctuation in water levels.
- The upstream end of the gravel bar shall be left undisturbed to maintain watercourse stability waterward of the ordinary high water line.
- Large woody material shall be retained waterward of the ordinary high water line and repositioned within the watercourse. Other debris shall be disposed of so as not to reenter the watercourse.
- Equipment shall be inspected, cleaned, and maintained to prevent loss of petroleum products waterward of the ordinary high water line.

k. Project Criteria for Moving Inchannel Large Wood for use in Engineered Logjams

- Only logs that are isolated on dry gravel bars in the Carbon River braided channel zone may be moved for use in logjams.

- No logs that are interacting with the wetted channel width may be moved, except within the construction footprint of a project site.

Equipment shall not enter or operate within the wetted perimeter of the watercourse, except at designated equipment crossing sites, and would only occur during the approved in water work season for the Carbon River (July 9 – August 22).

USFWS BIOLOGICAL OPINION - REASONABLE AND PRUDENT MEASURES

In addition to the above conservation measures, the following are required for implementation of the project:

The Park Service in cooperation with the Service has incorporated all practicable conservation and minimization measures into the project design to minimize incidental take. However, the Service believes the following reasonable and prudent measures (RPMs) are necessary and appropriate to minimize take of spotted owls, murrelets, and bull trout:

1. Minimize impacts to murrelets associated with helicopter noise and rotor wash and monitor helicopter use during the nesting season.
2. Minimize and monitor incidental take of bull trout caused by fish handling and turbidity.
3. Monitor spotted owl territories in project area.

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the Act, the Park Service must comply with the following terms and conditions, which implement the reasonable and prudent measures, described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

The following terms and conditions are required for the implementation of RPM 1:

1. The Park Service shall work with the helicopter contractor to define the helicopter flight route. The helicopter flight path should follow the course of the Carbon River as much as practicable to avoid flights directly over old-growth forest habitat. Minimize helicopter operations below 500 feet above ground level to the maximum extent practicable. Transport flights should maintain a minimum altitude of 1000 ft above ground level as much as practicable. Submit a report of the total hours of helicopter flight time and the flight paths used during the nesting season by November 30 of the same year.

The following terms and conditions are required for the implementation of RPM 2:

1. The Park Service shall ensure that fish capture and removal operations are conducted by a qualified biologist, and that all staff participating in the operation have the necessary knowledge, skills, and abilities to ensure safe handling of fish. Fish capture and removal operations shall take all appropriate steps to minimize the amount and duration of handling.
2. The Park Service shall document and report all bull trout or other salmonids encountered during fish capture and removal operations. The report should also specify the location and provide an estimate of the area that was isolated and dewatered. The Park Service shall submit a monitoring report to the FWS's consulting biologist (Vince Harke, 360-753-9529) at the Washington Fish and Wildlife Office in Lacey, Washington, by November 30 following each in-water construction season.

The Park Service in coordination with the Service shall develop a plan to monitor turbidity levels in Ranger Creek during culvert removal and along the Carbon River below the Maintenance Area ELJ site. This monitoring plan shall be submitted to the Service for approval by May 1, 2011.

3. The Park Service shall annually monitor all check dams installed in Falls Creek and at culvert removal sites to ensure that these structures are in compliance with the minimum fish passage guidelines established in the project design criteria. The Park Service shall document any obvious signs of channel bed or bank instability (e.g., headcutting) resulting from the work, and any additional actions taken to correct problem areas, and the final condition of the work area.
4. The Park Service shall submit a monitoring report to the Service's consulting biologist by November 30 following each in-water construction season, to include at a minimum, the following: (a) dates and times of construction activities, (b) monitoring results, sample times, locations, and measured turbidities (in NTUs), (c) summary of all annual construction activities, and, (d) summary of corrective actions taken to maintain fish passage at stream crossing sites.

The following terms and conditions are required for the implementation of RPM 3:

1. Continue to monitor spotted owl activity centers in the Carbon River valley. If an actual nest tree is located for the June Creek activity center (or any other site), report this location to the Service, and determine if the nest tree is located within the defined harassment distances of project activities. If monitoring indicates the spotted owls are not actively nesting, or that the nest is located beyond the harassment distances, we will acknowledge in writing that the incidental take anticipated in this biological opinion did/did not occur. The Park Service shall submit a monitoring report to the FWS's consulting biologist at the Washington Fish and Wildlife Office in Lacey, Washington, by November 30 following each in-water construction season.

The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. The Park Service must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

The Service is to be notified within three working days upon locating a dead, injured or sick endangered or threatened species specimen. Initial notification must be made to the nearest U.S. Fish and Wildlife Service Law Enforcement Office. Notification must include the date, time, precise location of the injured animal or carcass, and any other pertinent information. Care should be taken in handling sick or injured specimens to preserve biological materials in the best possible state for later analysis of cause of death, if that occurs. In conjunction with the care of sick or injured endangered or threatened species or preservation of biological materials from a dead animal, the finder has the responsibility to ensure that evidence associated with the specimen is not unnecessarily disturbed. Contact the U.S. Fish and Wildlife Service Law Enforcement Office at (425) 883-8122, or the Service's Washington Fish and Wildlife Office at (360) 753-9440.

NMFS Essential Fish Habitat Conservation Recommendations

1. Conduct reach, topographic, and channel migration assessments to determine which sections of the trail could be moved to areas less susceptible to flood damage and that would not require bank protection.
2. If bank and channel stabilization techniques are required, the use of toe-roughened gabion or toe-roughened log-crib walls will be used to minimize use of gabion baskets.
3. Replacement of the Chenuis and Ranger Creek culverts will occur as soon as practicable so fish have access to the upstream habitat.

Carbon River Access Management Finding of No Significant Impact

Attachment B: SHPO Carbon River Road MOA Stipulations

- I. The NPS/MORA shall preserve the 2006 Carbon River Road Cultural Landscape Inventory, as an archival record of the road's pre-November 2006 flood condition, in the park and federal archive repositories.
- II. The NPS/MORA shall interpret the history of the Carbon River Road as the park's first NPS-built scenic road with contributions by the Civilian Conservation Corps (CCC) to visitors in the former road corridor.
- III. The NPS/MORA shall ensure that project designs and construction are carried out in conformance with the Secretary of the Interior's Standards for Rehabilitation of Historic Properties, in order to retain to the greatest extent possible the Carbon River Road corridor's rustic and scenic characteristics that were incorporated into its original design and construction from the early 1920s through the 1930s, and to ensure the compatibility of new features, such as flood protection structures and bike trail bridges.
- IV. The NPS/MORA shall preserve the 20-foot wide Carbon River Corridor as a linear opening in the rainforest, by preventing young trees from establishing beside the new 10 feet-wide hiking/bicycling trail. The corridor shall be allowed to revegetate with low-growing plants such as ground covers, but not to fill-in with trees.
- V. The NPS/MORA shall reconstruct the Ipsut Creek Patrol Cabin within the former Ipsut Creek Campground parking area, a less flood-prone location, according to the terms of the August, 2007 MOA.
- VI. The NPS/MORA shall ensure all construction workers in the corridor are familiar with the historic significance of the road and the historic rustic and naturalistic character that is to be conveyed in the new hiking and bicycling trail.
- VII. The NPS shall conduct archaeological subsurface testing within the Ipsut Creek Campground in order to determine vertical and horizontal extents of site 45PI01111 and assess the site's eligibility for inclusion in the National Register of Historic Places.
- VIII. The NPS shall prepare, if appropriate, a Determination of Eligibility for site 45PI01111.
- IX. The NPS will provide archeological monitoring during construction to ensure that intact portions of historic site 45PI01040 (Washington Mining and Milling Co. Mine Adit) and any archeological resources found as a result of testing at site 45PI01111 are avoided by construction disturbances.
- X. The NPS shall ensure in the event of the inadvertent discovery of human remains, funerary objects, sacred sites, or objects of cultural patrimony all work in the affected area(s) would stop immediately and the site would be treated in a manner consistent with applicable federal law, including, but not limited to, the Native American Graves Protection and Repatriation Act of 1990.
- XI. The NPS shall curate all archaeological material recovered from subsurface testing, monitoring or inadvertent discoveries excluding human remains, funerary objects, sacred sites, or objects of cultural patrimony at the MORA curatorial facility.
- XII. The NPS shall ensure that all historical, architectural, and/or archeological work conducted

pursuant to this Agreement is carried out by or under the direct supervision of a person or persons meeting at a minimum the appropriate qualifications set forth in the Department of the Interior's "Professional Qualifications." (48 CFR 44738-46739)

Carbon River Access Management Finding of No Significant Impact Attachment C: SHPO Ipsut Creek Patrol Cabin MOA Stipulations

NPS/MORA will ensure that the following measures are carried out:

- 1) To prevent the loss of the Ipsut Creek Cabin to river flooding and erosion, the cabin will be cleaned, disassembled, labeled and transported to a safe temporary storage location before November 2007. Field notes and sketches will be prepared identifying the locations of the labeled building components sufficient to ensure that the cabin can accurately be reassembled at a new location in the future.
- 2) A new site will be selected by an interdisciplinary team including a historical architect and a cultural landscape architect to determine an appropriate new location that is similar in character to the existing site and is determined to be at less risk of flooding. The selection of the new site location will be determined through the NEPA environmental analysis process which will consider alternatives for the future of the Carbon River Road that is currently washed out in several locations including at Ipsut Creek. The alternative locations will be selected in consultation with the WA SHPO.
- 3) Through the NEPA / Section 106 process, the public will be afforded the opportunity to comment on the alternatives for relocating the cabin.
- 4) The cabin will be photographed and sketched to record construction details. The documentation will include:
 - a) Black and white photographs taken of interior and exterior views of the cabin and overall contextual photos of the impacted site as well as any site or structural details as appropriate.
 - b) A photographic index identifying each photograph by name, property, date and orientation of view.
 - c) Field notes sufficient to produce measured drawings and to reconstruct the cabin.
 - d) An area map of the Ipsut Creek Cabin pre-move location including the current landscaping details, with approximate scale and directional arrows.
 - e) A site map for the post-move location including the relationship to the pre-move location and landscape details.
 - f) The historic building inventory card which includes a summary of the historical significance of the cabin.
 - g) Documentation will be prepared using archival supplies and processes.

NPS shall provide SHPO an opportunity to review the existing conditions documentation prior to disassembling the cabin and the new location documentation prior to reassembly prepared by NPS as mitigation for Ipsut Creek Cabin. If SHPO does not provide the NPS with comments within 30 days of receipt of the documentation, the NPS will assume the SHPO is satisfied with the adequacy of the documentation and will proceed with the undertaking. NPS shall insure that all original materials associated with this documentation are deposited in the archives of Mount Rainier National Park and that archival copies of the documentation are deposited with the SHPO.

3)¹ NPS shall ensure that any burial sites, human remains, funerary objects, sacred objects, or objects of cultural patrimony encountered during the disassembling and reassembling process are treated in a manner consistent with applicable federal law, including, but not limited to, the Native American Graves Protection and Repatriation Act of 1990.

4) NPS shall ensure that all historical, architectural, and/or archeological work conducted pursuant to this Agreement is carried out by or under the direct supervision of a person or persons meeting at a minimum the appropriate qualifications set forth in the Department of the Interior's "Professional Qualifications." (48 CFR 44738-46739)

5) Failure to carry out the terms of this agreement requires that NPS again request the Council's comments in accordance with 36 CFR 800. If NPS does not carry out the terms of this agreement, it will not take or sanction any action or make any irreversible commitment that would result in adverse effect to the historic property or would foreclose the Council's consideration of modifications or alternatives to the undertaking.

6) Should the SHPO or the Council object within thirty (30) days of notification to any actions proposed to be carried out under this agreement, the NPS shall consult with the objecting party to resolve the objection. If the NPS determines that the objection cannot be resolved, the NPS shall request the further comments of the Council, pursuant to 36 CFR 800.6(b). Any Council comment provided in response to such a request will be taken into account by the NPS in accordance with 36 CFR 800.6(c)(2), with reference only to the subject of the dispute; the NPS's responsibility to carry out all actions under this agreement that are not the subjects of the dispute will remain unchanged.

7) At any time during the implementation of the measures stipulated in this agreement, should any objection to any such measure or its manner of implementation be raised by a member of the public, the NPS shall take the objection into account and consult as needed with the objecting party, the SHPO, or the Council to resolve the objection.

8) Any party to this agreement may request that it be amended. The process of amending the agreement shall be the same as that exercised in creating the original Agreement.

9) Any party to this Agreement may terminate it by providing thirty (30) days notice to the other parties, provided that the parties will consult during the period prior to termination to seek agreements on amendments or other actions that would avoid termination. In the event of termination, the NPS will comply with 36 CFR 800A through 800.6 with regard to the action covered by this Agreement.

¹Note: This numbering is original to the document.