National Park Service
U.S. Department of the Interior

Katmai National Park & Preserve
King Salmon, Alaska

# Brooks River Visitor Access

# FINAL
# Environmental Impact Statement

# BROOKS RIVER VISITOR ACCESS
# FINAL ENVIRONMENTAL IMPACT STATEMENT
# KATMAI NATIONAL PARK AND PRESERVE
# ALASKA

**Lead Agency:** U.S. Department of the Interior, National Park Service

**Proposed Action:** The National Park Service (NPS) is preparing an environmental impact statement (EIS) for visitor access for the Brooks River area of Katmai National Park and Preserve.

**Abstract:** The National Park Service is preparing a plan for visitor access at the Brooks River area of Katmai National Park and Preserve. The final environmental impact statement evaluates five alternatives to improve visitor access in the Brooks River area and relocate the park's barge landing site and access road away from the mouth of Brooks River.

The **no-action alternative** would maintain seasonal use of the 8-foot-wide floating bridge. The barge landing would remain at its current location. Under **alternative 2**, pedestrians and vehicles would use a boardwalk and bridge system (about 1,600 feet (ft)) between Brooks Lodge and the bus parking area. The barge landing site would be relocated about 2,000 ft south and require the construction of a new access road. Under **alternative 3**, pedestrians and vehicles would use a single boardwalk and bridge system (about 850 ft) with single access points on the north and the south sides of Brooks River. The barge landing site would be relocated about 200 ft south and generally use the existing barge access road. Under **alternative 4** (NPS preferred alternative), pedestrians and vehicles would use a single boardwalk and bridge system (about 1,500 ft) with single access points on the north and the south sides of Brooks River. The barge landing site would be relocated about 2,000 ft south and require the construction of a new access road. Under **alternative 5**, pedestrians and vehicles would use a single boardwalk and bridge system (about 1,100 ft) with single access points on the north and the south sides of Brooks River. The bridge would be as in alternative 4. The barge landing site would be relocated about 2,000 ft south and would require the construction of a new access road.

The key impacts of implementing the action alternatives (2, 3, 4, and 5) would be safer, less human-bear interactions; would have beneficial and adverse effects on salmon and other fish, bald eagles, wetlands and upland vegetation, hydrology and floodplains, soundscapes, archeological resources, ethnographic resources, and visitor experience; would have adverse effects on historic structures and cultural landscapes; would have adverse impacts on visual/scenic resources; and would have some beneficial effects on the socioeconomic environment.

**Public Comment:** The draft Visitor Access Plan/EIS was available for public review and comment from June 22, 2012 to August 20, 2012. NPS responses to public comments on the draft EIS are included in this final Visitor Access Plan/EIS. A 30-day no-action period will follow the U.S. Environmental Protection Agency's publication of the final EIS in the *Federal Register*. Following the 30-day no-action period, a Record of Decision describing the actions to be taken (selected alternative) will be signed by the regional director of the National Park Service Alaska Region. Both the final EIS and Record of Decision will be made available to the public.

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# SUMMARY

## INTRODUCTION

The National Park Service is preparing a plan for visitor access at the Brooks River area of Katmai National Park and Preserve. This document evaluates alternatives for constructing a bridge and boardwalks to replace the current floating bridge and associated trails to improve visitor access and provide for the same pedestrian and small vehicle traffic that currently use the floating bridge to cross Brooks River. Existing floatplane access in the Brooks River area, to the shores of Lake Brooks and Naknek Lake, would continue. This document also considers alternatives for relocating the park's barge landing site and access road away from the mouth of Brooks River.

## PURPOSE AND NEED FOR THE PLAN

The purpose and need is to improve visitor access and resource protection at the Brooks River area. This proposal would amend the 1996 *Brooks River Area—Final Development Concept Plan and Environmental Impact Statement* (1996 development concept plan) decision on access (including the construction of a floatplane dock and breakwater, a 1- to 2-mile access road, and the implementation of a shuttle system).

This plan is needed for several reasons:

- to improve visitor and employee safety, reducing the risk of human-bear conflicts
- to provide dependable access for the phased relocation of facilities and park concession operations
- to protect key park resources in the Brooks River area, including brown bears, salmon and trout, and cultural resources
- to improve visitor experience in the area
- to connect infrastructure utilities between the Valley Road Administrative Area and the north side of Brooks River

## SCOPE OF THE PLAN

This plan addresses how visitors and park and concession staff access the Brooks Camp area. If implemented, it would amend the 1996 *Brooks River Area—Final Development Concept Plan and Environmental Impact Statement* decisions regarding access in and around Brooks Camp. The 1996 plan approved a floatplane and boat dock and breakwater on Naknek Lake south of the Brooks River mouth. To move visitors from the dock to Beaver Pond Terrace (on the south side where the lodge would move) would require a new road and shuttle bus system, which was approved in the 1996 plan. This bridge and elevated boardwalk implementation plan amends these decisions by maintaining the existing floatplane and boat access to Brooks Camp at Naknek Lake. No dock, breakwater, or road would be built.

In approving the move of Brooks Camp to the south side of Brooks River, the 1996 plan envisioned eliminating the bridge and making the north side a "people free zone." Because there would be no new boat and floatplane docking area on the south side, this plan proposes to continue existing boat and floatplane access to the shores of Naknek Lake and Lake Brooks and to facilitate movement of visitors and staff within the Brooks River area via an elevated bridge and boardwalk system.

The 1996 plan also envisioned relocation of the barge landing area from the river mouth to the boat docking area, which was located on Naknek Lake southeast of the present barge dock station. This plan supports the 1996 concept of moving the barge landing area from the river mouth where the operation is highly visible to visitors and in an area frequented by brown bears. However, because no new docking system would be developed, alternative barge/watercraft landing areas, farther from the river mouth, are proposed.

Other decisions made in the 1996 plan would continue to provide overall guidance for development and operations in the Brooks Camp area and would remain valid. These decisions include the following:

- moving Brooks Camp, including the lodge, to the south side of Brooks River
- visitor use limits as proposed in the 1996 plan

The National Park Service is proposing a phasing strategy to implement the rest of the 1996 plan by replacing the floating bridge at Brooks River and by relocating the barge/watercraft landing area. By doing this, the Brooks Camp area would be fully operational for the duration of the move.

## ALTERNATIVES

Five alternatives were developed for constructing a bridge and boardwalks to replace the current floating bridge and associated trails, and to relocate the park's barge landing site and access road.

The alternatives were developed through an interdisciplinary team process that included tiering from earlier plans, including the 1996 *Brooks River Area—Final Development Concept Plan and Environmental Impact Statement* and 1986 *General Management Plan*. Based on public scoping comments, input from NPS staff, and NPS mandates and policies, various concepts and project elements were considered. The planning team also considered potential environmental, visitor experience, visitor safety, operational efficiency, design, cost, and other factors in crafting the action alternatives. Different combinations of project elements with regard to the bridge, boardwalk, and barge/landing area were then integrated into the four action alternatives.

## ALTERNATIVE 1 (NO ACTION ALTERNATIVE)

This alternative represents a continuation of the existing situation. Under the no-action alternative, visitors and park and concessions staff would continue to access Brooks River via a trail through the vegetated area known as *the Corner* (a primary route for people traveling from Brooks Camp to the bridge and the south side of Brooks River, and an important area for brown bears to rest, especially sows with cubs) as they head south from the Brooks Camp area. Seasonal use of the existing floating bridge across Brooks River would continue. Park staff would continue to install and remove the bridge each spring and fall and stabilize the riverbanks to ensure that the floating bridge remains in place while in use.

The barge landing and associated road would remain at its current location on the south side of the river. The NPS landing craft, barges, and other boats would continue to land at the site at the mouth of Brooks River.

Utility connections between the north side of the Brooks River and the Valley Road Administrative Area would be considered at a later date as part of a separate action.
The key impacts of implementing this alternative would be associated with brown bears and the visitor experience. Long-term, moderate, adverse, and primarily localized impacts would occur to brown

bears. These adverse effects would primarily result from continuing ground level human-bear interactions between Brooks Camp and the bus parking area on the south side of Brooks River. Human habituation of bears also would continue. Localized, moderate, long-term, adverse impacts on the visitor experience would occur primarily because of the perpetuation of inconveniences associated with closing the floating bridge and access points to avoid unwanted human-bear interactions. The no-action alternative would also perpetuate visitor safety concerns because of frequent unwanted human-bear interactions having localized, moderate, long-term, adverse impacts.

## ACTIONS COMMON TO ALL ACTION ALTERNATIVES

The following actions would be implemented under all of the action alternatives considered in this environmental impact statement:

- All construction activities would be scheduled to ensure that the least possible disturbance to resources and visitor experience would occur.
- The construction contractor might occupy a temporary construction camp at or near the Valley Road Administrative Area, or the contractor may use the existing contractor camp about 0.5 mile southeast of the Valley Road Administrative Area ("Squirrel Camp").
- Existing gravel sources about 5 miles southeast of Brooks River on Valley of Ten Thousand Smokes Road would be used.
- NPS staff would monitor the impacts on park resources from the construction and continuing use of the bridge and boardwalks and from construction of the new barge landing site.
- Up to seven viewing areas (depending on the alternative) would be established on the north and south sides of Brooks River.
- Gates would be installed at each end of the boardwalk where they meet existing grade to prevent bears from gaining access to the boardwalks and bridge.
- Emergency ladders would be included at the north end of the bridge for safety reasons.
- Under all of the alternatives, including the no-action alternative, the new barge landing ramp would be hardened with materials such as interlocking pavers or geoweb filled with gravel.
- Both electrical intertie and septic tank pump-out lines would use the bridge to cross Brooks River.

## ALTERNATIVE 2

Under alternative 2, pedestrians and vehicles would use an extensive boardwalk and bridge system (about 1,600 ft) between Brooks Lodge and the bus parking area. The 3-span bridge would require two sets of supports (steel piles) in the river. On the north side of Brooks River, a boardwalk would separate visitors from bears and would eliminate human use of the Corner. The south boardwalk would run from the river to the bus parking area. The boardwalks would have separate access points for pedestrians and vehicles on the north and south sides of Brooks River. Up to four viewing/pullout areas would located along the north boardwalk, and up to three primary viewing/pullout areas would be on the south boardwalk.

The barge landing site would be relocated about 2,000 ft south and require the construction of a new access road. The existing access road would be removed and the landscape restored. A boat parking area would be used for parking up to eight skiffs on trailers in the summer and for overwintering the park's landing craft.

The key impacts of this alternative would be associated with brown bears, salmon and other fish, hydrology, cultural landscape, visitor experience, and visual/scenic resources. Compared to alternative 1, alternative 2 would have both beneficial and adverse, short- and long-term, minor to moderate impacts on brown bears, fish, and hydrology due to construction and operation of the bridge and boardwalks and removal of the floating bridge. Construction of the bridge and boardwalks would have a long-term, moderate, adverse impact on the Brooks Camp cultural landscape. Construction of the bridge, boardwalks, and viewing areas would greatly improve visitor safety and provide new bear viewing opportunities, resulting in a localized, major, long-term, beneficial impact on visitor experience (although there would be minor, localized, adverse impacts during the construction period). From a visual/scenic resource perspective, construction of the bridge would have a localized, major, long-term, adverse impact.

## ALTERNATIVE 3

Under alternative 3, pedestrians and vehicles would use a single boardwalk and bridge system (about 850 ft) with single access points on the north and south sides of Brooks River. The preengineered medium-span bridge would require six sets of steel support piles in the river. The north boardwalk would start near the fish freezing station and ramp up to 10 ft above grade and extend to the north end of the bridge through the Corner following the existing trail alignment. A relatively short south boardwalk would ramp down from the bridge until it reaches grade and connects to the existing road. The north boardwalk would include up to two viewing/pullout areas, while the south boardwalk would have one viewing area on each side of the south side of the bridge.

The barge landing site would be relocated about 200 ft south and generally use the existing barge access road.

The key impacts of this alternative would be associated with brown bears, salmon and other fish, hydrology, cultural landscape, visitor experience, and visual/scenic resources. Compared to alternative 1, alternative 3 would have both beneficial and adverse, short- and long-term, minor to moderate impacts on brown bears, fish, and hydrology due to construction and operation of the bridge and boardwalks and removal of the floating bridge. Construction of the bridge and boardwalks would have a long-term, moderate, adverse impact on the Brooks Camp cultural landscape. Construction of the bridge, boardwalks and viewing areas would greatly improve visitor safety and provide new bear viewing opportunities, resulting in a localized, major, long-term, beneficial impact on visitor experience (although there would be minor, localized, adverse impacts during the construction period). From a visual/scenic resources perspective, construction of the bridge in alternative 3 would have a localized, minor to moderate, long-term, adverse impact.

## ALTERNATIVE 4 (NPS PREFERRED ALTERNATIVE)

Under alternative 4, pedestrians and vehicles would use a single boardwalk and bridge system (about 1,550 ft) with single access points on the north and south sides of Brooks River. The wooden short-span bridge would require up to 14 sets of steel piles in the river. The north boardwalk would start adjacent to the lodge and then continue south over wetlands to the bridge. The south boardwalk would run from the bridge, cut through a wooded area, and run along the edge of a wetland to about 100 ft from the bus parking area. The north boardwalk would have up to four viewing/pullout areas, while the south boardwalk would have up to three primary viewing/pullout areas.

The barge landing site and boat parking area would be the same as in alternative 2. The existing site would be relocated about 2,000 ft south and require the construction of a new access road.

The key impacts of alternative 4 would be associated with brown bears, salmon and other fish, hydrology, cultural landscape, visitor experience, and visual/scenic resources. Compared to alternative 1, alternative 4 would have both beneficial and adverse, short- and long-term, minor to moderate impacts on brown bears, fish, and hydrology due to construction and operation of the bridge and boardwalks and removal of the floating bridge. However, bridge designs with a large number of supports (piles), such as alternative 4, have a higher potential for adverse impacts on fish and hydrology. Construction of the bridge and boardwalks would have a long-term, moderate, adverse impact on the Brooks Camp cultural landscape. Construction of the bridge, boardwalks, and viewing areas would greatly improve visitor safety and provide new bear viewing opportunities, resulting in a localized, major, long-term, beneficial impact on visitor experience (although there would be minor, localized, adverse impacts during the construction period). From a visual/scenic resources perspective, construction of the bridge in alternative 4 would have a localized, moderate, long-term adverse impact.

## ALTERNATIVE 5

Under alternative 5 pedestrians and vehicles would use a single boardwalk and bridge system (about 1,100 ft) with single access points on the north and south sides of Brooks River. The bridge would be as described in alternative 4. The north boardwalk would be the same as described in alternative 4; however, the south boardwalk would connect to the south end of the bridge and ramp down to meet the access road about 215 ft south of Brooks River. The north boardwalk would have up to four viewing/pullout areas, while the south boardwalk would have at least one viewing/pullout area on each side of the south side of the bridge.

The barge landing site and boat parking area would be the same as in alternative 2. The existing site would be relocated about 2,000 ft south and would require the construction of a new access road.

The key impacts of alternative 5 would be associated with brown bears, salmon and other fish, hydrology, cultural landscape, visitor experience, and visual/scenic resources. Compared to alternative 1, alternative 5 would have both beneficial and adverse, short- and long-term, minor to moderate impacts on brown bears, fish, and hydrology due to construction and operation of the bridge and boardwalks and removal of the floating bridge. However, bridge designs with a large number of supports, such as those described in alternative 4, have a higher potential for adverse impacts on fish and hydrology. Construction of the bridge and boardwalks would have a long-term, moderate, adverse impact on the Brooks Camp cultural landscape. Construction of the bridge, boardwalks, and viewing areas would greatly improve visitor safety and provide new bear viewing opportunities, resulting in a localized, major, long-term, beneficial impact on visitor experience (although there would be minor, localized, adverse impacts during the construction period). From a visual/scenic resources perspective, construction of the bridge in alternative 4 would have a localized, moderate, long-term, adverse impact.

## ENVIRONMENTALLY PREFERABLE ALTERNATIVE

The environmentally preferable alternative is “the alternative that causes the least damage to the biological and physical environment; it also means the alternative that best protects, preserves, and enhances historic, cultural, and natural resources." Alternative 4 is the environmentally preferable alternative.

## NEXT STEPS

Following distribution of the final environmental impact statement and a 30-day no-action period, a record of decision approving a final plan will be signed by the NPS Alaska regional director. The record of decision documents the NPS selection of an alternative for implementation. With the signing of the record of decision, the plan can then be implemented.

It is important to note that not all of the actions in the selected alternative would necessarily be implemented immediately. The implementation of the approved plan, no matter which alternative, would depend on future NPS funding levels and servicewide priorities. The approval of this plan does not guarantee that funding and staffing needed to implement the plan would be forthcoming.

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## MAPS



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# ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| ACHP | Advisory Council on Historic Preservation |
| ANILCA | Alaska National Interest Lands Conservation Act |
| CEQ | Council on Environmental Quality |
| CFR | Code of Federal Regulations |
| CUA | Commercial Use Authorizations |
| DCP | Development Concept Plan |
| FTE | Full-time Equivalent |
| NAGPRA | Native American Graves Protection and Repatriation Act of 1990 |
| NEPA | National Environmental Policy Act of 1969, as amended |
| NOAA | National Oceanic and Atmospheric Administration |
| NPS | National Park Service |
| Park | Katmai National Park and Preserve |
| SHPO | State Historic Preservation Office(r) |
| USC | United States Code |
| USDI | U.S. Department of the Interior |
| USFWS | U.S. Fish and Wildlife Service |

# A GUIDE TO THIS DOCUMENT

**Chapter 1: Purpose and Need for the Action** sets the framework for the entire document. It describes why the environmental impact statement is being prepared and what needs it addresses. The chapter also provides background on previous related studies. This chapter also provides an overview of the scope of the environmental impact analysis—specifically what impact topics were or were not analyzed in detail.

**Chapter 2: Alternatives** begins by describing the components of the alternatives. It then describes a no-action alternative (alternative 1). Alternatives 2 through 5 are then presented, which propose varying modifications for access in and around Brooks Camp. Next, there is a discussion of which alternative was determined to be the environmentally preferable alternative and a description of alternatives considered but dismissed. A section is presented on mitigation of potential impacts of the alternatives. The chapter concludes with summary tables of the alternatives and the environmental consequences of implementing those alternative actions.

**Chapter 3: Affected Environment** describes those areas and resources that would be affected by implementing the various alternatives—natural and cultural resources, visitors and visitor experience, visual/scenic resources, and socioeconomics

**Chapter 4: Environmental Consequences** analyzes the impacts of implementing the alternatives on the topics described in "Chapter 3: Affected Environment." Methods that were used for assessing the impacts in terms of the intensity, type, and duration of impacts are outlined. This chapter also includes an analysis of cumulative impacts for each alternative.

**Chapter 5: Consultation and Coordination** describes the history of public and agency coordination during the development of this document and lists agencies and organizations that will be receiving copies of this document. Chapter 5 also includes NPS responses to the concerns raised by commenters on the draft EIS. Copies of agency letters are in appendix D.

The **Appendixes** present supporting information for the document, along with selected references and a list of the document preparers.

# 1

# Purpose and Need For The Action

# INTRODUCTION

Brooks Camp, on the shore of Naknek Lake in Katmai National Park, is one of the park's primary visitor destinations for brown bear viewing, fly-fishing, and access to Valley of Ten Thousand Smokes. During the summer season (June–September), a lodge and campground serve overnight guests and a shuttle is available to transport visitors to the valley created by the 1912 eruption of Novarupta. The 1-mile Brooks River corridor is the center of brown bear viewing activities. While brown bears can be sighted any month of the summer, when the red salmon are spawning (July and September) over 100 brown bears congregate at Brooks River to feed. During these periods, visitor numbers peak to over 300 per day to view the bears or to participate in catch and release fishing. Access to Brooks Camp is via a floatplane or sometimes boat, which can easily beach on the shore of Naknek Lake, north of Brooks River. Access to the Brooks Falls bear viewing platforms or to Valley Road requires crossing Brooks River to the south side via a floating bridge. Most supplies for National Park Service (NPS) administrative facilities and operations arrive via barge or boat to a landing site at the mouth of Brooks River, on the south shore, 750 ft along a riverside access route from the bridge. Other supplies arrive by floatplane and boat or barge landings on the north side of Brooks River.

Human-bear interactions in the Brooks River area result in numerous visitor safety issues. Special regulations for Katmai National Park and Preserve prohibit visitors from approaching within 50 yards of brown bears. At the river mouth, bears can be viewed feeding, resting, playing, or fighting in the immediate vicinity of the floating bridge and barge landing site and access road. Bears in the river or on the shore can result in delaying visitors from crossing the bridge; visitors can retreat to a bear viewing platform on the south shore to wait for bears to move from the immediate vicinity. Bear activity can also delay barge landing, unloading activities, and transporting of food, supplies, and materials.

The National Park Service is preparing a plan for visitor access to and within the Brooks River area of Katmai National Park (maps 1 and 2). This environmental impact statement would amend a prior plan, which called for construction of new access facilities to move floatplane, boat, and barge landing areas to the south side of Brooks River. Specifically, this draft environmental impact statement evaluates alternatives for replacing the floating bridge with an elevated bridge and boardwalk system, along with a new barge landing site and access road.

## PURPOSE

This project is intended to facilitate the phased relocation of Brooks Camp facilities and operations to the south side of Brooks River, as funding becomes available, as called for in the 1996 Record of Decision (ROD) for the *Brooks River Area—Final Development Concept Plan and Environmental Impact Statement* (NPS 1996a). This phased strategy would allow the Brooks Camp area to be fully operational for the duration of the relocation. The project would improve visitor access and provide for pedestrian and small vehicle traffic that currently use the floating bridge to cross Brooks River. It would provide safe and reliable access for visitors and park and concessioner employees in and around the Brooks Camp area of the park. Another objective is to enhance resource protection in the Brooks River area.

If implemented this plan would amend some of the planning direction for the Brooks Camp area provided by the 1996 *Brooks River Area—Final Development Concept Plan and Environmental Impact Statement.* Specifically, it would change as follows:

- The existing floatplane and boat access to Brooks Camp at Naknek Lake would be maintained; the 1996 plan approved a floatplane/boat dock and breakwater for wave attenuation on Naknek Lake about 3,000 ft southeast of the mouth of Brooks River. The floatplane / boat dock and breakwater would not be constructed.
- The plan included a new access road and shuttle bus system to transport visitors from the landing site to the new Beaver Pond terrace lodge site; these access facilities would not be constructed.
- An elevated bridge and boardwalk system would be developed to facilitate movement of visitors and staff and transport supplies within the Brooks River area. After the phased relocation is complete only a ranger/visitor contact station, minimal day use facilities (vault toilet and picnic area), and limited emergency rescue equipment would be maintained on the north side of the river. The bridge and boardwalk system would allow access from floatplane/boat point of entry across Brooks River to the relocated Brooks Camp on the south side of the river; the 1996 plan envisioned eliminating the floating bridge and all facilities on the north side of the Brooks River.
- The existing barge landing site on the south side of Brooks River would be removed. The barge landing area would be relocated farther south of the river mouth on Naknek Lake. The draft environmental impact statement evaluates three barge landing sites and access road configurations. This plan supports the 1996 plan's concept of moving the barge landing area from the river mouth where the operation is highly visible to visitors and in an area frequented by brown bears.

The decision to move Brooks Camp, including the lodge, to the south side of Brooks River was made in the 1996 plan. The 1996 plan, as amended by and in conjunction with this plan, would provide overall guidance for development and operations in the Brooks Camp area.


# MAP 1. REGION

Katmai National Park and Preserve

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# MAP 2. Brooks River Area

Katmai National Park and Preserve

United States Department of the Interior • National Park Service

## NEED

The bridge/boardwalk and barge landing/ access road project is needed for several reasons related to access, safety, resource protection, visitor experience, and operations.

- Provide dependable access for the phased relocation of facilities and park concession operations
  - Dependable pedestrian and small utility vehicle access across Brooks River is needed to provide for continued operations during the phased relocation of Brooks Camp to the south side of Brooks River.
- Improve safety
  - Visitor and employee safety needs to be improved to reduce the risk of human-bear conflicts where brown bears concentrate near the mouth of Brooks River—the center of bear viewing activity. The frequency of human-bear interaction in this lower river area, combined with the limited mobility of some visitors and the challenge of managing groups of more than 15 people elevates the risk in this area. The human-bear conflicts with visitors accessing the floating bridge, landing the barge, and trucking materials along the barge road are numerous, and time consuming for NPS and lodge employees, contractors, and the public.
- Protect park resources
  - Key resources in the Brooks River area need protection. These resources include migratory salmon and trout that use the Brooks River area as spawning habitat, the Brooks River watershed and adjacent wetlands, concentrations of feeding brown bears that rely on the resources and habitat provided along the Brooks River corridor, and the Brooks River Archeological District National Historic Landmark.
- Improve visitor experience
  - There are opportunities to improve visitor experience in the river outlet area where some operations, such as a barge landing site, can degrade that experience. The visitor experience can also be improved through changes in access within the Brooks River area by reducing access delays caused by bear concentrations at floating bridge access points on both sides of the river.
- Operations—connect infrastructure utilities
  - Work is underway to replace failing utilities at Brooks Camp through the construction of new utility systems on the south side of the river. However, some of the utility systems on the north side of the river need to be connected until the phased relocation is complete. The action alternatives address how these utility connections between the new utility infrastructure near the Valley Road Administrative Area and the north side of Brooks River would be made.

This draft environmental impact statement analyzes the potential environmental impacts that could result from the alternatives considered, including the no-action alternative. This draft environmental impact statement has been prepared in accordance with the National Environmental Policy Act of 1969 (NEPA), regulations of the Council on Environmental Quality (CEQ) (40 CRS 1508.9), and the NPS compliance guidance handbook and Director's Order 12: *Conservation Planning, Environmental Impact Analysis, and Decision-making* (NPS 2001).

## PARK PURPOSE AND SIGNIFICANCE

### Park Purpose

The purpose of Katmai National Park and Preserve conveys the reason(s) for which it was set aside as a national park system unit. The *Katmai National Park and Preserve Foundation Statement* (NPS 2009) identified the following park purpose:

> Protect, study, and interpret active volcanism surrounding the Valley of Ten Thousand Smokes, extensive coastal resources, habitats supporting a high concentration of salmon and brown bears, and an ongoing story of humans integrated with a dynamic subarctic ecosystem.

In 1980, Congress passed the Alaska National Interest Lands Conservation Act (ANILCA), which enlarged and designated Katmai as a national park and preserve. Section 202 of the act states that the area be managed for the following specific purposes:

- to protect habitats for, and populations of, fish and wildlife including, but not limited to, high concentrations of brown/grizzly bears and their denning areas
- to maintain unimpaired the water habitat for significant salmon populations
- to protect scenic, geological, cultural, and recreational features

### Park Significance

Statements of park significance were developed as part of the foundation statement (NPS 2009d). The foundation statement defines what is most important about the park's resources and values and is guided by the park's legislation and knowledge acquired through management, research, and civic engagement. The park significance statements are used to guide all planning and management decisions to ensure that the resources and values that contribute to the park's designation are preserved.

The following park significance statements are relevant to this project. Katmai National Park and Preserve

- is home to the world's largest protected population of brown bears, offering visitors an unprecedented opportunity to study and view bears in their native habitat
- protects the Naknek Lake drainage, an important spawning and rearing ground for Bristol Bay sockeye salmon, sustaining one of the largest salmon runs in the world
- contains vast multilake watersheds with hundreds of miles of rivers that link the freshwater and marine aquatic systems and provide critical habitat for fish and wildlife
- contains a 9,000-year record of human adaptation to environmental and ecological change that continues today

## BACKGROUND

### Brief Description of the Park and Brooks Camp

Katmai National Park and Preserve, encompassing approximately 4.1 million acres, is at the head of the Alaska Peninsula (see map 1), about 290 miles southwest of Anchorage. Established as a national monument in 1918 to preserve the Valley of Ten Thousand Smokes and the landscape associated with the cataclysmic volcanic eruption of 1912, it was expanded over the years by four presidential proclamations and then enlarged and redesignated a national park and preserve by the Alaska National Interest Lands Conservation Act in 1980.

King Salmon is the closest permanent town and the location of the field headquarters for Katmai National Park and Preserve. It is about 10 miles from the western boundary of the park and about 284 miles southwest of Anchorage. King Salmon is the main departure point and gateway for park visitors. There are no road connections with King Salmon or the park to the rest of the state.

Katmai National Park and Preserve is renowned for the opportunities it provides for wildlife viewing, sportfishing, and learning about the area's rich human history. Brooks Camp is one of the main attraction areas of the park. Brooks Camp is about 30 air miles from park headquarters. Set on the shores of Naknek Lake near the mouth of Brooks River, Brooks Camp is accessible by boat or floatplane only.

Brooks Camp was originally established in the 1950s to support recreational fishing activities. Today the area is known for opportunities for watching brown bears. Each year during the June to September salmon runs, visitors come to see the bears feeding. Viewing platforms and other infrastructure have been established to support these activities, including a floating bridge that provides access over Brooks River from Brooks Camp to the viewing areas and Valley of Ten Thousand Smokes Road.

Other visitor facilities at Brooks Camp include Brooks Lodge (concessioner operated), a visitor center, an auditorium, a campground, and a picnic area. A significant cultural site is a short distance from the visitor center, providing visitors with an important opportunity to learn about the human history of the Brooks Camp area. Nearby attractions include the Valley of Ten Thousand Smokes. Groups leave Brooks Camp and cross the river to access the daily bus tours to Valley of Ten Thousand Smokes; these tours are popular with Brooks Camp visitors. Hiking to Dumpling Mountain (elevation 2,440 ft) is another popular attraction in the Brooks Camp area.

Primary access to the seasonal camp is by floatplane or boat from King Salmon. The camp lies near the outlet of Brooks River, a 1.5-mile long drainage extending from Lake Brooks into Naknek Lake. Brooks River divides the Brooks Camp area. The area north of the river includes Brooks Lodge and other concessioner and NPS buildings, including a ranger station, maintenance facilities, seasonal housing (cabins and tent platforms), visitor center, auditorium, and a campground. The area south of the river includes several bear viewing platforms, NPS employee housing (cabins), maintenance facilities, and a picnic shelter.

## RELATIONSHIP OF PROPOSAL TO OTHER PLANNING PROJECTS AND POLICIES

Several plans have influenced or would be influenced by the *Brooks River Visitor Access Draft Environmental Impact Statement*. These plans have been prepared by the National Park Service. Some of these plans are described briefly here, along with their relationship to this document.

### 1986 General Management Plan

The park's 1986 general management plan guides management actions to protect natural and cultural resources; upgrade facilities, staffing, and services necessary to support recreational uses; and to improve visitor opportunities to experience park resources.

The general management plan specifically addressed several Brooks Camp issues, including the stabilization of facilities and activities, ongoing studies to document human-bear interactions, the need for a development concept plan, accommodation of expected increases in visitation, and the potential for a wider range of dispersed activities emanating from the Brooks Camp area.

This project is consistent with the management directions in the 1986 general management plan.

### 1996 Brooks River Area Development Concept Plan

In 1996, the National Park Service completed the *Final Brooks River Area Development Concept Plan and Environmental Impact Statement* (NPS 1996a). The plan's selected alternative called for a reorientation of management and use to more adequately preserve and interpret the area's globally significant Alaskan brown bear viewing opportunities and prime brown bear habitat and to manage these elements as integral parts of an evolving environment that also contains nationally significant cultural resources, scenic values, and world-class sportfishing opportunities. The primary goals of the 1996 plan are to

- protect cultural and natural resources
- improve visitor experience
- provide alternative strategies for operation and maintenance of Brooks River facilities

Some of the specific actions from the 1996 plan include the following:

- The lodge and the bulk of the concession operation would be relocated to an area south of Brooks River at Beaver Pond Terrace (to be implemented). An access road connecting the relocated facilities to the valley road would be required.
- NPS facilities would be consolidated in an area along Valley of Ten Thousand Smokes Road. (Work is currently underway to construct the infrastructure to allow housing to be consolidated within the new Valley Road Administrative Area (NPS 2007b; NPS 2009b; URS 2009a).
- The immediate Brooks River area would become a day use area.
- The existing floating bridge would be removed. (The proposed 2012 plan would include an elevated bridge and boardwalk system.)
- Visitor use levels would be managed.
- A floatplane/watercraft/docking area, breakwater, and access road with an attendant shuttle system on Naknek Lake would be developed. (These facilities and access road would not be developed if the proposed plan is approved.)
- The Brooks Falls viewing platform would be redesigned and expanded. (Falls Trail boardwalk and Riffles platform were completed in 1996 and 2000.)

The National Park Service would move different components of Brooks Camp to the south side until most facilities and activities have been moved. When the total move is finished, according to the changes proposed in this document, the remaining facilities and activities on the north side would be a ranger/visitor contact station, minimal day use facilities (vault toilet and picnic area), and limited emergency equipment such as a rescue skiff and medical supplies.

Subject to available funding, the move would be in phases according the following sequence and approximate time frame (figure 1):

**5–10 years**

- maintenance facilities consolidated and relocated to the Valley Road Administrative Area (largely completed)
- utility infrastructure (power, communication, water, and wastewater) constructed at the Valley Road Administrative Area (underway)
- new barge landing and access road constructed
- floating bridge replaced with elevated bridge and boardwalk system
- Brooks Camp powered by Valley Road Administrative Area electrical system
- first phase of relocation/ replacement of employee housing to the Valley Road Administrative Area

**10–15 years**

- second phase of relocation/replacement of employee housing to the Valley Road Administrative Area

**15+ years**

- lodge and campground relocated to Beaver Pond Terrace; an access road would connect the relocated facilities to the valley road
- remaining support structures relocated to the south side of the river
- third phase of relocation/replacement of employee housing to the Valley Road Administrative Area

The proposed 2012 plan is consistent with the overall intent of the 1996 plan and continues implementation by proposing visitor access improvements as the next step.

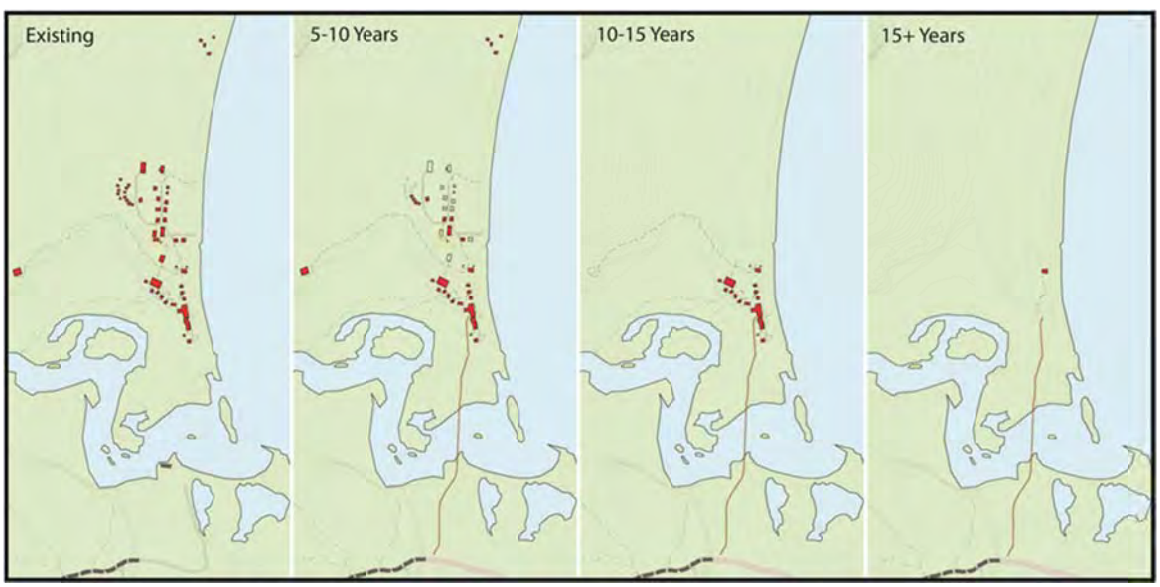



**FIGURE 1. SCHEMATIC OF PHASED RELOCATION OF BROOKS CAMP**

## 2007 Brooks Camp Maintenance Facility Environmental Assessment

As part of the 2007 *Brooks Lake Maintenance Facility Environmental Assessment*, the National Park Service continued to implement the 1996 development concept plan by relocating and replacing maintenance facilities currently in the vicinity of Lake Brooks and in Brooks Camp. The new maintenance and housing area approved in this plan is referred to as the Valley Road Administrative Area. The plan also called for the first phase of new housing with construction of two duplex housing units in the park near the new location for maintenance facilities. Existing housing units (tent structures) in the Brooks Camp area will be removed and the sites will be rehabilitated to a natural condition.

The proposed 2012 plan is consistent with and supportive of actions proposed in the 2007 environmental assessment.

## 2009 Brooks Camp Utilities and Housing Relocation Environmental Assessment

The National Park Service recently approved replacing utility systems for Brooks Camp at the Valley Road Administrative Area. The project facilitates the move of support facilities to the south side of the river through site planning and layout, utility installations, and housing relocation. The project site is immediately adjacent to the recently constructed gravel pad and new maintenance facility along Valley of Ten Thousand Smokes Road, near its intersection with the road from Lake Brooks to the lower viewing platform.

The proposed 2012 plan is consistent with and supportive of actions proposed in the 2009 environmental assessment.

## Policy on Impairment of Park Resources

In addition to determining the environmental consequences of implementing the preferred and other alternatives, NPS *Management Policies 2006* (section 1.4) requires analysis of potential effects to determine whether the preferred alternative would impair a park's resources and values.

The fundamental purpose of the national park system, established by the NPS Organic Act (16 USC 1) and reaffirmed by the NPS General Authorities Act of 1970, as amended, begins with a mandate to conserve park resources and values. NPS managers must always seek ways to avoid or minimize to the greatest degree practicable adverse impacts on park resources and values. However, the laws do give the National Park Service the management discretion to allow impacts on park resources and values when necessary and appropriate to fulfill the purposes of the park. That discretion is limited by the statutory requirement that the National Park Service must leave resources and values unimpaired unless a particular law directly and specifically provides otherwise.

The prohibited impairment is an impact that, in the professional judgment of the responsible NPS manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values (NPS *Management Policies 2006,* section 1.4.5). Whether an impact meets this definition depends on the particular resources that would be affected; the severity, duration, and timing of the impact; the direct and indirect effects of the impact; and the cumulative effects of the impact in question and other impacts.

An impact on any park resource or value may, but does not necessarily, constitute impairment. An impact would be more likely to constitute impairment to the extent that it affects a resource or value whose conservation is

- necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park;
- key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or
- identified in the park's general management plan or other relevant NPS planning documents as being of significance.

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

Impairment may result from visitor activities, NPS administrative activities, or activities undertaken by concessioners, contractors, and others operating in the park. Impairment may also result from sources or activities outside the park.

The determination of nonimpairment for the selected alternative will be attached to the record of decision.

## IMPACT TOPICS TO BE ADDRESSED

Impact topics are a more refined set of concerns about park resources or values analyzed for each of the alternatives. The impact topics were derived from the issues identified in scoping, and these topics were used in chapter 4 to examine the extent to which a resource would be affected by the actions of a particular alternative.

The following impact topics are those that have been considered in this document. Included is identification of the issues associated with each impact topic and the rationale for analyzing the impact topic.

### Natural Resources

**Brown Bears.** Katmai National Park and Preserve is home to the world's largest protected population of brown bears. The Brooks River area provides excellent habitat for brown bears during the summer. The existing scenario along Brooks River, as well as the action alternatives, could impact brown bears. Brown bears could be affected by construction activities and use of the facilities, and changes to brown bears feeding, resting, mating, or caring for young could occur in the short term.

**Bald Eagles.** An active bald eagle nest is near the proposed barge landing and access road in three of the action alternatives. The proposed construction and use of the new barge road could impact the ability of the eagles to successfully use the nest site.

**Salmon, Rainbow Trout, and Arctic Grayling.** Katmai National Park and Preserve protects the Naknek Lake drainage, a significant spawning and rearing ground for Bristol Bay sockeye salmon, sustaining one of the largest salmon runs in the world. Brooks River is a migration route for five species of spawning salmon and hosts populations of trophy rainbow trout. The floating bridge is set directly on the surface of the river and may be an impediment to fish migration and affect spawning habitat.

Depending on the type of bridge built across Brooks River, support piles could obstruct fish passage and affect spawning habitat.

**Wetlands and Upland Vegetation.** Wetlands at the mouth of Brooks River could be affected by removal of the existing barge road and landing area.

Existing, undisturbed wetlands could be affected by the construction of a new bridge and boardwalk system, changed circulation patterns in the Brooks Camp area, and new barge landing road.

Vegetation would also be affected by the new developments. There would be a risk of increasing existing infestations of invasive plants and introducing new invasive species in the Brooks River area.

**Hydrology and Floodplains.** The flow of Brooks River affects wildlife, visitors, and facilities at Brooks Camp. Annual use of the floating bridge could continue to obstruct upper water column flow and associated hydraulic effects could trigger changes in hydrology, channel or bank erosion, and river geomorphology.

Removal of the spit of land that was filled and stabilized to support the existing floating bridge could restore the natural hydrological regime in the lower reaches of the river.

Permanent bridge support piles could also affect river hydrology.

**Natural Soundscape.** Natural sounds in the area could be affected by construction activities, increased audio exposure from activities on the new bridge and boardwalks, and operational noise associated with the new barge landing and access road.

Removal of the existing barge landing and access road would benefit the soundscape along Brooks River.

## Cultural Resources

**Archeological Resources.** Brooks River Archeological District National Historic Landmark is one of the most significant archeological areas in Alaska. Construction of infrastructure and changes in park operations could have an adverse effect on these resources.

**Historic Structures.** Brooks Camp is historically known as one of the first post-World War II tourism-based fishing lodges in Alaska. The camp also contains two historic structures listed in the National Register of Historic Places—the current ranger station and visitor center— and several other structures of historic significance, including the Brooks Lodge building, office/store, as well as a number of NPS cabins. The location of the elevated boardwalk on the north side of Brooks River may have an impact on these historic structures.

**Cultural Landscape.** The Brooks River area consists of three principal cultural landscapes. The first is associated with Alaska Native use of the Brooks River area for traditional habitation and fishing purposes. The second is associated with the tourism-based use of the river for sport fishing and bear viewing. The third is associated with the prehistoric archeological resources of the area, which is based on its status as a national historic landmark. The first two landscapes are currently being evaluated to determine their potential eligibility for listing in the national register. Each of the alternatives has the potential to impact cultural landscapes.

**Ethnographic Resources.** The Brooks River area is the site of an annual redfish harvest and other traditional uses that may be affected by proposed development such as construction of the bridge and boardwalks and the proposed changes to the barge landing area.

## Visitor Experience

The Brooks River area is one of the best places in the world to view brown bears. Each summer thousands of people travel to Brooks Camp for the opportunity to view feeding aggregations of brown bears. The experience is marked by the need for visitors to get from the floatplane access area at Brooks Camp to the viewing platforms at Brooks Falls, located a mile away on the south bank of Brooks River. There are often delays due to bears in the area, and the overall experience must be intensively managed to ensure that both visitors and bears remain safe.

Another major user group of this area is recreational anglers. Any changes to the access of the area, including the construction and maintenance of structures and changes to management strategies, would impact the experience of these users.

The proposed actions could make the Brooks River area experience too controlled and managed. Additional impacts could come from changes in the temporal use patterns that come about because of the increased accessibility and safety provided by the action alternatives.

Safety is a key consideration at Brooks Camp for all people in the area. The alternatives could change the level of safety for visitors and employees. The proposed elevated bridge and boardwalks could largely separate people and bears in the area adjacent to the river mouth, thereby reducing the number and intensity of human-bear encounters.

### Visual/Scenic Resources

The proposed bridge concepts could impact the visual resources of the area. Bridge designs using long spans would require substantial superstructure. Views from the structure, along the river, Naknek Lake, Dumpling Mountain, and views from aircraft could be affected by the project.

The construction of an elevated permanent bridge and boardwalk system could affect the visual resources of the otherwise rustic setting of the Brooks Camp area.

### Socioeconomics

Katmai National Park and Preserve is an important part of the regional economy. The park draws international tourism, bringing in wildlife viewers, floaters, hunters, anglers, hikers, and others by the thousands. The park has been an important factor in the economic health of local communities since it was established as a national monument nearly a century ago. In contemporary times, hundreds of people rely on the resources of the park for their livelihoods, and the Brooks River area is one of the primary focal points for the hundreds of concessioner and commercial guides who choose to do business in the park. Changing access to the Brooks Camp area could impact these stakeholders.

## IMPACT TOPICS DISMISSED FROM DETAILED ANALYSIS

NEPA regulations emphasize the importance of adjusting the scope of each impact analysis to the details of the project and its setting and focusing on the specific potential impacts of the project. The following issues were considered but dismissed from detailed analysis, and are therefore not addressed further in this document.

### Air Quality

Katmai National Park and Preserve is designated as a Class II area under the Clean Air Act. Class II areas are afforded a high degree of protection under the act. The proposed actions would have a minimal effect on air quality due to the small amount of emissions associated with project construction and use.

### Water Quality

Negligible degradation of water quality in Brooks River or Naknek Lake may occur during bridge pile placement or barge landing construction. Turbidity and sedimentation effects would be localized and be limited to the construction period. Water quality protection measures and best management practices would be used to protect water quality and prevent its degradation from construction. Such measures may include in-stream sedimentation check dams, surface silt fencing, prompt revegetation, and replacement of topsoil.

## Threatened and Endangered Species

The Endangered Species Act requires an analysis of impacts on all federally listed threatened and endangered (T&E) species, as well as species of special concern listed by the State of Alaska. There are no listed federal T&E species within the proposed project area. The olive-sided flycatcher (a candidate species) may inhabit the spruce forests around the project area during the summer. This species has been previously observed in the park along Valley Road. Effects, if any, would be minimal due to the vast quantity of habitat in the area. In addition, no tree cutting would occur from April 10 to July 15 to protect nesting migratory birds.

## Climate Change

Fossil fuel consumption associated with construction and use of the bridge/ boardwalk and barge landing / access road would contribute a miniscule amount to the park's carbon footprint. The minimal variation expected in fossil fuel use across alternatives would have only negligible incremental effects on the park's overall carbon footprint, as it relates to climate change.

## Natural Lightscape

The National Park Service recognizes the role that darkness plays in natural resource processes and the evolution of species (NPS 2006). No lighting would be installed on the elevated walkway. Lighting during the construction phase would be the minimum needed to accomplish the project without undue interruption of visitor services.

## Environmental Justice

Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," requires all federal agencies to identify and address disproportionately high and adverse human health or environmental effects of their programs and policies on minorities and low-income populations and communities. No minority or low-income populations or communities are near Brooks Camp. This plan would not result in changes to human health or the environment with disproportionately high and adverse effects on minority or low-income populations or communities.

## Subsistence

The Alaska National Interest Lands Conservation Act, section 810(a) summary evaluation and finding (appendix A) concluded that the preferred alternative would not result in a restriction of subsistence uses in the project area.

## Traditional Redfish Fishery

Descendants of people that lived within Katmai National Park have an authorized traditional use fishery for harvest of spawned-out sockeye salmon at Brooks River. None of the alternatives would limit or alter this activity.

## Wilderness

The project area is an area zoned for the development of visitor facilities and is not within a designated or eligible wilderness area.

## Conformity with Local Land Use Plans

The project area is within the boundaries of the park and should not result in any actions that would cause unconformity or inconsistency with local land use plans.

## Energy Requirements and Conservation Potential

In all action alternatives, new facilities would be designed with long-term sustainability in mind. The NPS has adopted the concept of sustainable design as a guiding principle of facility planning and development (NPS *Management Policies 2006* section 9.1.1.6). The objectives of sustainability are to design facilities to minimize adverse effects on natural and cultural values, to reflect their environmental setting, and to require the least amount of nonrenewable fuels/energy. The action alternatives are not expected to result in an increased energy need. The alternatives could improve the energy efficiency of the Brooks River area. The bridge and boardwalk system would serve to provide an electric connection between Brooks Camp and the Valley Road Administrative Area. Brooks Camp, until it is relocated, would be powered by more efficient generators at the Valley Road Administrative Area, thereby reducing fuel consumption.

# PERMITS AND APPROVALS

Table 1 presents approvals, reviews, and permitting requirements anticipated to be needed for implementation of the alternatives.

**TABLE 1. PERMITS AND APPROVALS NEEDED TO IMPLEMENT ALTERNATIVES**

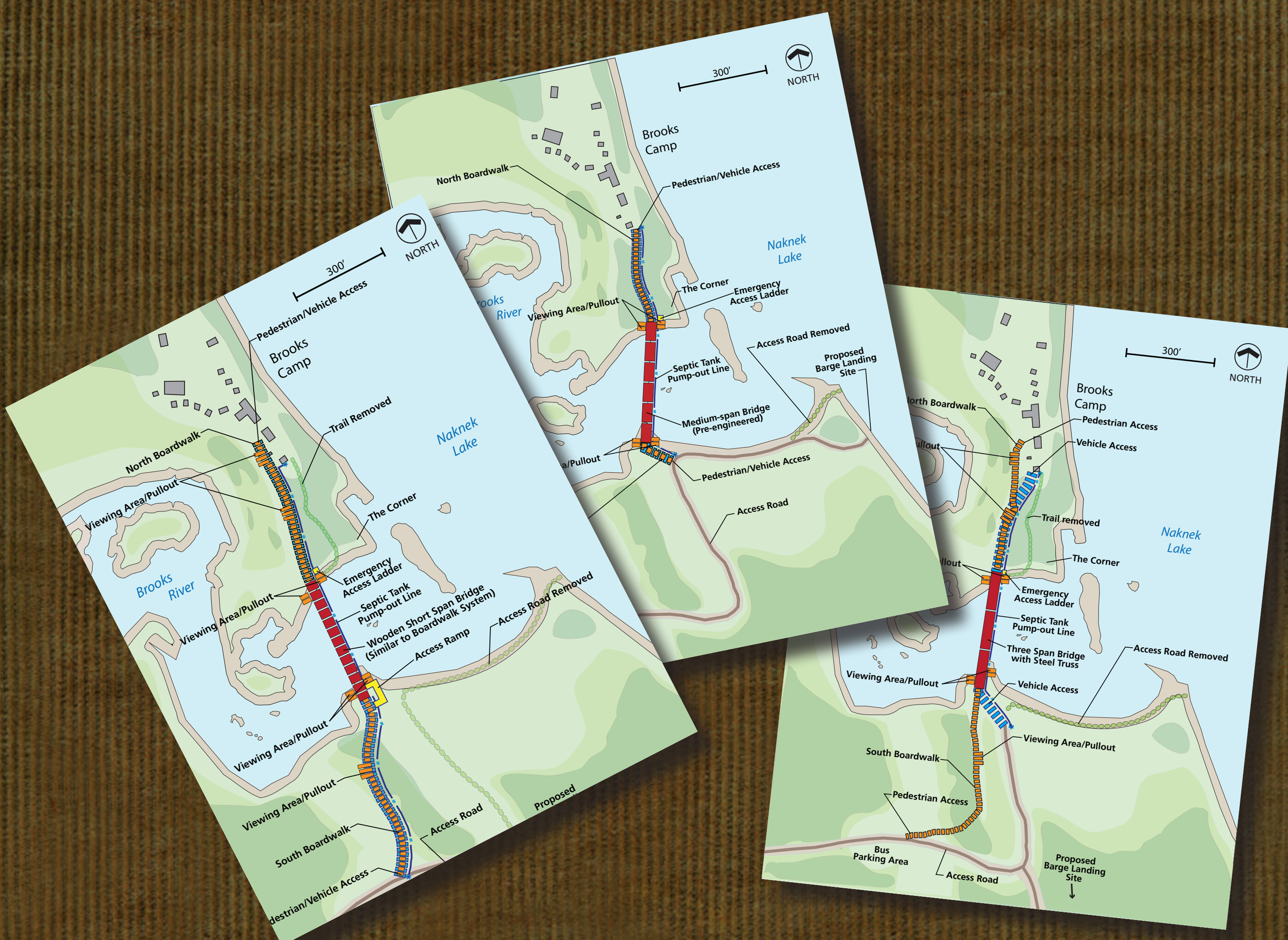
| Permit or Approval | Information | Agency |
|---|---|---|
| Fish Habitat Permit (Alaska Statute 16.05.871 Anadromous Fish Conservation Act) | Required for barge landing development on Naknek Lake and placement of bridge support piles in Naknek River | Alaska Department of Fish and Game (ADF&G) |
| Alaska Statute 16.05.841 (Fishway Act) | Authorization required for activities within or across a stream used by fish that could represent an impediment to the efficient passage of fish. | Alaska Department of Fish and Game |
| Clean Water Act, section 404 permit | Required for disposal or placement of fill in navigable waters and wetlands; potential effects may occur to wetlands from barge landing and access road and existing access road removal. | U.S. Army Corps of Engineers |
| Clean Water Act, section 401 certificate of reasonable assurance | Necessary to ensure that project complies with state's water quality standards. | Alaska Department of Environmental Conservation |
| Wetlands Statement of Findings | Required to examine potential adverse effects to wetlands from bridge piles, barge landing, and access road; and existing access road removal. | National Park Service |
| Bald and Golden Eagle Protection Act | Incidental take permit required if disturbance to eagle nest near Beaver Pond could not be avoided. | U.S. Fish and Wildlife Service |
| National Historic Preservation Act, section 106 compliance | Alaska state historic preservation office concurrence with finding of no historic properties affected or a memorandum of understanding with state historic preservation office to resolve adverse effects. | State Historic Preservation Office |
| Conservation Easement | Consult with and obtain and consider views of the grantors. | Conservation Easement, section 17, "Notice" |

# NEXT STEPS

Following distribution of the *Brooks River Visitor Access Final Environmental Impact Statement*, and a 30-day no-action period, a record of decision approving a final plan will be signed by the NPS regional director. The record of decision would document the NPS selection of an alternative for implementation. With the signing of the record of decision and publication of a notice in the *Federal Register*, the Brooks River plan could then be implemented.

# 2

# Alternatives Including The Preferred Alternative



# INTRODUCTION

This chapter describes five alternatives for access at the Brooks River area of Katmai National Park and Preserve. Alternative 1 (no-action alternative) presents a continuation of current management direction and is included as a baseline for comparing the consequences of implementing each alternative. Alternatives 2 through 5 (action alternatives) present different ways of providing access within the Brooks River area; the NPS preferred alternative (alternative 4) is also identified. Elements common to all action alternatives are also presented. Mitigation measures that would be used to reduce or avoid impacts are listed after the descriptions of the alternatives. The chapter also includes a brief description of alternatives and actions that were considered but dismissed from further analysis, a discussion of costs, and a discussion of the environmentally preferable alternative. Table 3 summarizes the components and attributes of each alternative. Table 4 summarizes the potential impacts of each alternative.

The alternatives were developed through an interdisciplinary team process that included tiering from earlier plans, including the 1996 *Brooks River Area Development Concept Plan / Environmental Impact Statement* and 1986 general management plan. Based on public scoping comments, input from NPS staff, and NPS mandates and policies, various concepts and project elements were considered. The National Park Service also considered potential environmental factors, visitor experience, visitor safety, operational efficiency, design, cost, and other factors in crafting the action alternatives. Different combinations of projects elements with regard to the bridge, boardwalk, and barge/landing area were integrated into the four action alternatives presented in this chapter.

The action alternatives describe the general locations and designs of the facilities being proposed. Specific details, such as railing designs, materials, and bridge supports, would be determined after the record of decision is signed for this document.

# ALTERNATIVE 1 (NO ACTION)

This alternative represents a continuation of the existing situation (see map 3). This alternative requires active management of the area by park staff.

The no-action alternative would maintain seasonal use of the floating bridge, which is 8 ft wide and about 320 ft long; it floats on the surface of Brooks River. The bridge would be used by both pedestrians and light utility vehicles.

Visitors and staff (park and concession) would continue to access Brooks River via a trail through the vegetated area known as the “Corner” as they head south from the Brooks Camp area. After crossing the floating bridge, visitors and staff would proceed to the road and then walk south to the bus parking area for Valley of Ten Thousand Smokes and the trail to the Brooks Falls viewing platforms.

Park staff would continue to install and remove the bridge each spring and fall. The banks of Brooks River would continue to be stabilized to ensure that the floating bridge and access trail remain in place while in use. The access trail on the north side of the river would continue to be used and maintained. Riverbank stabilization measures involving the placement of fill, log revetments, and vegetation staking would continue.

The existing barge landing and associated road would remain on the south side of the river (see map 3). The barge landing ramp would be hardened with materials such as interlocking pavers, planks, or geoweb filled with gravel. Any hardening material would be neutral in color to blend with the shoreline.

NPS landing craft, barges, and some boats would continue to land at the site at the mouth of Brooks River. (Most boats land in front of Brooks Camp.)

Utility connections between the north side of Brooks River and the Valley Road Administrative Area would be considered at a later date as part of a separate action. Until the utility connections are completed, septic waste from Brooks Camp would be transported across Brooks River every spring via a hauling trailer. The floating bridge would not be used for this operation.


**MAP 3.**
**ALTERNATIVE 1**

# ACTIONS COMMON TO ALL ACTION ALTERNATIVES

## CONSTRUCTION SCHEDULE

The construction of the bridge and boardwalk would be anticipated to last approximately three years and would most likely start in August of year one and be completed by June of year three. Completion of the bridge and boardwalk would occur during the second winter/ spring season, with demobilization occurring by August of the third season.

The construction of the barge landing, road, and parking area would most likely start in late fall and be completed prior to the visitor season the next year (May/June). The hardened barge landing would be constructed in the late winter / early spring when lake levels are lowest.

Much of the construction is scheduled for late fall and early spring to avoid periods of peak bear numbers (July and September) and park visitors. Any work that needs to occur during the summer season would be scheduled for the periods of lowest bear and visitor activity and would avoid bird migration and fish spawning seasons.

Mobilization and construction camp setup and gravel processing would occur during late summer or early fall (August to October) before freeze-up.

The construction contractor may occupy a temporary construction camp at the Valley Road Administrative Area. The contractor may need three structures to house up to 12 people. Alternatively, the construction crew may use the existing contractor camp about 0.5 mile southeast of the Valley Road Administrative Area. This camp, commonly referred to as "Squirrel Camp," was established for use by contractors for past and future major park developments.

## USE OF EXISTING GRAVEL

Existing gravel sources about 5 miles southeast of Brooks River on Valley of Ten Thousand Smokes Road would be used (see map 2). This gravel pit contains sufficient material for future NPS development projects, including the construction of roads on the south side of Brooks River for the relocation of Brooks Camp (NPS 1997).

## MONITORING

The National Park Service would monitor the impacts on park resources from the construction and continuing use of the bridge and boardwalk in all action alternatives.

- **Brown Bears:** Brown bear behavior would be monitored during construction activities as well as during the operation of the new bridge and boardwalks. Data obtained from monitoring activities would be considered in future bear management decisions, which may include developing and implementing proper bear viewing etiquette on the bridge/boardwalks.

- **Bald Eagles:** An active bald eagle nest has been observed near the proposed Beaver Pond barge access road. The National Park Service would monitor eagle nesting during road construction and use activities for a period of up to three years from the time construction activities are completed. The NPS staff would report monitoring data to U.S. Fish and Wildlife Service (USFWS) on an annual basis.

- **Wetlands and Vegetation:** Wetlands and upland vegetation restoration activities would be monitored.

- **Visitor Use and Park Operations:** Combined use of the boardwalks and bridge would be monitored to determine visitor satisfaction and operational efficiency. Future management actions would be determined based on monitoring information.

## VIEWING AREAS

Up to seven viewing areas (depending on the alternative) would be established on the north and south sides of Brooks River. These areas would be designed to accommodate about 20–25 people. The viewing areas also would be used to hold people for short periods of time if the bridge is closed and as pullout spots when vehicles are crossing the bridge.

## BARGE LANDING RAMP

Under all of the action alternatives, a hardened ramp would be installed to better accommodate boat and barge operations. The new barge landing ramp would be hardened with materials such as interlocking pavers, planks, or geoweb filled with gravel. Any hardening material would be neutral in color to blend with the shoreline.

## UTILITIES

Both electrical intertie and septic tank pump-out lines would use the bridge to cross Brooks River. An electrical intertie would be routed in conjunction with the pedestrian portions of the boardwalk systems while the septic tank pump-out line would follow the same routing as the vehicle ramps to ensure that connections on the south side of the river can be made to the sewage hauling trailer.

## BEAR GATES

Gates would be installed at each end of the boardwalk where they meet existing grade to prevent bears from gaining access to the boardwalks and bridge. The gates would be similar to those on the boardwalks at Falls and Riffles viewing platforms.

## EMERGENCY LADDERS/RAMPS

An emergency ladder would be included at the north end of the bridge for safety reasons. The fully accessible emergency access / egress ramp would be included on the south side of Brooks River. A secondary purpose of the ramp would be to provide anglers and other visitors access to the south bank of Brooks River.

## HABITAT RESTORATION AREA

The construction of an elevated boardwalk and bridge would direct all human traffic away from the area known as the Corner. Currently, the Corner is a primary route for people traveling from Brooks Camp to the bridge and the south side of Brooks River. At peak times of the year, several hundred people can pass through this area each day; it is also the location where people cluster to observe bears along the river near the floating bridge. The Corner is also an important area for brown bears to rest, especially sows with cubs. In all the action alternatives, the Corner and the trail from the lodge to the Corner would be rehabilitated and restored (see map 3).

## BOAT AND FLOATPLANE ACCESS TO BROOKS CAMP AREA

Under all action alternatives, floatplane access would continue to Lake Brooks and Naknek Lake, depending on the wind. On west wind days, Naknek Lake is favored, and on east wind days, Lake Brooks is favored.

Boat access to Brooks Camp from Lake Camp (near King Salmon) would continue on Naknek Lake. Visitors arriving by boat would temporarily moor ashore on Naknek Lake near Brooks Camp.

# ALTERNATIVE 2

Both pedestrians and vehicles would use a boardwalk and bridge system between Brooks Lodge and the bus parking area for a total approximate length of 1,600 ft. Figure 2 shows a simulation of what the bridge and south boardwalk would look like. The north and south boardwalks would have separate access points for pedestrians and vehicles on the north and south sides of Brooks River. The barge landing would be relocated to an area approximately 2,000 ft south of the existing site and would require the construction of a new access road (see map 4).

## NORTH BOARDWALK

On the north side of Brooks River, an extensive elevated boardwalk system would separate visitors from bears and would eliminate human use of the Corner. Pedestrians would enter the boardwalk system near Brooks Lodge. A 5-foot-wide pedestrian section would start near the lodge and continue at 10 ft above grade for approximately 335 ft. Vehicles would use a ramp that starts at the fish freezing station before merging with the pedestrian boardwalk along the wetlands about 225 ft south of the lodge. From the intersection of the two northern boardwalks to the start of the bridge (200 ft), the boardwalk would be 8 ft wide to accommodate both pedestrians and vehicles and continue at 10 ft above grade. The total length of the north boardwalk from the lodge to the start of the bridge would be approximately 535 ft.

The north boardwalk would consist of up to four viewing/pullout areas. Two would face west and overlook the wetland and Brooks River. Two would face east to provide upriver and downriver viewing opportunities.

## BRIDGE

The bridge across Brooks River would follow the alignment of the floating bridge. This concept calls for a 3-span bridge about 360 ft in length. This bridge would have an 8-foot-wide wooden bridge deck with a steel truss on each side and would span 120 ft between steel pile foundations. Two sets of steel support piles (each with two piles) would be in the riverbed. This bridge walking surface would be at least 10 ft above the river.

## SOUTH BOARDWALK

Connecting to the southern end of the bridge, an 8-foot-wide transition area that is about 20 ft long allows for pedestrians and vehicles to separate onto their own boardwalks. A pedestrian-only boardwalk would follow the edge of a wetland, and then cut east along an old road corridor before ending at the bus parking area. This elevated boardwalk would be 10 ft above grade and would ramp down to grade, ending about 100 ft east of the bus parking area. This section of boardwalk would be about 715 ft long. An 8-foot-wide vehicle ramp would separate from the boardwalk at the southern terminus of the bridge. This vehicle spur ramp would be approximately 215 ft in length and would ramp down to grade.

The south boardwalk would have up to three primary viewing/pullout areas. One would be placed on each side of the south end of the bridge to provide upriver and downriver viewing opportunities. One would face east and overlook the wetland. Because of the length of the south boardwalk, up to two additional smaller pullout areas may be installed to allow for the safe passage of pedestrians and vehicles.

## BARGE LANDING AND ACCESS ROAD

A barge landing would be on the shore of Naknek Lake, about 2,000 ft south of the existing barge landing (figure 3). The barge landing area (6,800 square feet ($ft^2$)) would include a permanent extended hardened boat launch ramp (24 ft to 30 ft wide and 170 ft to 240 ft long) to accommodate lake level fluctuations and a fenced storage/staging area (150 ft by 100 ft) for storage of the NPS barge on a 90-foot-long trailer and miscellaneous smaller boats/trailers. This secured area would be behind the lakeshore vegetation to allow the movement of wildlife along the lakeshore. The storage area would be accessible from the access road via a gated entrance.

A new access road, approximately 1,500 ft long and 14 ft wide, would intersect the Valley Road and run to the north side of Beaver Pond and east to the new barge landing site on Naknek Lake. It is anticipated that a culvert would be required to facilitate a hydrological connection of adjacent wetlands.

The existing barge landing area (5,800 $ft^2$), boat storage/staging area (16,000 $ft^2$), and gravel access road (600 ft by 14 ft) on the south side of the river would be removed and the landscape would be restored to natural conditions.


**MAP 4. ALTERNATIVE 2**

FROM RIVER MOUTH LOOKING SOUTH

**FIGURE 2. SIMULATION OF BRIDGE AND SOUTH BOARDWALK IN ALTERNATIVE 2**

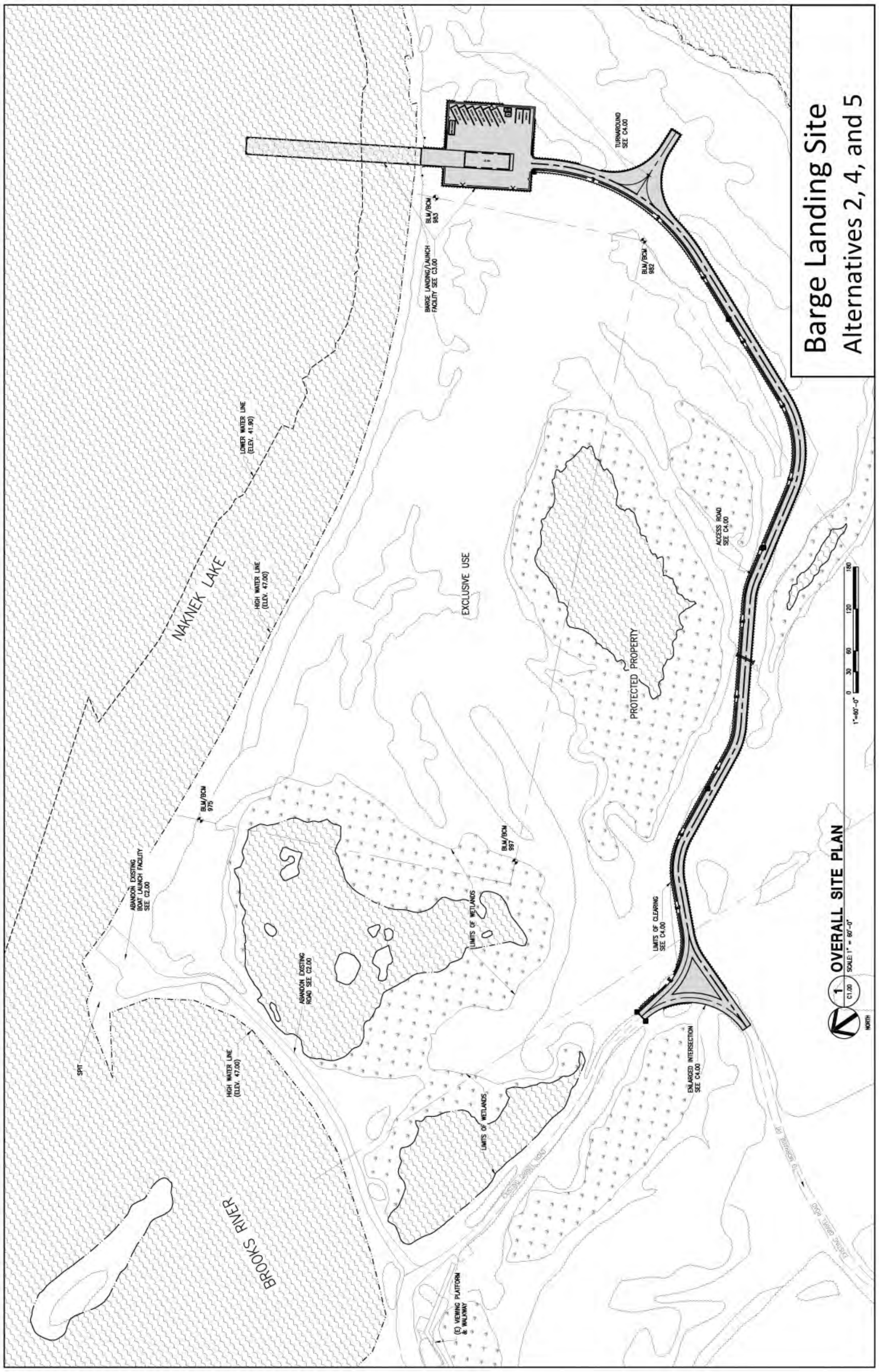



**FIGURE 3. BARGE LANDING SITE AND ACCESS ROAD FOR ALTERNATIVES 2, 4, AND 5**

# ALTERNATIVE 3

Both pedestrians and vehicles would use a single boardwalk and bridge system with single access points on the north and the south sides of Brooks River. The bridge and boardwalk system would have a total estimated length of 850 ft. The barge landing would be relocated to an area approximately 200 ft south of the existing site and would generally use the existing barge access road (see map 5).

## NORTH BOARDWALK

An 8-foot-wide elevated boardwalk would start near the fish freezing station and ramp up to 10 ft above grade and extend to the north end of the bridge through the Corner following the existing trail alignment. This boardwalk would be about 330 ft long. Both people and vehicles would use the same boardwalk.

The north boardwalk would consist of up to two viewing/pullout areas, placed on each side of the north end of the bridge to provide upriver and downriver viewing opportunities. Due to the length of the north boardwalk, up to two additional smaller pullout areas may be installed to allow for the safe passage of pedestrians and vehicles.

## BRIDGE

This bridge alternative would cross Brooks River at the Corner. Figure 4 shows a simulation of what the bridge would look like. This alternative would use a preengineered, medium-span bridge approximately 415 ft in length. The spans would measure approximately 50 ft and there would be six sets of steel support piles (each set with two piles) in the riverbed. This bridge walking surface would be a minimum of 10 ft above the river.

## SOUTH BOARDWALK

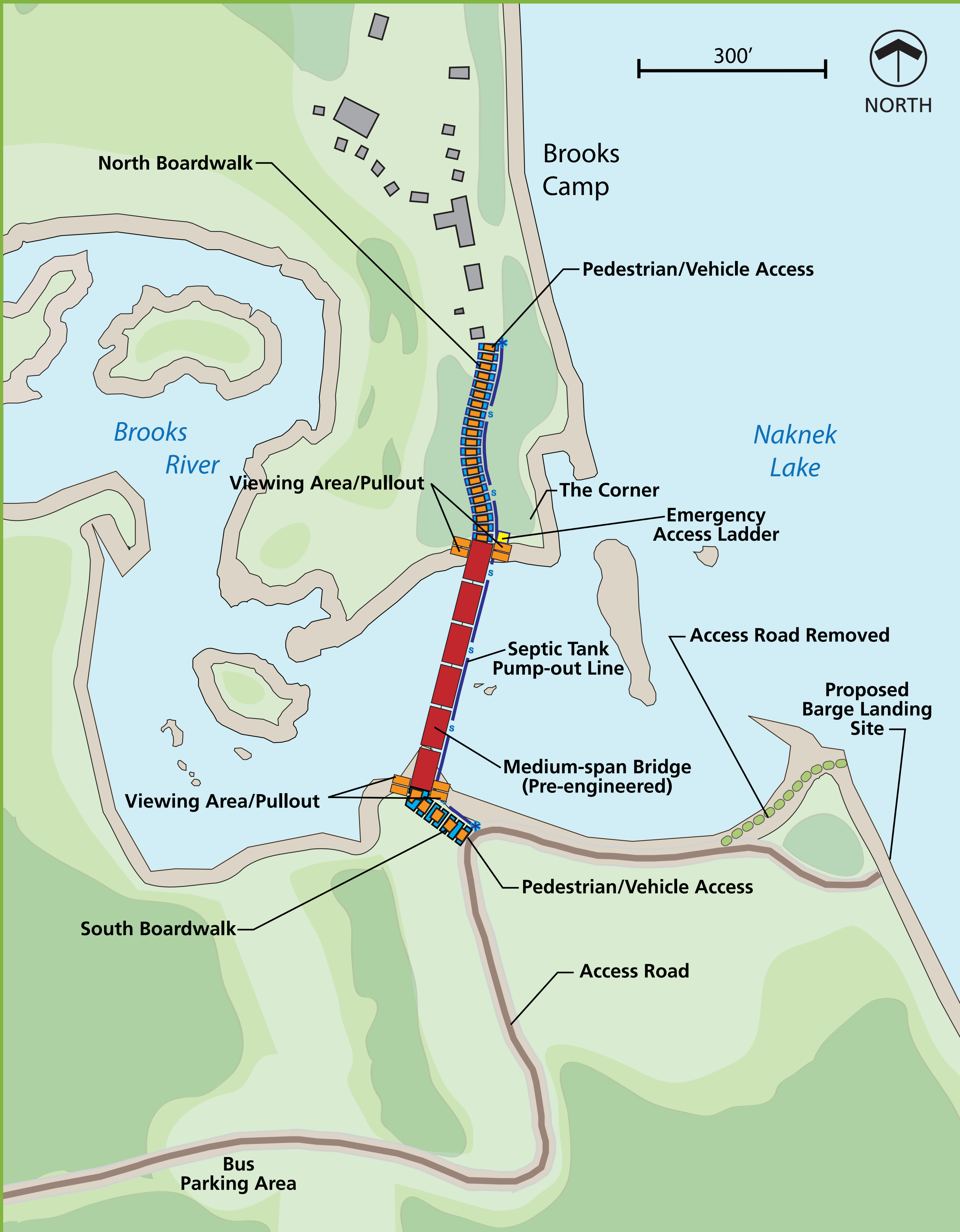
Starting at the southern end of the bridge, this boardwalk would ramp down until it reaches grade and connects to the existing road. This option is about 210 ft long and is designed to accommodate pedestrians and vehicles. One viewing area would likely be placed on each end of the south side of the bridge to provide upriver and downriver viewing opportunities.

## BARGE LANDING AND ACCESS ROAD

A new barge landing site would be located approximately 200 ft south of the mouth of Brooks River (figure 5). The barge landing area (6,800 $ft^2$) would include a permanent extended hardened boat launch ramp (24 ft to 30 ft wide and 270 ft to 340 ft long) to accommodate lake level fluctuations and a fenced area for storage of the NPS barge on a 90-foot-long trailer.

A new road segment (about 100 ft by 14 ft) would be constructed from the existing access road and extend to a new Naknek Lake barge landing site.

The existing barge landing area (5,800 $ft^2$), boat storage / staging area (16,000 $ft^2$), and about 300 ft of the gravel access road on the south side of the river would be removed and restored to natural conditions.




# MAP 5. ALTERNATIVE 3


**FIGURE 4. SIMULATION OF BRIDGE IN ALTERNATIVE 3**


**FIGURE 5. BARGE LANDING SITE FOR ALTERNATIVE 3**

# ALTERNATIVE 4 (NPS PREFERRED ALTERNATIVE)

Both pedestrians and vehicles would use a single boardwalk and bridge system with single access points on the north and south sides of Brooks River. Figure 6 shows a simulation of what the bridge and south boardwalk would look like. The bridge and boardwalk system would have a total estimated length of 1,550 ft. The barge landing would be relocated to an area about 2,000 ft south of the existing site and would require the construction of a new access road (see map 6).

## NORTH BOARDWALK

The boardwalk would start adjacent to the lodge, and then would continue south over the wetlands for approximately 560 ft. The elevated boardwalk would be at least 10 ft above grade once it clears the area around the lodge. This boardwalk would be 8 ft wide and designed to accommodate both pedestrians and vehicles simultaneously.

The north boardwalk would have up to four viewing/pullout areas. Two would face west and overlook the wetland and Brooks River and two would be on each side of the north end of the bridge to provide upriver and downriver viewing opportunities.

## BRIDGE

The wooden short-span bridge, approximately 350 ft in length with a minimum distance of 24 ft between piles, would follow the alignment of the floating bridge. There would be up to 14 sets of steel support piles (each set with two piles) in the riverbed. The bridge would be built using techniques similar to the boardwalk system. This bridge walking surface would be a minimum of 10 ft above the river.

## SOUTH BOARDWALK

An 8-foot-wide pedestrian-vehicle boardwalk would cross a wetland south of the southern bridge terminus and then cut west through a wooded area. The boardwalk would follow the edge of the western wetland before ending about 100 ft from the bus parking area. This elevated boardwalk would be 10 ft above grade and would ramp down to grade as it approaches the bus parking area. This section of boardwalk would have an estimated length of 630 ft.

The south boardwalk would have up to three primary viewing/pullout areas. One would be placed on each side of the south end of the bridge to provide upriver and downriver viewing opportunities. One would face east and overlook the wetland. Because of the length of the south boardwalk, one to two additional smaller pullout areas may be installed to allow for the safe passage of pedestrians and vehicles.

## BARGE LANDING AND ACCESS ROAD

A barge landing would be located on the shore of Naknek Lake approximately 2,000 ft south of the existing barge landing. The barge landing area (6,800 $ft^2$) would include a permanent extended hardened boat launch ramp (24 ft to 30 ft wide and 170 ft to 240 ft long) to accommodate lake level fluctuations and a fenced storage/staging area (150 ft by 100 ft) for storage of the NPS barge on a 90-foot-long trailer and miscellaneous smaller boats/trailers. This secured area would be located behind the lakeshore vegetation to facilitate the movement of wildlife along the lakeshore. The storage area would be accessible from the access road via a gated entrance.

A new access road, approximately 1,500 ft long and 14 ft wide, would intersect Valley Road and run to the north side of Beaver Pond and east to the new barge landing site on Naknek Lake. It is anticipated that a culvert would be required to facilitate a hydrological connection of adjacent wetlands.

The existing barge landing area (5,800 $ft^2$), boat storage/staging area (16,000 $ft^2$), and the gravel access road (about 1,200 ft by 14 ft) on the south side of the river would be removed and the landscape would be restored to natural conditions.


**MAP 6.**
**ALTERNATIVE 4**

**FIGURE 6. SIMULATION OF BRIDGE AND SOUTH BOARDWALK IN ALTERNATIVE 4**

# ALTERNATIVE 5

Both pedestrians and vehicles would use a single boardwalk and bridge system with single access points on the north and the south sides of Brooks River. The bridge and boardwalk system would have a total estimated length of 1,100 ft. The barge landing would be relocated to an area approximately 2,000 ft south of the existing site and would require the construction of a new access road (see map 7).

## NORTH BOARDWALK

The boardwalk would start adjacent to the lodge, and then would continue south through the wetlands for about 560 ft. The elevated boardwalk would be at least 10 ft above grade once it clears the area around the lodge. This boardwalk would be 8 ft wide and accommodate both pedestrians and vehicles.

The north boardwalk would consist of up to four viewing/pullout areas. Two would face west and overlook the wetlands and Brooks River. Two would be on each side of the north end of the bridge to provide upriver and downriver viewing opportunities.

## BRIDGE

The bridge, which would follow the alignment of the floating bridge, would be a wooden short-span bridge, about 350 ft in length with a minimum distance of 24 ft between piles. There would be up to 14 sets of steel support piles (each set with two piles) in the riverbed. It would be built using techniques similar to the boardwalk system, and the bridge's walking surface would be a minimum of 10 ft above the river.

## SOUTH BOARDWALK

An 8-foot-wide pedestrian and vehicle boardwalk would connect to the south end of the bridge and ramp down to meet the access road about 215 ft south of Brooks River. At least one viewing/pullout area would be placed on each side of the south end of the bridge to provide upriver and downriver viewing opportunities.

## BARGE LANDING AND ACCESS ROAD

A barge landing would be located on the shore of Naknek Lake approximately 2,000 ft south of the existing barge landing (map 7). The barge landing area (6,800 $ft^2$) would include a permanent extended hardened boat launch ramp (24 ft to 30 ft wide and 170 ft to 240 ft long) to accommodate lake level fluctuations and a fenced storage/staging area (150 ft by 100 ft) for storage of the NPS barge on a 90-foot-long trailer and miscellaneous smaller boats/trailers. This secured area would be sited behind the lakeshore vegetation to facilitate the movement of wildlife along the lakeshore. The storage area would be accessible from the access road via a gated entrance.

A new access road, approximately 1,500 ft long and 14 ft wide, would intersect Valley Road and run to the north side of Beaver Pond and east to the new barge landing site on Naknek Lake. It is anticipated that a culvert would be required to facilitate a hydrological connection of adjacent wetlands.

The existing barge landing area (5,800 $ft^2$), boat storage/staging area (16,000 $ft^{2,}$) and gravel access road (600 ft by 14 ft) on the south side of the river would be removed and the landscape would be restored to natural conditions.


**MAP 7.**
**ALTERNATIVE 5**

# MITIGATIVE MEASURES

## BROWN BEARS

To reduce possible negative impacts on brown bears and other wildlife within the Brooks River area, mobilization, construction, and demobilization activities would be coordinated between the project contractor, Brooks Camp manager, and park divisions responsible for protecting wildlife and visitors and managing commercial services. Bear response techniques identified in the park's *Bear-Human Conflict Management Plan* (NPS 2006b) would be used to manage human-bear interactions associated with this plan. Construction-specific mitigations would include the following:

- The NPS project manager or bear manager will be on-site when materials are being loaded or unloaded to monitor operations.
- Use of the Naknek Lake barge landing and access road would be limited to the loading and unloading of equipment, materials, and supplies for immediate transport to the park-approved staging area(s) and/or construction camp.
- Equipment, materials, and supplies in the staging area(s) and contractor camp would be secured by hard-sided storage containers and/or an electric perimeter fence.
- Food would be stored in bear-resistant containers and garbage would be regularly transported to an approved solid waste facility outside the park.
- Work would be temporarily halted when bears approach within 50 yards of an unfenced work area. Workers would allow the bear(s) to pass through the work area, unless the area (elevated bridge or boardwalk) is vertically separated, before starting or resuming mobilization, construction, or demobilization activities.

## MIGRATORY BIRDS

No trees and shrubs would be cut or removed between April 10 and July 15 to protect migratory nesting birds, particularly those birds that are considered species of special concern that may nest within the area, including the olive-sided flycatcher (*Contopus borealis*), blackpoll warbler (*Dendroica straita*), and gray-cheeked thrush (*Catharus minimus*).

## SALMON AND OTHER FISH

To protect fish populations and habitat, the following mitigations would be followed in the projects areas:

- Fuel, lubricants, or other hazardous substances would not be stored below the ordinary high water (OHW) of Brooks River, Naknek Lake, or Lake Brooks.
- Equipment servicing and refueling would not be conducted below the OHW level of Brooks River or Naknek Lake.
- Equipment leaking fuel, oil, hydraulic fluid, or other pollutants would not be operated or moved below the OHW level of Brooks River or Naknek Lake.
- Work below the ordinary high water within Brooks River and the shoreline of Naknek Lake would occur during winter and spring when water levels are low and spawning fish are less likely to be impacted.

- Riverbed and lakebed materials displaced by bridge and barge ramp construction that are important for fish spawning habitat would be redistributed to adjacent areas within Brooks River and Naknek Lake. Materials would not be completely removed from the project areas.
- Areas below the OHW level would be graded to closely match preconstruction slopes and contours after cessation of construction activities.
- Riprap and nonvegetation bank stabilization methods would be avoided or greatly minimized. Riverbanks would be rehabilitated using native vegetation and natural materials, such as coir logs, willow stakes, and downed trees for stabilization.

## WETLANDS AND VEGETATION

Construction activities within wetlands would be limited to the minimum area needed to install the boardwalk and bridge supports.

Equipment servicing and refueling would not be conducted within wetlands. Equipment leaking fuel, oil, hydraulic fluid, or other pollutants would not be operated within or immediately adjacent to wetlands.

Local native plants would be used to rehabilitate construction sites, former trails, and roads.

## NONNATIVE PLANT SPECIES

The following guidelines would be followed to prevent the introduction and spread of invasive plant species within the park:

- All heavy equipment and vehicles (including, but not limited to, tankers, trucks, ATVs, trailers, and excavation equipment) would be thoroughly cleaned (preferably by pressure washing) and free of soil, dirt, mud, or gravel before being transported into the park.
- NPS staff would inspect all heavy equipment and other vehicles at or near the park boundary to ensure they are free of invasive seed sources. Improperly cleaned vehicles and equipment would not be allowed into the park.

## CULTURAL RESOURCES

To ensure that the proposed project complies with section 106 of the National Historic Preservation Act, the following mitigation measures would be followed:

- The National Park Service would continue to consult with the Alaska state historic preservation office (SHPO), the Council of Katmai Descendants, the heirs of Palakia Melgenak, and others with cultural ties to the Brooks River area.
- Archeological monitoring and additional surveys (if needed) would precede and/or accompany construction-related ground disturbance to ensure that significant archeological resources are avoided and protected to the greatest extent possible. If previously unknown resources are discovered, all work in the immediate vicinity of the discovery would cease until the resources are assessed, documented and protected in consultation with the Alaska SHPO, traditionally associated peoples, and others as appropriate. A mitigation strategy would be developed in further consultation if resources could not be avoided.
- All known significant cultural resources in the project area (e.g., archeological and ethnographic

resources, historic buildings, cultural landscape features) would be clearly identified for avoidance during construction.

- In the event that human remains, funerary objects, sacred objects, or objects of cultural patrimony are discovered, Katmai National Park and Preserve would comply with the Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) (25 USC 3001) following the procedures set forth in a memorandum of agreement among the park and traditional associated federally recognized tribes and interested parties signed on July 19, 2011.

# IDENTIFICATION OF THE NPS PREFERRED ALTERNATIVE

Alternative 4 is the NPS preferred alternative because it best meets the purpose and need for the plan. Alternative 4 includes the longest elevated bridge/boardwalk configuration of any of the alternatives. The bridge/boardwalk extends from Brooks Camp (north side of river) to the bus parking area on the south side of river. The system would provide dependable access for the phased relocation of facilities and improve visitor and employee safety by providing a 10-foot vertical separation between humans and bears, substantially reducing human-bear interactions. Alternative 4 would decrease adverse effects on brown bears due to elimination of the floating bridge, restoration of an open travel route from the lower Brooks River to Naknek River via the river's north bank and the Corner, and the vertical separation of bears and humans throughout the project area. The elevated bridge and boardwalk would also reduce impacts to archaeological resources and improve viewing alternatives for visitors.

The removal of the floating bridge and existing barge landing / access road at the mouth of Brooks River would protect key resources and reduce human-bear interactions. Removal of barge activity in this area would improve visitor experience because it would not be subject to operational activities that disturb wildlife and create noise and activities that may degrade the park experience.

# ENVIRONMENTALLY PREFERABLE ALTERNATIVE

In accordance with Director's Order 12: *Conservation Planning, Environmental Impact Analysis, and Decision-making* (NPS 2001), the National Park Service is required to identify the environmentally preferable alternative in all environmental documents, including environmental impact statements. The environmentally preferable alternative is "the alternative that causes the least damage to the biological and physical environment; it also means the alternative that best protects, preserves, and enhances historic, cultural, and natural resources."

Alternative 4 (NPS preferred alternative) is the environmentally preferable alternative. Alternatives 4 and 5 would improve resources and values at the mouth of Brooks River with removal of the existing floating bridge and construction of an elevated boardwalk and bridge system to separate people and bears. The elevated bridge and boardwalk system would direct all human traffic away from the Corner. Alternatives 4 and 5 would also remove the existing barge landing site and access road from the south bank of Brooks River, eliminating facilities impacts on sensitive resources and park visitors. However, alternative 4 would remove an additional segment of access road that would be retained under alternative 5.

While alternatives 2 and 3 incorporate elevated boardwalk and bridge systems, they would not remove as much infrastructure from the sensitive resources area at the mouth of Brooks River.

# COSTS OF THE ALTERNATIVES

Table 2 provides cost estimates for development of the various facility components of alternatives 1 through 5. (For alternative 1, the only cost shown is for hardening the beach at the existing landing site.) The cost estimates are NPS Class C estimates, which are based on the average cost of similar facilities constructed in Alaska through federal government contracts. Actual costs may be higher or lower depending on the final design and site conditions. These estimates are intended primarily to assist in comparing the relative cost of implementing the alternatives.

**TABLE 2. CONCEPTUAL (CLASS C) CONSTRUCTION COST ESTIMATES (DOLLARS) FOR ALTERNATIVES 1 THROUGH 5[1]**

| Facility | Alternatives | | | | |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Boardwalk[2] | NA | $2,126,000 | $910,000 | $2,286,000 | $1,527,000 |
| Bridge[2] | NA | 3,187,000 | 2,814,000 | 1,600,000 | 1,600,000 |
| Power Connection[2] | NA | 249,000 | 279,000 | 236,000 | 229,000 |
| Septic Pump-out and Power[2] | NA | 199,000 | 197,000 | 227,000 | 218,000 |
| Barge Landing and Access Road | $1,542,000 | 2,165,000 | 1,768,000 | 2,165,000 | 2,165,000 |
| Camp Construction[2] | NA | 895,000 | 895,000 | 895,000 | 895,000 |
| Construction Cost Estimate by Alternative | 1,542,000 | 8,821,000 | 6,863,000 | 7,409,000 | 6,634,000 |
| Construction Costs[3] | | | | | |
| Low Estimate | $1,079,400 | $6,174,000 | $4,804,100 | $5,186,300 | $4,643,800 |
| High Estimate | $2,313,000 | $13,231,500 | $10,294,500 | $11,113,500 | $9,951,000 |

NA = Not Applicable

1. Compliance, design, construction contingency, and construction administration are not included in estimates.
2. Estimates derived from June 17, 2010, KPB Architects' estimate prepared for schematic design alternatives; the estimates assume all of the viewing/pullout areas would be built in each alternative. Costs are adjusted to 2014 dollars.
3. Estimates from Coffman Engineers 2012; estimates for alternatives 2, 4, and 5 include barge landing area, new access road, and a fenced storage/staging area; estimate also includes removal and rehabilitation of existing barge landing, boat ramp launch and bulkhead dock, gravel access road, and boat storage area. Costs are adjusted to 2013 dollars.
3. Based on the accepted industry accuracy range of Class C estimates, which is –30% to +50%.

Geotechnical investigation in the area of the bridge and boardwalk has revealed *soft* soils, which in general have poor structural properties, particularly when subject to seismic activity. The geotechnical report suggests that in the event of an earthquake, the soils have a high potential for liquefaction and resulting settlement and/or displacement. This settlement or lateral displacement of soils supporting the foundations of the structures has the potential for varying degrees of damage to the bridge and boardwalk depending on the severity of the seismic event. A risk assessment (Coffman Engineers 2012) has been performed to evaluate different scenarios projecting the probability and severity of a seismic event and the potential for damage. The scenarios are described as *event return periods*, which consider the likelihood and severity of seismic activity. A 36-year return period corresponds to 50 percent probability of exceedance in 25 years; a 108-year return has a 50 percent probability of exceedance in 75 years; a 475-year return period has a 10 percent probability of exceedance in 50 years; and a 975-year return period a 5 percent probability of exceedance in 50 years. The short-term scenarios (36-year return and 108-year return) indicate that there will be no risk to life/safety and minimal damage to the bridge and boardwalks. The assessment of risk in the long-term scenarios (475-year return period and 975-year return period) indicate there is some potential for collapse of bridge spans, resulting in risk to life safety and significant property damage. The risk assessment and projections of damage have been considered and further engineering solutions will be evaluated in an effort to mitigate and/or reduce the potential for damage to the bridge and boardwalk structures. These potential engineering seismic enhancements would not be expected to significantly affect the projected cost estimate ranges.

# ALTERNATIVES AND ACTIONS CONSIDERED BUT ELIMINATED FROM DETAILED STUDY

## MORE INTENSIVE BEAR/ VISITOR MANAGEMENT

This option would focus on management of bears and people to address safety concerns rather than building a new bridge and boardwalk system. More emphasis would be placed on actively managing bears to prevent bear problems, including hazing and aversive conditioning, and blocking bear movements in areas where traffic jams and delays frequently occur. Increased monitoring of bears would occur and more staff would be on hand. Better education of visitors and staff regarding the 50-yard rule and increased enforcement of violations of park rules would also occur.

More intensive bear and visitor management was dismissed because it is not certain such management would effectively and efficiently increase human safety. Intensive management would not necessarily reduce visitor delays and access issues or improve visitor experience, and it would not provide dependable access during the phased relocation of facilities and park concession operations when facilities are separated on the north and south sides of the river. Further, this option would be inconsistent with the current bear management plan, which provides for free movement of bears and allows natural patterns of feeding and habitat use to occur.

## SINGLE-SPAN BRIDGE ALTERNATIVE

This bridge option would use a single-span suspension type bridge to cross Brooks River. It would have a total length of 345 ft. The single-span bridge design would require a superstructure at least 50 ft above the riverbed (suspension cable towers) to support the single span. Figure 7 shows a simulation of what the bridge would look like. This bridge would require anchor supports coming off the ends of the bridge for a distance up to 100 ft on each side (see figure 7).

Based on the NPS value analysis (NPS 2010d) it was determined that a single-span bridge would not be appropriate for the Brooks Camp area. Although the bridge would have successfully crossed Brooks River without the use of piles within the riverbed, the bridge structure would have been too far out of scale compared to the rest of the developed facilities at Brooks Camp. It would have compromised the sense of place of the rustic Alaska fishing camp and have had substantial negative impacts on the visual resources of the park. High construction cost was another reason to dismiss this alternative.

**FIGURE 7. SIMULATION OF SUSPENSION BRIDGE FROM SOUTH BANK LOOKING WEST**

**TABLE 3. SUMMARY OF ALTERNATIVES**

| Section | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 | Alternative 5 |
|---|---|---|---|---|---|
| **North Boardwalk** | None; gravel path at grade through the Corner would remain | 5-foot-wide pedestrian boardwalk (335 ft) starting at the lodge<br>8-foot-wide vehicle ramp (225 ft) (starting at the fish freezing building)<br>8-foot-wide combined (200 ft) pedestrian/vehicle boardwalk from the intersection of the two northern boardwalks to the bridge<br>Would be routed west of the Corner area | 8-foot-wide combined pedestrian and vehicle boardwalk (330 ft long) (starting at the fish freezing station)<br>Would be routed through the Corner area | 8-foot-wide combined pedestrian and vehicle boardwalk (560 ft long) (starting near the lodge<br>Would be routed west of the Corner area | 8-foot-wide combined pedestrian and vehicle boardwalk (560 ft long) (starting near the lodge)<br>Would be routed from the lodge, west of the Corner area |
| **Bridge** | Floating bridge would be installed and removed each season | Three spans (120 ft each); total length 360 ft<br>8-foot- wide deck with a steel truss on each side and steel piles<br>Would follow the alignment of the floating bridge | 8-foot-wide combined pedestrian and vehicle bridge (415 ft long)<br>Preengineered steel truss construction with 50-foot spans<br>Would cross Brooks River at the Corner (east of the floating bridge alignment) | 8-foot-wide combined pedestrian and vehicle wood and steel bridge (350 ft long)<br>Built with steel piles at least 24 ft apart<br>Would follow the alignment of the floating bridge | 8-foot-wide combined pedestrian and vehicle wood and steel bridge (350 ft long).<br>Built with steel piles at least 24 ft apart<br>Would follow the alignment of the floating bridge |
| **South Boardwalk** | None | 8-foot-wide combined boardwalk (for 20 ft)<br>5-foot-wide pedestrian boardwalk (715 ft long) that would end 100 ft from the bus parking area<br>8-foot-wide vehicle ramp (210 ft long) that would end at the existing access road | 8-foot-wide combined pedestrian and vehicle ramp (200 ft long).<br>Would end at the existing access road | 8-foot-wide combined pedestrian and vehicle ramp (630 ft long)<br>Would cross a section of forest on its northern end<br>Would end 100 ft from the bus parking area | 8-foot-wide combined pedestrian and vehicle ramp (200 ft long)<br>Would end at the existing access road |

**TABLE 3. SUMMARY OF ALTERNATIVES**

| Section | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 | Alternative 5 |
|---|---|---|---|---|---|
| **Barge Landing / Access Road** | Would remain on the south side of the mouth of Brooks River<br>Hardened ramp (24 ft to 30 ft wide and 270 ft to 340 ft long) would be installed on the existing landing site | A new barge landing would be constructed on the shore of Naknek Lake about 2,000 ft south of the existing barge landing; a hardened ramp (24 ft to 30 ft wide and 270 ft to 340 ft long) would be installed on the site<br>A 1,500-foot road would be constructed to access the barge landing<br>The existing barge landing area, boat storage / staging area and gravel access road (600 ft) on the south side of the river would be removed and restored to natural conditions | A new barge landing would be constructed on the shore of Naknek Lake about 200 ft south of the existing barge landing; a hardened ramp (24 ft to 30 ft wide and 270 ft to 340 ft long) would be installed on the site<br>A 100-foot road would be constructed to access the barge landing. Most of the road along the south shore of Brooks River would continue to be used<br>The existing barge landing area, boat storage / staging area, and about 300 ft of the gravel access road on the south side of the river would be removed and restored to natural conditions | A new barge landing would be constructed on the shore of Naknek Lake about 2,000 ft south of the existing barge landing; a hardened ramp (24 ft to 30 ft wide and 270 ft to 340 ft long) would be installed on the site<br>A 1,500-foot road would be constructed to access the barge landing<br>The existing barge landing area, boat storage / staging area, and gravel access road (600 ft) on the south side of the river would be removed and restored to natural conditions | A new barge landing would be constructed on the shore of Naknek Lake about 2,000 ft south of the existing barge landing; a hardened ramp (24 ft to 30 ft wide and 270 ft to 340 ft long) would be installed on the site<br>A 1,500-foot road would be constructed to access the barge landing<br>The existing barge landing area, boat storage / staging area, and gravel access road (600 ft) on the south side of the river would be removed and restored to natural conditions |
| **Viewing/Pullout Areas** | Viewing platform on the south side of Brooks River would remain | Up to seven viewing areas / pullouts along the boardwalks and at the bridge termini—four on the north side of Brooks River and three on the south side of the river | Up to four viewing areas / pullouts—two on the north side of Brooks River and two on the south side of Brooks River | Up to seven viewing areas / pullouts along the boardwalks and at the bridge termini—four on the north side of Brooks River and three on the south side of the river | Up to six viewing areas / pullouts along the boardwalk and at the bridge termini—four on the north side of Brooks River and two on the south side of the river |

**TABLE 4. SUMMARY OF IMPACTS OF THE ALTERNATIVES**

| Impact Topic | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 | Alternative 5 |
|---|---|---|---|---|---|
| **Brown Bears** | Alternative 1 would result in continuing long-term, moderate, adverse, and localized impacts on the brown bear. Adverse parkwide effects would occur if habituated bears from Brooks Camp move into other areas in the region. These adverse effects would primarily result from continuing ground level human-bear interactions between Brooks Camp and the bus parking area on the south side of Brooks River. The interactions would continue to result from the physical overlap of human high use areas at ground level (visitors and staff) and brown bear high use areas (along the river, near the mouth, and along Naknek Lake). Occasional unsafe human-bear interactions would be expected to continue as well as the resulting human habituation of bears, with the potential for bears being injured or killed. | Alternative 2 would result in short- and long-term, moderate, adverse, and primarily localized impacts on brown bears due to human disturbances to bears and their habitat. There still would be potential for human habituation of bears and some potential for occasional unsafe human-bear interactions and bears being injured or killed. These adverse effects would mainly result from the notable distance of overhead human activity above bears and bear habitat in the area (pedestrians and vehicles); a decrease in the horizontal separation between bears and humans (i.e., people on the elevated structures); an increase in the visual and audio exposure of human activities; and a disturbance to the bear habitat in the project area with construction-related activities and noise. However, when compared to alternative 1, brown bears would benefit from the | Alternative 3 would result in short- and long-term, moderate, adverse, and primarily localized impacts on brown bears. There still would be potential for human habituation of bears and some potential for occasional unsafe human-bear interactions and for bears being injured or killed. These adverse effects would mainly result from the proposed overhead human activity above bears and bear habitat in the area (pedestrians, staff, and vehicles); a decrease in the horizontal separation between bears and humans (i.e., people on the elevated structures); an increase in the visual and audio exposure of human activities on the boardwalks and bridge; a disturbance to the bear habitat in the project area with construction-related activities and noise; and continued ground level interactions between bears and humans (primarily on the south side of the river where elevated | Alternative 4 would result in a long-term, moderate, adverse, and primarily localized impact on brown bears. There still would be potential for human habituation of bears and some potential for occasional unsafe human-bear interactions and for bears being injured or killed. These adverse effects would mainly result from the notable distance of overhead human activity above bears and bear habitat in the area (pedestrians, staff, and vehicles); a decrease in the horizontal separation between bears and humans (i.e., people on the elevated structures); an increase in the visual and audio exposure of human activities; and a disturbance to the bear habitat in the project area with construction-related activities and noise. However, when compared to alternative 1, brown bears would benefit from the removal of the floating bridge, a reduced potential for ground level | Alternative 5 would result in a long-term, moderate, adverse, and primarily localized impact on brown bears. There still would be the potential for human habituation of bears and some potential for occasional unsafe human-bear interactions and for bears being injured or killed. These adverse effects would mainly result from the notable distance of overhead human activity above bears and bear habitat in the area (pedestrians, staff, and vehicles); a decrease in the horizontal separation between bears and humans (i.e., people on the elevated structures); an increase in the visual and audio exposure of human activities; and a disturbance to the bear habitat in the project area with construction-related activities and noise. However, when compared to alternative 1, brown bears would benefit from the removal of the floating bridge, a reduced potential for ground level |

**TABLE 4. SUMMARY OF IMPACTS OF THE ALTERNATIVES**

| Impact Topic | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 | Alternative 5 |
|---|---|---|---|---|---|
| | | removal of the floating bridge, a reduced potential for ground level human-bear interactions along the lower portion of the Brooks River corridor, an undisturbed and buffered area for bear resting or movement near the river mouth (i.e., the Corner area), and the relocation of the barge landing approximately 2,000 ft to the south along the Naknek Lake shoreline. | boardwalks terminate). However, when compared to alternative 1, brown bears would benefit from the elimination of the floating bridge and a reduced potential for ground level human-bear interactions on the north side of the river. | human-bear interactions along the lower portion of the Brooks River corridor, an undisturbed and buffered area for bear resting or movement near the river mouth (i.e., the Corner area), and the relocation of the barge landing approximately 2,000 ft to the south along the Naknek Lake shoreline. | human-bear interactions along the lower portion of the Brooks River corridor, an undisturbed and buffered area for bear resting or movement near the river mouth (i.e., the Corner area), and the relocation of the barge landing approximately 2,000 ft to the south along the Naknek Lake shoreline. |
| **Salmon, Rainbow Trout, and Arctic Grayling** | Alternative 1 would result in continuing short- to long-term, minor, adverse, and localized impacts on salmon, rainbow trout, and arctic grayling in Brooks River. These effects would result from the continued annual use of the floating bridge across Brooks River. The bridge would continue to be an impediment to fish migration in the upper portions of the water column, but fish could still migrate up and downriver. The presence of the bridge and the | Alternative 2 would result in short- to long-term, minor, adverse, and localized impacts on salmon, rainbow trout, and arctic grayling in Brooks River. These effects would result from the addition of two permanent flow obstructions to the channel (i.e., two bridge pile systems spaced at 120 ft) and the associated construction disturbances in the channel. The support piles and river debris that catches on them could obstruct fish passage and alter flow hydraulics, which may result in scouring and sediment | Alternative 3 would result in short- to long-term, minor, adverse, and localized impacts on salmon, rainbow trout, and arctic grayling in Brooks River. These effects would result from the addition of six permanent flow obstructions to the channel (i.e., six bridge pile systems spaced 50 ft apart) and the associated construction disturbances in the channel. The support piles, and river debris that catches on them, could obstruct fish passage and alter flow hydraulics, which may result in scouring and sediment | Alternative 4 would result in short- to long-term, moderate, adverse, and localized impacts on salmon, rainbow trout, and arctic grayling in Brooks River. These effects would result from the addition of up to 14 permanent flow obstructions in the channel (i.e., 14 bridge pile systems spaced at 24 ft) and the associated construction disturbances in the channel. The support piles, and river debris that catches on them, could obstruct fish passage and alter flow hydraulics, which may result in scouring and sediment | Alternative 5 would result in short- to long-term, moderate, adverse, and localized impacts on salmon, rainbow trout, and arctic grayling in Brooks River. These effects would result from the addition of up to 14 permanent flow obstructions to the channel (i.e., 14 bridge pile systems spaced at 24 ft) and the associated construction disturbances in the channel. The support piles, and river debris that catches on them, could obstruct fish passage and alter flow hydraulics, which may result in scouring and sediment |

**TABLE 4. SUMMARY OF IMPACTS OF THE ALTERNATIVES**

| Impact Topic | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 | Alternative 5 |
|---|---|---|---|---|---|
| | annual bridge installation would alter spawning habitat by disturbing the riverbed, and could result in some arctic grayling spawning being adversely affected. | deposition in the river. However, salmon, rainbow trout, and arctic grayling would benefit from the elimination of the temporary floating bridge and its associated negative effects on fish passage and spawning habitat. | deposition in the river. However, salmon, rainbow trout, and arctic grayling would benefit from alternative 3 due to the elimination of the temporary floating bridge and its associated negative effects on fish passage and spawning habitat. | deposition in the river. However, salmon, rainbow trout, and arctic grayling would benefit from alternative 4 due to the elimination of the temporary floating bridge and its associated negative effects on fish passage and spawning habitat. | deposition in the river. However, salmon, rainbow trout, and arctic grayling would benefit from alternative 5 due to the elimination of the temporary floating bridge and its associated negative effects on fish passage and spawning habitat. |
| **Bald Eagle** | Alternative 1 would result in a continuing long-term, minor, adverse, and localized impact on the bald eagles in the Brooks River area. These adverse effects would primarily result from the continuance of seasonal human activity throughout the project area. However, the disturbances resulting from alternative 1 would not be expected to affect bald eagle nesting in the area. | Alternative 2 would result in short- and long-term, moderate, adverse, localized impacts on the bald eagles in the Brooks River area. These adverse effects would primarily result from the construction and future use of a new barge landing area and access road near an eagle nest and Beaver Pond foraging and roosting areas. These activities could adversely affect bald eagle nesting in the Beaver Pond area. | Alternative 3 would result in short- to long-term, minor, adverse, and localized impacts on the bald eagles in the Brooks River area. These effects would result from general human activity in the Brooks River area, including continued use of the barge landing site and access road. | Alternative 4 would result in short- and long-term, moderate, adverse, localized impacts on the bald eagles in the Brooks River area. These adverse effects would primarily result from the construction and future use of a new barge landing area and access road near an eagle nest and Beaver Pond foraging and roosting areas. These activities could adversely affect bald eagle nesting in the Beaver Pond area. | Alternative 5 would result in short- and long-term, moderate, adverse, and localized impacts on the bald eagles in the Brooks River area. These adverse effects would primarily result from the construction and future use of a new barge landing area and access road near an eagle nest and Beaver Pond foraging and roosting areas. These activities could adversely affect bald eagle nesting in the Beaver Pond area. |
| **Wetlands and Upland Vegetation** | Alternative 1 would result in the continuation of long-term, minor, adverse, and localized impacts on wetlands and vegetation. These adverse effects would result from continued vegetation | Alternative 2 would result in short- to long-term, moderate, adverse, and localized impacts on wetlands and vegetation. The adverse effects would primarily result from displaced and altered vegetation | Alternative 3 would result in a short- to long-term, minor, adverse, and localized impact on wetlands and vegetation. The adverse effects would primarily result from displaced and altered vegetation | Alternative 4 would result in a short- to long-term, moderate, adverse, and localized impact on wetlands and vegetation. The adverse effects would primarily result from displaced and altered vegetation | Alternative 5 would result in short- to long-term, moderate, adverse, and localized impacts on wetlands and vegetation. The adverse effects would primarily result from displaced and altered vegetation |

**TABLE 4. SUMMARY OF IMPACTS OF THE ALTERNATIVES**

| Impact Topic | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 | Alternative 5 |
|---|---|---|---|---|---|
| | trampling and social trails from ground level pedestrian and vehicle use in the Corner area on the north side of the river and between the floating bridge and the bus parking area on the south side of the river. The continued hydrological disturbances to wetlands E, F, and G adjacent to the access roads along the south bank and between the bridge and the bus parking area would also contribute to this adverse effect. | along the alignment of the proposed boardwalks, disturbances to wetlands H and I (to the west of Brooks Camp) and wetlands E and F (between the bridge and the bus parking area), vegetation and wetland impacts from the proposed access road to the new barge landing area (wetlands A, B, C, D, and J), and possible impacts from site construction activities (e.g., sedimentation, , and propagation of nonnative invasive plant species). However, wetlands and vegetation would also benefit from the reduced potential for vegetation trampling and social trails on both sides of the river and the restored wetland hydrology of wetland G along the restored barge landing access road area. | along the alignment of the proposed boardwalk and possible impacts from site construction activities (e.g., sedimentation, and propagation of nonnative invasive plant species). However, the proposed boardwalks, ramps, and accesses are primarily aligned in already disturbed areas, so the adverse effects would be minimal. The wetland and upland vegetation would also benefit from the reduced potential for vegetation trampling and social trails on the north side of the river. | along the alignment of the proposed boardwalks; disturbances to wetlands H and I (west of Brooks Camp) and wetlands E and F (between the bridge and the bus parking area); vegetation and wetland impacts from the new access road to the new barge landing area (wetlands A, B, C, D, and J); and possible impacts from site construction activities (e.g., sedimentation, and propagation of nonnative invasive plant species). However, wetlands and vegetation would also benefit from the reduced potential for vegetation trampling and social trails on both sides of the river, restored vegetation along the access road between the bridge and bus parking area, and the restored wetland hydrology of wetland G along the restored barge landing access road area. | along the alignment of the proposed boardwalks; disturbances to wetlands H and I (west of Brooks Camp); vegetation and wetland impacts from the proposed access road to the new barge landing area (wetlands A, B, C, D, and J); and possible impacts from site construction activities (e.g., sedimentation, , and propagation of nonnative invasive plant species). However, wetlands and vegetation would benefit from the reduced potential for vegetation trampling and social trails on the north side of the river and the restored wetland hydrology of wetland G along the restored barge landing access road area. |

**TABLE 4. SUMMARY OF IMPACTS OF THE ALTERNATIVES**

| Impact Topic | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 | Alternative 5 |
|---|---|---|---|---|---|
| **Hydrology and Floodplains** | Alternative 1 would continue to have a long-term, moderate, adverse, and localized effect on hydrology and floodplains. These adverse effects would primarily result from the continued use of the floating bridge across Brooks River. The bridge would continue to alter river flow hydraulics and geomorphology (because of blocking upper levels of water column), as well as contribute to bank erosion in areas near the bridge anchor points. | Alternative 2 would have short- to long-term, minor, adverse, and localized impacts on hydrology and floodplains, primarily from the addition of two permanent flow obstructions to the channel (two bridge pile systems spaced at 120 ft) and the associated construction disturbances in the channel. The support piles, and river debris that catches on them, would alter flow hydraulics, which could also result in riverbed scouring and sandbar development. However, the hydrology and floodplains would benefit from the removal of the floating bridge (that alters river flow hydraulics and flooding and contributes to bank erosion near its anchors) and the restoration of surface and subsurface flows between wetland G and the river (along the existing barge landing access road). | Alternative 3 would have short- to long-term, minor, adverse, and localized impacts on hydrology and floodplains, primarily from the addition of six permanent flow obstructions to the channel (i.e., six sets of bridge pile systems spaced at 50 ft) and the associated construction disturbances in the channel. The support piles, and river debris that catches on them, would alter flow hydraulics, which could also result in riverbed scouring and sandbar development. However, the hydrology would benefit from the removal of the floating bridge (that alters river flow hydraulics and flooding, and contributes to bank erosion near its anchors). | Alternative 4 would have short- to long-term, moderate, adverse, and localized impacts on hydrology and floodplains, primarily from the addition of up to 14 permanent flow obstructions to the channel (14 bridge pile systems spaced at 24 ft) and the associated construction disturbances in the channel. The support piles, and river debris that catches on them, would alter flow hydraulics, which could also result in scouring and sandbar development. However, the hydrology would benefit from the removal of the floating bridge (that alters river flow hydraulics and flooding, and contributes to bank erosion near its anchors) and the restoration of surface and subsurface flows between wetland G and the river (along the existing barge landing access road). | Alternative 5 would have short- to long-term, moderate, adverse, and localized impacts on hydrology and floodplains, primarily from the addition of up to 14 permanent flow obstructions to the channel (14 bridge pile systems spaced at 24 ft) and the associated construction disturbances in the channel. The support piles, and river debris that catches on them, would alter flow hydraulics, which could also result in scouring and sandbar development. However, the hydrology would benefit from the removal of the floating bridge (that alters river flow hydraulics and flooding, and contributes to bank erosion near its anchors) and the restoration of surface and subsurface flows between wetland G and the river (along the existing barge landing access road). |
| **Soundscape** | The effect of alternative 1 on the natural soundscape in the project area would continue | Alternative 2 would have short- and long-term, moderate, adverse, and localized impacts on the | Alternative 3 would have short- and long-term, moderate, adverse, and localized impacts on the | Alternative 4 would have short- and long-term, moderate, adverse, and localized impacts on the | Alternative 5 would have short- and long-term, moderate, adverse, and localized impacts on the |

**TABLE 4. SUMMARY OF IMPACTS OF THE ALTERNATIVES**

| Impact Topic | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 | Alternative 5 |
|---|---|---|---|---|---|
| | to be long-term, minor, adverse, and localized. These adverse effects would primarily result from the continued noise generation from human activities associated with Brooks Camp (e.g., visitors and staff, motorized vehicles, and generator noise from NPS/concessioner operations). The noise disturbances would primarily originate at ground level, occur in the summer, and would extend out from Brooks Camp, the campground, the Lake Brooks area, and along the roads and trails that connect these sites. | natural soundscape. Adverse impacts would primarily result from construction-related noise, increasing the audio exposure of human activities on the boardwalks/bridge, and introducing park operations noise to a new access corridor and barge landing area to the south. The removal/relocation of two notable noise sources along open, exposed areas of the Brooks River corridor (barge landing and access road) would benefit the soundscape along Brooks River, but introduce noise sources to a relatively undisturbed area to the south. | natural soundscape. Adverse impacts would primarily result from construction-related noise, increasing the audio exposure of human activities on the boardwalks/bridge. The slight relocation of the barge landing away from the mouth of Brooks River could benefit the soundscape.<br><br>There would likely be a 2-year duration of noise impacts due to the longer construction period for this bridge design. | natural soundscape. Adverse impacts would primarily result from construction-related noise, increasing the audio exposure of human activities on the boardwalks/bridge, and introducing park operations noise to a new access corridor and barge landing area to the south. The removal/relocation of two notable noise sources along open, exposed areas of the Brooks River corridor (barge landing and access road) would benefit the soundscape along Brooks River, but would introduce noise sources to a relatively undisturbed area to the south. | natural soundscape. Adverse impacts would primarily result from construction-related noise, increasing the audio exposure of human activities on the boardwalks/bridge, and introducing park operations noise to a new access corridor and barge landing area to the south. The removal/relocation of two notable noise sources along open, exposed areas of the Brooks River corridor (barge landing and access road) would benefit the soundscape along Brooks River, but would introduce noise sources to a relatively undisturbed area to the south. |
| **Archeological Resources** | The no-action alternative would have long-term, minor, adverse impacts on archeological resources contributing to the eligibility of Brooks River Archeological District National Historic Landmark. | Alternative 2 would have long-term, localized, minor, adverse impacts on archeological resources contributing to the eligibility of Brooks River Archeological District National Historic Landmark.<br><br>**Section 106 Summary.** After applying Advisory Council on Historic Preservation (ACHP) criteria of adverse effect (36 | Alternative 3 would have long-term, localized, minor, adverse impacts on archeological resources contributing to the eligibility of Brooks River Archeological District National Historic Landmark.<br><br>**Section 106 Summary.** After applying ACHP criteria of adverse effect (36 CFR Part 800.5), the National Park | Alternative 4 would have long-term, localized, minor, adverse impacts on archeological resources contributing to the eligibility of Brooks River Archeological District National Historic Landmark.<br><br>**Section 106 Summary.** After applying ACHP criteria of adverse effect (36 CFR Part 800.5), the National Park | Alternative 5 would have long-term, localized, minor adverse impacts on archeological resources contributing to the eligibility of the Brooks River Archeological District National Historic Landmark.<br><br>**Section 106 Summary.** After applying ACHP criteria of adverse effect (36 CFR Part 800.5), the |

**TABLE 4. SUMMARY OF IMPACTS OF THE ALTERNATIVES**

| Impact Topic | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 | Alternative 5 |
|---|---|---|---|---|---|
| | | CFR Part 800.5, *Assessment of Adverse Effects*), the National Park Service concludes that alternative 2 would result in *no adverse effect* on archeological resources. | Service concludes that alternative 3 would result in *no adverse effect* on archeological resources. | Service concludes that alternative 4 would result in *no adverse effect* on archeological resources. | National Park Service concludes that alternative 5 would result in *no adverse effect* on archeological resources. |
| **Historic Structures and Cultural Landscapes** | The no-action alternative would have long-term, localized, minor, adverse impacts on historic structures and cultural landscape features contributing to the significance of the Brooks Camp Historic District. | Alternative 2 would have long-term, localized, moderate, adverse impacts on historic structures and cultural landscape features contributing to the significance of the Brooks Camp Historic District.<br>**Section 106 Summary.** After applying ACHP criteria of adverse effect (36 CFR Part 800.5), the National Park Service concludes that alternative 2 would result in an *adverse effect* on the Brooks Camp cultural landscape because of the bridge and boardwalk construction. | Alternative 3 would have long-term, localized, moderate, adverse impacts on historic structures and cultural landscape features contributing to the significance of the Brooks Camp Historic District.<br>**Section 106 Summary.** After applying ACHP criteria of adverse effect (36 CFR Part 800.5), the National Park Service concludes that alternative 3 would result in an *adverse effect* on the Brooks Camp cultural landscape because of the bridge and boardwalk construction. | Alternative 4 would have long-term, localized, moderate, adverse impacts on historic structures and cultural landscape features contributing to the significance of the Brooks Camp Historic District.<br>**Section 106 Summary.** After applying ACHP criteria of adverse effect (36 CFR Part 800.5), the National Park Service concludes that alternative 4 would result in an *adverse effect* on the Brooks Camp cultural landscape because of the bridge and boardwalk construction. | Alternative 5 would have long-term, localized, moderate, adverse impacts on historic structures and cultural landscape features contributing to the significance of the Brooks Camp Historic District.<br>**Section 106 Summary**. After applying ACHP criteria of adverse effect (36 CFR Part 800.5), the National Park Service concludes that alternative 5 would result in an *adverse effect* on the Brooks Camp cultural landscape because of the bridge and boardwalk construction. |
| **Ethnographic Resources** | The no-action alternative would have long-term, localized, minor impacts on ethnographic resources in the vicinity of Brooks River Archeological District National Historic Landmark. | Alternative 2 would have long-term, localized, minor, adverse impacts on ethnographic resources in the vicinity of Brooks River Archeological District National Historic Landmark.<br>**Section 106 Summary.** After applying ACHP | Alternative 3 would have long-term, localized, minor, adverse impacts on ethnographic resources in the vicinity of Brooks River Archeological District National Historic Landmark.<br>**Section 106 Summary.** After applying ACHP | Alternative 4 would have long-term, localized, minor, adverse impacts on ethnographic resources in the vicinity of Brooks River Archeological District National Historic Landmark.<br>**Section 106 Summary.** After applying ACHP | Alternative 5 would have long-term, localized, minor, adverse impacts on ethnographic resources in the vicinity of Brooks River Archeological District National Historic Landmark.<br>**Section 106 Summary.** After applying ACHP |

**TABLE 4. SUMMARY OF IMPACTS OF THE ALTERNATIVES**

| Impact Topic | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 | Alternative 5 |
|---|---|---|---|---|---|
| | | criteria of adverse effect (36 CFR Part 800.5), the National Park Service concludes that alternative 2 would result in *no adverse effect* on ethnographic resources. | criteria of adverse effect (36 CFR Part 800.5), the National Park Service concludes that alternative 3 would result in *no adverse effect* on ethnographic resources. | criteria of adverse effect (36 CFR Part 800.5), the National Park Service concludes that alternative 4 would result in *no adverse effect* on ethnographic resources. | criteria of adverse effect (36 CFR Part 800.5), the National Park Service concludes that alternative 5 would result in *no adverse effect* on ethnographic resources. |
| **Visitor Experience** | The no-action alternative would have localized, moderate, long-term, beneficial impacts on visitor experience because of the sense of adventure associated with viewing bears in close proximity.<br><br>Despite substantial efforts to educate visitors and monitor human-bear interactions, the no-action alternative would also perpetuate visitor safety concerns because of frequent unwanted human-bear interactions. Combined with the continued use of the floating bridge by both pedestrians and vehicles, alternative 1 would have localized, major, long-term, adverse impacts on visitor safety. | In general, alternative 2 would have localized, moderate, long-term, beneficial impacts on the visitor experience associated with creating a travel corridor that would avoid interruptions from bear conflicts while at the same time providing new bear viewing areas along the bridge and boardwalks. Localized, moderate, short-term, adverse impacts would only be associated with temporary construction activities.<br><br>Alternative 2 would also greatly improve visitor safety by providing a safe travel corridor that avoids human-bear interactions—a localized, moderate, long-term, beneficial impact. This result includes the consideration of localized, minor, long-term, adverse impacts that would also occur because | Alternative 3 would have an overall localized, moderate, long-term, beneficial impact on the visitor experience by improving access and providing for additional bear watching opportunities. Localized, moderate, short-term, adverse impacts would be associated with noise and intrusions from construction activities during project implementation but could easily be mitigated.<br><br>The new bridge and boardwalk additions proposed in this alternative would have localized, moderate, long-term, beneficial impacts on visitor and employee safety by providing a safe travel corridor. This result includes the consideration of some level of risk associated with the | Alternative 4 would have localized, major, long-term, beneficial impacts on the visitor experience by improving access and providing for additional bear-watching opportunities, and by providing a ramp to access the south bank of the river. Localized, moderate, short-term, adverse impacts would be associated with noise and visual intrusions from construction activities.<br><br>Alternative 4 would also result in localized, moderate, long-term, beneficial impacts on visitor safety by providing an extensive elevated travel corridor directly connecting Brooks Camp to the bus parking area and viewing platforms on the south side. Emergency design features, such as a ladder on the north side and | Alternative 5 would have localized, moderate, long-term, beneficial impacts on the visitor experience by providing new viewing areas and an elevated travel corridor. However, localized, minor, short-term, adverse impacts on the visitor experience would occur from construction activities.<br><br>This alternative would also greatly improve visitor safety by providing an elevated travel corridor with emergency access ladder, having localized, moderate, long-term, beneficial impacts. This includes the consideration of localized, minor, long-term, adverse impacts would be associated with potential pedestrian-vehicle conflicts. |

**TABLE 4. SUMMARY OF IMPACTS OF THE ALTERNATIVES**

| Impact Topic | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 | Alternative 5 |
|---|---|---|---|---|---|
| | | of the potential risk from pedestrian-vehicle conflicts on the extensive bridge and boardwalk system. | potential for pedestrian-vehicle conflicts on the corridor, which would continue and result in localized, minor, long-term, adverse impacts. | ramp on either end of the bridge, would contribute to mitigating risks in the event of an incident or a need to access/evacuate the elevated boardwalk and bridge because of an unexpected bear encounter. This result includes the consideration of localized, minor, long-term, adverse impacts on visitor safety would result from risks associated with use of the bridge and extensive boardwalk system by pedestrians and vehicles. | |
| **Visual/Scenic Resources** | Though easily identifiable from foreground views along the immediate shorelines of Brooks River, the view of the floating bridge is low in the overall landscape. Similarly, the barge landing, access roads, and trails would continue to be noticeable within the viewshed. Overall, the no-action alternative would continue to have local, moderate, long-term, adverse impacts on visual resources and scenery. | Alternative 2 would have the largest development of infrastructure among the action alternatives, resulting in localized, moderate, long-term, adverse impacts on the visual resources from the perspective of a visitor looking at the bridge or new barge landing site, but would result in localized, moderate, long-term, beneficial visual impacts for visitors while on the bridge or boardwalks because of the removal of the trail through the | Alternative 3 proposes a more consolidated bridge and boardwalk design with a smaller development footprint than alternative 2, but these features would still be easily visible to all visitors in foreground and middle ground views. Overall, these actions would result in localized, moderate, long-term, adverse impacts on visual resources and scenery. | Alternative 4 proposes a major increase in the development footprint, adding extensive boardwalks on either side of the bridge. The bridge design itself would produce a highly visible profile against the riparian landscape. The construction of a new access road would create an easily identifiable impact on the natural scenery in that area, but the viewshed on the riverbank would be greatly improved. Overall, this alternative would result in localized, moderate, long-term, adverse | Overall, alternative 5 would produce localized, moderate, long-term, adverse impacts on the visual resources from the perspective of a visitor looking at the bridge or new barge landing site because of these developments would not blend into the landscape, but the alternative would result in localized, moderate, long-term, beneficial visual impacts for visitors on the bridge or boardwalks because the trail through the Corner and the access road along |

**TABLE 4. SUMMARY OF IMPACTS OF THE ALTERNATIVES**

| Impact Topic | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 | Alternative 5 |
|---|---|---|---|---|---|
| | | Corner and the access road to the barge landing along the south bank. | | impacts on the visual resources from the perspective of a visitor looking at the bridge or new barge landing site, but would result in localized, moderate, long-term, beneficial visual impacts for visitors on the bridge or boardwalks. | the south bank would be removed. |
| **Socioeconomic Environment** | Alternative 1 would have minor, long-term, beneficial effects to the regional economy. These effects would be primarily tied to federal and visitor spending, as well as the provision of commercial and guide services in the park. | Alternative 2 would result in short- and long-term, minor, beneficial impacts on the regional economy. These effects would primarily result from construction of the bridge/boardwalk, hardening of the barge landing site, and some additional commercial activity. | Alternative 3 would result in short- and long-term, minor, beneficial impacts on the regional economy. These effects would primarily result from construction of the bridge/boardwalk, hardening of the barge landing site, and some additional commercial activity. | Alternative 4 would result in short- and long-term, minor, beneficial impacts on the regional economy. These effects would primarily result from construction of the bridge/boardwalk, hardening of the barge landing site, and some additional commercial activity. | Alternative 5 would result in short- and long-term, minor, beneficial impacts on the regional economy. These effects would primarily result from construction of the bridge/boardwalk, hardening of the barge landing site, and some additional commercial activity. |

# 3

# Affected Environment

# INTRODUCTION

This chapter describes the environment that could be affected by actions proposed in the alternatives for the Brooks Camp area. This chapter includes the specific topics identified in chapter 1 that are analyzed to determine the environmental impacts of implementing the alternatives.

The focus is on those key natural and cultural resources, visitor uses and experiences, and the socioeconomic environment that could be affected by implementing the alternatives. The conditions described herein provide a baseline for the analyses in chapter 4.

# NATURAL RESOURCES

## GENERAL DESCRIPTION

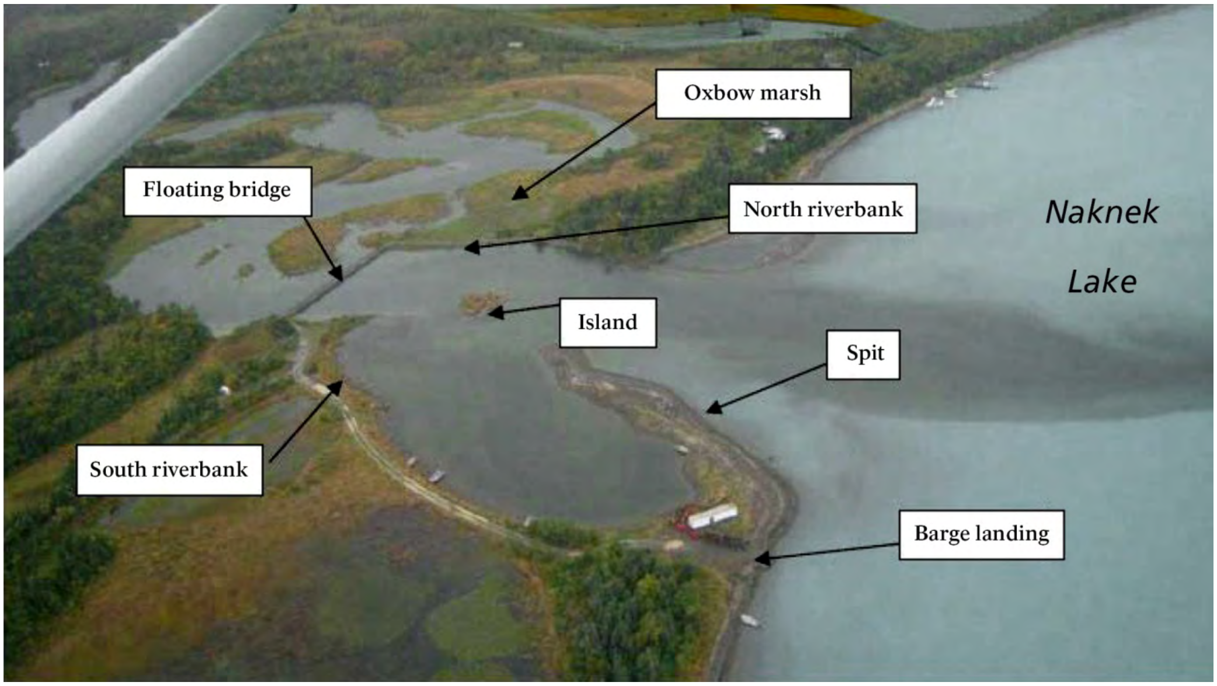
Brooks Camp is in the interior lakes region of Katmai National Park and Preserve, about 35 miles southeast of King Salmon, Alaska. Most of the camp infrastructure is at the mouth of Brooks River where it empties into Naknek Lake.

The project area includes Brooks Camp, its vicinity on both the north and south sides of Brooks River, and the adjacent shores of Naknek Lake where NPS barge landings occur (see figure 8). Although the alternative bridge locations are focused near the mouth of Brooks River, this project area is ecologically connected to the upstream stretches of the river, which extend more than a mile to the west (as the river flows out of Lake Brooks and meanders downstream). The seasonal salmon runs through Naknek Lake to Lake Brooks, and the associated brown bear feeding patterns along Brooks River, contribute to a complex natural system in this area.

The landscape in the vicinity of the project area consists of gradual rolling terrain that flattens out in the lower areas of the drainage basin (along the floodplain of Brooks River and near the shores of Naknek Lake). The elevation in the project area generally ranges from about 40 ft to 90 ft above mean sea level. Wet meadows, willow thickets, and floodplain marshes are common features of the lowland portions of the project area. These wetland areas are primarily found in the low-lying oxbow floodplains of Brooks River. The upland portions on the south side of the river are generally covered with a white spruce forest, with interspersed balsam poplar and Kenai birch near perimeters of open wet meadow areas. On the north side of the river, the upland areas include more open grassy areas, with pockets of mixed forest that include Kenai birch, balsam poplar, and white spruce (NPS 1996a; URS Group, Inc. 2009a).

The wildlife habitat provided by this mosaic of uplands and lowlands around the mouth of Brooks River serve many small and large mammal species, as well as a wide variety of birds. Mammals that inhabit the project area include brown bear, moose, wolf, wolverine, mink, short-tailed weasel, river otter, beaver, porcupine, snowshoe hare, lynx, arctic ground squirrel, red squirrel, red-backed vole, northern jumping mouse, little brown bat, and several species of shrews (NPS 1996a). Given their high seasonal concentration and activity, and their appeal to park visitors, brown bears are the most prominent wildlife species in the Brooks Camp area.

The brown bear activity in the vicinity of the project area primarily coincides with sockeye salmon runs in Brooks River during the summer and early fall. The bears tend to concentrate along the Brooks River corridor through the month of July when the sockeye salmon make their migration from Naknek Lake up to Lake Brooks. Although the numbers vary from year to year, typically 40–60 brown bears arrive in the area to feed on the migrating salmon (NPS 1996a; URS Group, Inc. 2009a).

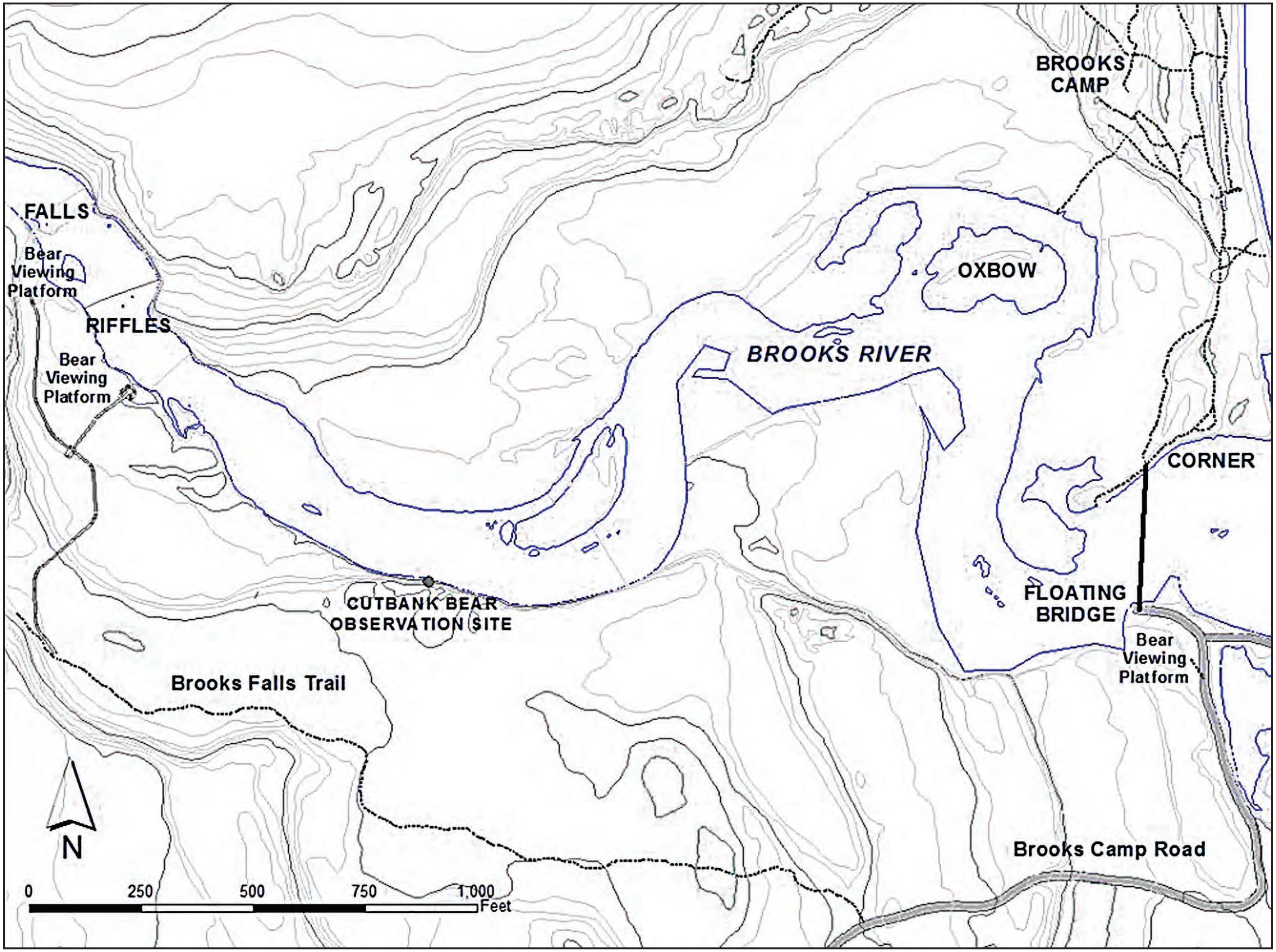



Source: BasePoint Design Corporation, Inc. 2007; photo by Helen Lons of National Park Service (photograph recorded in 2007 prior to floating bridge relocation to its current location)

**FIGURE 8. AERIAL IMAGE OF PROJECT AREA**

In addition to the sockeye salmon, several other fish species occupy the waters of Brooks River and adjacent Lake Brooks and Naknek Lake. These fish include coho salmon, Chinook salmon, pink salmon, chum salmon, grayling, arctic char, Dolly Varden, lake trout, rainbow trout, arctic lamprey, humpback whitefish, least cisco, pygmy whitefish, round whitefish, pond smelt, northern pike, longnose sucker, burbot, threespine and ninespine sticklebacks, and coast range and slimy sculpins. Of these fish, the rainbow trout plays an important role in the Brooks River ecology by feeding on the high concentrations of salmon eggs and juvenile salmon in the river. Rainbow trout numbers in Brooks River are the highest in late September when the trout enter the river from Lake Brooks and Naknek Lake to feed on the recently laid sockeye salmon eggs (NPS 1996a).

Bird species that commonly inhabit the project area include bald eagles, common ravens, black-billed magpies, tree swallows, ospreys, mallards, and common mergansers. Sea birds such as Bonaparte's gulls, arctic terns, glaucous-winged gulls, and mew gulls visit the area during salmon runs and die-offs and when salmon fry and smolt numbers are high (NPS 1996a). The boreal forests in the project area host several songbird species such as the dark-eyed junco, gray jay, American robin, varied and hermit thrushes, and black-capped and boreal chickadees. Tundra swans and diving birds, such as the greater scaup, and the common golden-eye are also known to use the beaver ponds in the area for feeding (NPS 1996a). A bald eagle nest also exists south of the project area on the fringe of the small lake known as Beaver Pond.




# Map 8. Middle Portion of the Brooks River

Katmai National Park and Preserve

United States Department of the Interior • National Park Service

## WILDLIFE

### Brown Bear

**General Species Summary.** The brown bear (*Ursus arctos*) is a common and vital member of the overall Alaska ecosystem. The brown bear is the same species as the grizzly bear, but it is different in that it resides in or near coastal areas and has a more abundant food supply, particularly salmon. Grizzly bears are listed as threatened under the Endangered Species Act for the Lower 48. However, given their higher population numbers in Alaska, the brown/grizzly bear is classified as a game animal in the state and there are established regional regulations. Today, population estimates indicate that more than 30,000 brown/grizzly bears live in Alaska (USFWS 2007b). Meanwhile, more than 25,000 brown/grizzly bears live in Canada. Of this large Alaskan population, a 2007 aerial survey estimated that nearly 2,200 brown bears live in Katmai National Park and Preserve, making the area the largest single concentration of protected brown bears on the continent (Olson and Putera 2007; DeBruyn 1999). The brown bears at the park are dependent on salmon, including those in Brooks River. In 2008, monitoring efforts identified at least 70 individual bears fishing for sockeye in June and July, and at least 52 bears feeding on spawned-out sockeye salmon in late summer and fall (Olson 2009).

The brown bear has a large overall range of 50 to 300 square miles for females and 200 to 500 square miles for males. The average lifespan of a brown bear is 15 to 20 years, with some living more than 30 years (USFWS 2007b). Some of the brown bears that frequent Brooks River return year after year. Brown bears usually spend spring and summer at the lower elevations of their range and return to higher elevations in autumn to search for dens on isolated mountain slopes for winter hibernation. The bears typically enter the dens in October or November. When brown bears emerge from their dens in spring (males in March or April, females in April and May), they often immediately seek carrion of other animals that succumbed to the winter. The bears then travel to the lower elevations of their range to areas that are wet, with greening herbaceous cover, such as the Brooks River basin (USFWS 2007b).

Brown bears are primarily solitary animals. Most of their time is spent foraging, independently of other bears. With the exception of interacting with other bears in concentrated feedings areas like Brooks Falls, the only times brown bears associate closely with other bears are during mating season and when females are tending to their young. The brown bear mating season is typically from June through July, which coincides with the time when the bears congregate along Brooks River for the July salmon run. Brown bear cubs rely primarily on their mother’s milk for up to a year, and stay with their mother for nearly three years. Thus, the cubs that accompany female bears to Brooks River may be anywhere from six months to three years old (USFWS 2007b).

The diet of the brown bear consists of both plants and animals, making it the largest omnivore in North America. More than 80 percent of the brown bear diet is plant-based (e.g., roots, fruits, nuts, and green vegetation). Adult insects or insect larvae are another common source of food for brown bears (USFWS 2007b). However, in the case of Katmai National Park and Preserve, the brown bear’s animal-based meat diet is quite pronounced. In addition to feeding on carrion, small mammals, or occasionally preying on young or weak moose, the brown bears at the park rely heavily on salmon as a key component of their diet. The sockeye salmon that migrate through Brooks River are a prime example of this dependence.

**Brown Bear Activity in Summer and Fall along Brooks River.** The sockeye salmon migrating up and spawning in Brooks River attract brown bears to the project area twice each year. Brown bears first occupy the Brooks River corridor after leaving their dens in spring when they sporadically pass through the area (prior to the salmon run). Greater numbers of bears begin to congregate and stay in the corridor from late June through July, when sockeye salmon migrate upstream through the Brooks River. These energetic salmon are targeted by brown bear predation primarily at Brooks Falls or in downstream pools. During August, the bear activity along Brooks River decreases as the bears move out to other rivers and streams in the area to feed on subsequent salmon runs or upslope to browse on berry patches. By the last week of August or the first week of September, brown bear activity returns to Brooks River because bears come to feed on spawned-out or dead sockeye salmon in the river. At this time, some bears also fish for coho salmon on Brooks Falls as the coho salmon migrate upstream as part of a smaller coho salmon run in September. The autumn bear activity along Brooks River typically continues through mid-October. Salmon occupy Brooks River for a longer period than any other river drainage in Katmai National Park and Preserve, with the exception of the Savonoski River (DeBruyn 1999; Troyer 1980; Smith 2002).

During the past few decades, the number of independent brown bears feeding on salmon in Brooks River has risen considerably. In the 1970s, a Brooks River study estimated that only 6 to 8 individual brown bears fished on Brooks River in July, while 8 to 24 bears foraged for dead or dying salmon in autumn (Troyer 1980). In the mid-1980s, a subsequent survey estimated 20 to 21 bears in July and 18 to 24 in autumn (Jope 1985). In the late 1980s and early 1990s, surveys indicated 19 to 32 bears in July and 32 to 44 bears in autumn (Olson et al. 1997). In 2008, NPS staff identified at least 70 individual brown bears in July and 50 bears in autumn—several times more than the Brooks River bear counts in past decades (Olson 2009).

Because notable variations in bear activity can occur from year to year, it is best to look at average numbers over multiple years. The shifts in bear activity numbers and timing (i.e., July compared to September) during the past 20 years can been seen by looking at four-year averages from 1988 to 1991 and from 2005 to 2008. Two decades ago, from 1988 through 1991, an average of 22 bears were regularly active along Brooks River in July each summer, and 26 bears were active in the autumn. Whereas, in the four years from 2005 through 2008, an average of 68 bears were regularly active in July each year, and 54 bears were active in the autumn (Olson 2009). These averages reveal a tripling and doubling of brown bear numbers over the past 20 years in July and autumn, respectively.

Not only are the recent total bear numbers more than those of the past, but also the July sockeye salmon run is now attracting more bears than the September salmon spawning and die-off. In past decades, the autumn feeding period attracted more bears than the summer feeding period.

Compared to other mammals, brown bears have a relatively slow population growth rate. The relatively rapid increase in brown bear activity along Brooks River may be explained by a wide variety of factors. First, the overall population of brown bears on the Alaska Peninsula has increased over the past decades (DeBruyn 1999; Sellers and McNay 1984). Secondly, the size of the July sockeye salmon run has been healthy and strong during the past 20 years (Olson 2009). Another important factor may be that more bears have become habituated to human activity over the years. More specifically, many cubs have experienced benign contacts with humans along Brooks River while being accompanied by adult bears over the years, which may habituate them as they grow older (Olson 2009). Additionally, the noted increases in the park's bear population may be the continuing result and progression that followed the cessation of bear hunting that occurred in the period after the National Park Service acquired the land around Brooks River (Troy Hamon, pers. comm., August 2010). Finally, in recent years, NPS staff and active NPS management provided more bear protection than in decades past (DeBruyn 1999).

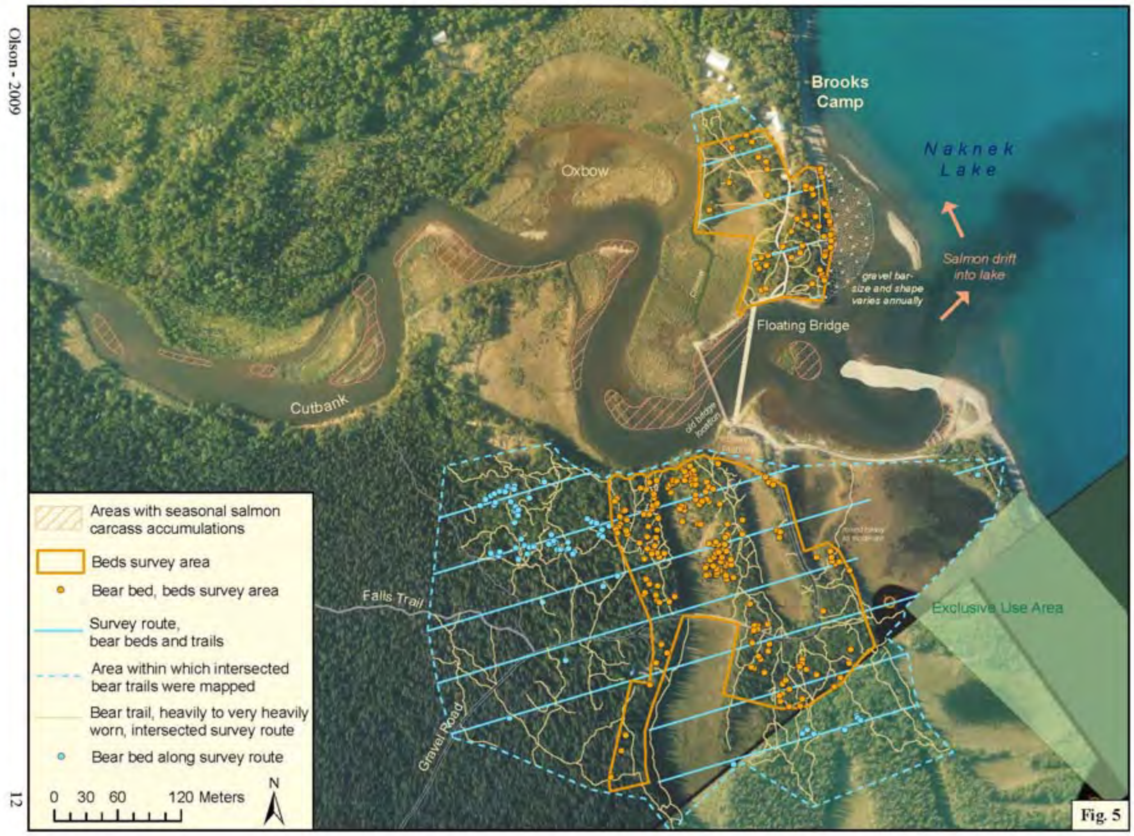
Many of the bears seen along Brooks River in summer and fall are repeat visitors from past years. In 2008, for example, 59 of the 70 individual bears observed in July were recognized from previous years, and 35 of the 52 individual bears observed in autumn of that same year were recognized from previous years (Olson 2009). Given the challenge of identifying bears as they grow and change in appearance each year (e.g., changes in fur), these observations should be considered minimum numbers. Similarly, in any given year, a number of bears visiting Brooks River in September are the same bears that fished in the river a couple months earlier in July of the same year.

Interestingly, although the numbers of bears coming to Brooks River in both July and September have increased over past decades, the bears continue to focus their activity on the same specific fishing sites and foraging locations along the river from year to year. Despite the year-to-year spatial consistency, the differences in activity locations and bear behavior between the July aggregation and the autumn aggregation require NPS staff to administer different levels, types, and locations of management actions to avoid human-bear conflicts (Olson et al. 2009; Olson 2009).

This management continues to become more and more challenging because, along with this increase in bears at Brooks River, the number of visitors coming to the area has also increased substantially. NPS staff is managing more bears and more people in the same small space. Over recent years, the frequency of ground level human-bear interaction incidents has increased when compared to incident records from past decades (Troy Hamon, pers. comm., August 2010).

Ground surveys conducted during August 2009 indicate that heavy concentrations of bear trails and bedding sites exist in the vicinity of the proposed elevated bridge and walkways on both sides of Brooks River (see figure 9) (Olson 2009).

**Summer Bear Activity: Behavior and Patterns from Late June through July.** As previously described, brown bears start arriving in the Brooks River corridor in late June or early July to feed on migrating sockeye salmon. At least 70 individual bears fished for salmon in this area in the summer of 2008 (Olson 2009). The bears usually remain in the area through July. One of the reasons for this high concentration of bears in July is because Brooks River has a waterfall that creates a migration challenge for salmon. Sockeye salmon seeking to pass over the falls gather below it and are more concentrated and available for capture than salmon in other rivers that lack such migration challenges (Troy Hamon, pers. comm., August 2010). In other words, this is one of the first good opportunities for brown bears to pursue a consistent, high volume of food and calories after emerging from dens in springtime (Olson et al. 2009).




(Source: Olson 2009)

**FIGURE 9. BEAR BEDS AND HEAVILY AND VERY HEAVILY WORN BEAR TRAILS FOUND WITHIN THE VICINITY OF THE PROPOSED LOWER RIVER ELEVATED BRIDGE AND BOARDWALKS**

During the summer aggregation, the most productive fishing area for bears on Brooks River is the area immediately below and on top of Brooks Falls (roughly halfway up Brooks River between Naknek Lake and Lake Brooks). In most cases, the best fishing sites at this waterfall go to the most dominant bears, which tend to be larger and older male bears (DeBruyn 1999). Other more submissive or subordinate bears typically fish for salmon in the shallow riffle area below Brooks Falls or forage for injured salmon that were unsuccessful in making the leap over Brooks Falls (DeBruyn 1999). As a consequence of the location and activity at Brooks Falls, in July the most active and concentrated bear fishing occurs in reaches of the river that are upstream of and somewhat removed from Brooks Camp and the project area.

**Autumn Bear Activity: Behavior and Patterns from Late August through Mid-October.** After the lull in August, brown bear activity typically returns to Brooks River by the last week of August, as bears seek salmon carcasses or dying, spawned-out salmon in the river. As previously noted, some of the bears return to Brooks Falls to fish for coho salmon that are migrating upstream as part of a smaller September coho salmon run (DeBruyn 1999). At least 52 individual brown bears foraged for salmon along Brooks River during the 2008 autumn activity period (Olson 2009). The autumn aggregation along Brooks River usually lasts through mid-October.
Unlike July, for the most part, this autumn aggregation focuses on areas where sockeye salmon carcasses pile up and on areas where bears can easily swim and dive for carcasses along the river bottom (Olson et al. 2009). In this case, the primary bear activity areas are a result of river current patterns and river morphology. Important locations for autumn foraging are in the middle portion of Brooks River down through the oxbow, as well as along the Naknek Lake shoreline north of the river mouth (DeBruyn 1999).

The availability of multiple locations where dying salmon and salmon carcasses amass most likely explains why only a few bears aggregate at Brooks Falls in the autumn (Olson 2009; Olson and Gilbert 1994; Olson et al. 1997). Thus, in the autumn the downstream flow of carcasses bring the bears much closer to the human activity zones of Brooks Camp when compared to the July run (Olson et al. 2009; Braaten and Gilbert 1987).

The area upstream of the existing floating bridge (from the river's mouth upstream approximately 0.75 mile, including the area known as the oxbow) has been documented as an important autumn feeding area for family groups that are more intolerant of the human activity common at the lower/mouth area of the river near Brooks Camp (Olson et al. 2009; Olson 1993; Olson and Gilbert 1994; Olson et al. 1997). A 1980s study noted that brown bears arriving at Brooks River in autumn appeared shyer than the bears that fished there in July. The study concluded that the autumn bears generally had a low tolerance for human activity, particularly the female bears with cubs (Braaten and Gilbert 1987). Subsequent authors did not note lower human tolerance as the number of bears and people active in the area increased through the years.

Other areas and natural features near the mouth of Brooks River (and downstream of the floating bridge) are also important for bears during the autumn feeding period. For example, the island, the spit, and adjacent riverbanks near the mouth of the river often provide areas for bears to rest between feeding activities in the river (see figure 9). These features also serve as safe havens for cubs or other bears when trying to avoid or escape larger, male bears that are feeding in the area.

**Human Habituation of Brown Bears.** In the area of Brooks River, the goal of NPS managers is to protect the brown bears and their habitat (which includes their access to seasonal salmon runs) while also providing opportunities for park visitors to observe the salmon run and bear feeding cycle. Given this goal and the annual concentration of both people and bears along Brooks River, it is inevitable that some bears will grow somewhat accustomed and adapted to certain levels and locations of human activity. *Human habituation* is the term used to describe this adaptation of certain brown bears to humans. *Habituation* is defined as "a waning of response to a repeated neutral stimulus" (DeBruyn 1999; Whittaker and Knight 1998). In this case, it applies to brown bears that experience repeated benign interactions with humans (over months or years) to a point where the bears' responses to nearby human activity are muted or minimized (Herrero et al. 2005).

Many consider it desirable to allow bears to become habituated to humans at Brooks River, as habituation may reduce the risk associated with close human-bear encounters because habituated bears are more tolerant of humans in close proximity. Not only does this provide safer opportunities for park visitors to observe bears at close range, but it also allows bears to access a critical food source (i.e., salmon) that exists near human activity centers.

However, human habituation in bears also has possible risks, for both bears and humans. For example, habituated brown bears may have a greater tendency to approach people, which may occasionally lead to dangerous interactions. Similarly, habituated bears may be less cautious when approaching roadways, which could lead to traffic delays or collisions. In addition, habituated bears are at much greater risk if they wander beyond protected lands, because they are more prone to be killed or victims of ignorant or illegal human behavior (Herrero et al. 2005). In other words, while habituation may improve safety for humans and bear access to salmon at Brooks River, it may leave bears and humans vulnerable in other situations and locations.

Another risk of habituation relates to the reaction distance of bears. When humans and bears are regularly near each other, the reaction distance in the event of a serious confrontation is so close that the response options and time are very limited (Troy Hamon, pers. comm., August 2010). This can increase the potential for a dangerous situation for both bear and human.

Even though some bears may become habituated to humans at Brooks River, it is very important to note that some bears do not become habituated. The bears that become habituated may have a competitive edge over nonhabituated bears because the habituated bears will likely have better access to prime salmon fishing/feeding areas (which are also in vicinity of humans). Bears that never become habituated to humans may be forced to seek salmon at less productive locations and/or during less productive times. Some of these bears may choose to avoid the Brooks River salmon run entirely.

One example of this variation in behavioral response of individual bears has been documented near the existing elevated boardwalk that accesses the Brooks Falls viewing platforms. While a large number of bears have not been notably affected by the elevated boardwalks, observations indicate that some individual bears adjust their behavior because of the presence of overhead human activity (DeBruyn et al. 2004). For example, the location where some bears cross under the boardwalk may depend on where humans are present on the boardwalk. Other bears may avoid crossing under the boardwalk entirely due to being intimidated by overhead activity. Thus, the value of the Brooks Falls area for fishing and resting to some bears may be adversely affected by the presence of overhead human activity on the boardwalks.

There are also examples of both habituated and nonhabituated bears being involved in a disproportionate number of negative human-bear interactions (DeBruyn 1999; Herrero 1985; Squibb and Holmes 1992). Regardless of how habituated a bear is, this variation is most likely because of the fact that each bear possesses a different level of individual tolerance and may behave in its own unique way (DeBruyn 1999). Furthermore, because of dominance hierarchies that form at feeding aggregation areas, bears that are subordinate or submissive to other more dominant bears may be more cautious of other dominant bears than they are humans. Thus, it may be difficult to determine why a particular bear is behaving in a "skittish" manner (i.e., whether the skittish behavior is a result of the bear's intolerance of humans or its hesitation with more dominant bears in the area) (DeBruyn 1999).

**Human-Bear Interactions at Brooks River.** For apparent reasons, most human-bear encounters in areas along Brooks River typically occur in areas where, and at times when, concentrated bear activity overlaps with concentrated human activity. To help minimize these interactions, park visitors are asked to keep distances between themselves and bears (a minimum of 50 yards from individual bears and more distance if the bear appears to want more space). Bear-watchers are also asked to minimize time spent on the boardwalks on the south side of the river and use them only as access routes to/from viewing platforms (i.e., not use them as viewing platforms) (Olson 2009). Regardless of these regulations, human-bear interactions and confrontations still occur.

One area that requires some of the most vigilance from park staff and visitors is the area in and around Brooks Camp at the mouth of Brooks River. The location of Brooks Camp, with the Brooks River oxbow to the west, the Brooks River mouth to the south, and Naknek Lake to east, and the concentration of bears around Brooks Camp during the salmon runs in the summer and fall substantially increase the potential for human-bear interactions. NPS records of human-bear interactions from 1989 through 2009 show the highest number of interactions at Brooks Camp occurring in July followed by September

A bear behavior researcher described Brooks Camp, in the autumn, as being, "surrounded on three sides by bears feeding on salmon" (Braaten and Gilbert 1987). Bears move back and forth to/from salmon carcass areas along the Naknek Lake shoreline and other areas along the river mouth and oxbow (as well as to/from bedding sites in this area). This bear activity is in the same area as Brooks Camp human movement areas. For example, the campground trail that connects the campground to the main Brooks Camp area is quite problematic because both people and bears are trying to use the same north to south corridor along the shore of Naknek Lake in the fall (Olson et al. 2009).

The trail that connects Brooks Camp to the existing floating bridge running along the north shore of Brooks River is another common site of human-bear encounters in the summer and fall. Human-bear encounters often occur in this area when bears are feeding on salmon or resting along the river shoreline while people are trying to access the bridge from the camp (or the camp from the bridge). Given this conflict, in August 2008 NPS staff moved the camp-side bridge access point about 65 meters (approx. 215 ft) downstream from its previous location to minimize the riverside travel distance from Brooks Camp to the bridge (Olson 2009).

When bears cause substantial delays along pedestrian travel routes, NPS staff resorts to the use of hazing techniques (e.g., yelling, air horns, rubber bullets). Since 1998, the park's bear management plan has included the option of hazing resting bears if human traffic movements are delayed more than 30 minutes (Olson et al. 2009). This hazing policy is particularly important for the area near Brooks Camp in the fall, when the primary trail from camp to the floating bridge is often impassable because of bears resting in the area near the river mouth (Olson et al. 2009). In recent years, the number of times hazing is used near the camp and along the shores of Naknek Lake has increased (to allow human passage).

However, sometimes NPS staff is not available to monitor these human-bear encounters. For example, a large amount of bear feeding activity takes place in the evening (generally from 6:00 p.m. to 10:00 p.m.). However, in past years, little or no NPS staff was present along the river during evening hours in September when the bears were active, and the actions of both park visitors and bears were generally unsupervised (Olson et al. 2009; Olson et al. 1998; Bentley et al. 2007). In 2009 and 2010, NPS staff hours in September were lengthened to 7:00 p.m. to provide more staff presence during this high activity period.

Another challenge with human-bear interaction results from a large number of anglers accessing Brooks River during heavy bear use in the area. Brooks River is a popular sportfishing area because of the salmon runs and presence of large rainbow trout feeding on salmon eggs or juveniles. Fishing is allowed anywhere on the river, with the exception of within 100 yards of the Brooks Falls fish ladder. However, continuing to engage in fishing within 50 yards of a bear is prohibited.

Because anglers and bears are pursuing the same fish, encounters do occur. For example, during the July salmon run, the bears are particularly tuned in to splashing of fish in the river. Concurrently, there tends to be more anglers in the river in July, with focus on catching the energetic, migrating rainbow trout. Thus, bears occasionally chase fish that are hooked on angler lines. Bears associating anglers with fish is a notable concern for the park (Olson et al. 2009). In the late 1990s, the National Park Service restricted any fish retention by anglers in the river upstream of the floating bridge in an attempt to minimize the bears "stealing" fish from anglers and associating anglers with the food source. This policy change appears to have been somewhat successful, though fish stealing still occurs from time to time (Olson et al. 2009). Anglers are allowed to keep one fish downstream of the bridge, but they must immediately place any kept fish in a plastic bag and store it whole in the fish freezing building in Brooks Camp (Olson 2009). Anglers are also required to cut the line if a bear begins pursuing the hooked fish.

Despite these regulations, human-bear interactions are still triggered when anglers do not abide by the 50-yard separation rule and/or continue reeling in fish near bears. Park staff has documented problems with some anglers affecting bear access to the river by hazing bears or not allowing bears to fish in the stretch of river the anglers are using (Olson et al. 2009).

Other documented incidents of bears being negatively affected are from noise from motorboats and floatplanes near the mouth of Brooks River. However, some bears have become habituated to boat and plane noise and are not notably affected (Olson et al. 2009). The impact of floatplanes and boats near the mouth of Brooks River is greatest during the autumn when the bear aggregation follows the salmon carcasses to areas near the river mouth and Naknek Lake shoreline. All floatplane activities along the lakeshore near Brooks Camp can be disturbing to some bears (i.e., floatplane landing, taking off, loading, and unloading). In some cases, staff members have observed human activity near the plane landing/ loading area pushing bears away from the shoreline and into Brooks Camp (Olson et al. 2009). Human activity in one area is capable of spurring human-bear encounters in another area. To help minimize such impacts, floatplane pilots are prohibited from approaching within 50 yards of bears.

The attraction of food brought by humans to the area can also generate human-bear interactions. However, only a few instances in recent years of bears accessing human food or garbage have been documented. This low number may be a result of both preventive measures taken by the park staff and park visitors, as well as the ample availability of another, better food source for the bears (salmon) (Olson et al. 2009).

Lastly, mainly during the autumn aggregation, some instances of bears damaging items such as boats, viewing platforms, the floating bridge, floatplanes, and bicycles have been noted. Hazing these bears with noise has proven to be important and effective in providing negative reinforcement for such behavior (Olson et al. 2009). However, periodic damage continues to occur.

## Bald Eagle

**General Species Summary.** The bald eagle (*Haliaeetus leucocephalus*) is both an important predator and an important scavenger in the ecosystem of southern Alaska. The bald eagle is protected by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.

Alaska contains an estimated 30,000 bald eagles (including fledglings). Although most bald eagles winter in southern Alaska, some are known to migrate southward along the coast during cold months (ADF&G 2008b; NPS 2010c).

Given its dependence on water bodies throughout its life cycle, bald eagles are most common in Alaska's southern coastal regions, as well as on offshore islands and around inland freshwater rivers and lakes (ADF&G 2008b). The vast complex of freshwater lakes and rivers of the Naknek drainage in Katmai National Park and Preserve provide ample habitat for bald eagles. Katmai National Park and Preserve has a large breeding population of bald eagles. Wooded areas or individual trees immediately along the edge of water bodies typically provide the necessary perching, roosting, and nesting areas for the eagles (USFWS 2007a). The bald eagle's association with water bodies is related to its primary food source—fish. Coastal bald eagles prey on herring, pollock, flounder, salmon, and other small shoreline sea life, and the inland bald eagles rely most heavily on salmon and other freshwater fish. They can also be opportunistic predators of waterfowl and small mammals. Equally important, bald eagles often rely on carrion for food when not preying on fish or wildlife. This dependence on carrion is particularly common in areas such as Brooks River, where bald eagles feed on dead, spawned-out salmon or salmon remnants left behind by brown bears (ADF&G 2008b).

Unlike many other avian species, bald eagles are known to mate for life. The mating pair typically nests in tall trees that are near water, with open views and little cover above the nest. Both the male and female participate in nest building, which typically begins in April in Alaska (ADF&G 2008b). The completed nest can be as large as 10 ft in diameter (USFWS 2007a). Generally, bald eagles use nests year after year, enlarging them or rebuilding them. However, the breeding pair may have alternate nests available in the same breeding area each year (USFWS 2007a).

Once the nest is ready, breeding bald eagles typically produce one to three eggs each year (USFWS 2007a). The eggs usually incubate for about 35 days before hatching. In many cases, the stronger eaglets take most or all of the food and/or kill the weakest or youngest eaglet in the nest (USFWS 2007a). Human disturbances, disease, lack of food, and severe weather can also lead to eaglet mortality (ADF&G 2008b). The surviving eaglets usually fledge from the nest after 75 days. Even after breeding season, the adults and fledglings may continue to roost near the nest site (USFWS 2007a).

The primary threats to the bald eagle populations in southwestern Alaska continue to involve human-related actions such as ecotourism, sport and commercial fishing, timber harvest and mining activities adjacent to parks, and potential oil spills or other coastal accidents (NPS 2010c). Given the very limited human activities within Katmai National Park and Preserve (relative to the size of the area), the effects on bald eagle population in the park are also relatively limited.

**Bald Eagle Activity along Brooks River, Naknek Lake, and on Beaver Pond.** Given the robust fishery in Brooks River, various slow water stretches of Brooks River (including the mouth near Naknek Lake) provide quality foraging habitat for the bald eagle. Trees along this corridor also provide roosting opportunities near feeding areas. In addition to the Brooks River fishery, bald eagles are also known to forage for fish and other food sources in other water bodies near the project area. Beaver Pond, to the south of Brooks River, is one prime example. The tall trees that ring Beaver Pond also provide quality roosting habitat for eagles very near the food sources of the small lake.

An active nest site exists near the project area along the north shore of Beaver Pond, immediately west and south of the proposed barge landing and proposed access road, respectively (under action alternatives 2, 4, and 5). According to NPS staff, this bald eagle nest was active in 2000, and again in 2009 and 2010 (Troy Hamon, pers. comm., August 2010). Because Beaver Pond and the nest site are relatively offset from the developed areas of Brooks Camp to the north, ground level human activity near the existing nest is generally uncommon. However, it should be noted that floatplane flight paths between Brooks Camp and King Salmon are often routed directly over Beaver Pond and the adjacent nest site (while the nest is both active and inactive). These flights generate noise and aircraft presence at relatively low altitudes near the nest site. Any correlation between the floatplane disturbances and nesting activity and success is unknown.

**BALD EAGLE NEST SITE NEAR NORTH SHORE OF BEAVER POND**

## SALMON AND OTHER FISH

The fish that inhabit Brooks River, Lake Brooks, Naknek Lake, and their tributaries are vital resources in the park's ecology. One example of this importance is the sockeye salmon run in Brooks River. Given the size and concentration of the annual sockeye salmon run and its direct relation to the brown bear feeding activities in the park, sockeye salmon directly contribute to the significance, purpose, and value of the park. As a result, sockeye salmon runs are included in the park's significance statements. The significance statement reads as follows:

> Katmai National Park and Preserve protects the Naknek Lake drainage, an important spawning and rearing ground for Bristol Bay sockeye salmon, sustaining one of the largest salmon runs in the world.

The salmon run and brown bears feeding are just two of the reasons why the Brooks River area is internationally recognized for its unique and outstanding wildlife and fish resources. The State of Alaska also formally recognizes Brooks River, Naknek Lake, and Lake Brooks as waters important for anadromous fish. In addition to anadromous fish, several other fish species occupy these waters and are integral components of the natural system.

## The Ecology of Salmon

In addition to being important to the individual fish species, these waters are also critical because they support and host the many interconnected biological processes that tie the local and regional ecology together. The biological processes that occur in Brooks River, such as fish migrations and spawning, have ecological value that extends well beyond feeding bears on Brooks Falls.

One of the most important roles of fish, particularly anadromous salmon, is being the catalyst for nutrient cycling in the natural system. For example, anadromous salmon spend multiple years in ocean waters feeding and growing before returning to their natal waters to spawn. While growing in ocean waters, the salmon accumulate large amounts of nitrogen in their tissues, as most of the world's stored nitrogen exists on the ocean floor (Kozlowski 2007).

The seasonal concentration of salmon in places like Brooks River also directly affects the seasonal distribution of salmon consumers, such as resident fish, birds, and mammals. The ecology of the Brooks River area is a prime example of this trend. The inland ecosystems (both aquatic and upland ecosystems) at Katmai National Park and Preserve are dependent on seasonal influx of ocean-derived nutrients brought by anadromous salmon (Bartz 2002; Naiman 2002; Helfield 2001; Helfield and Naiman 2001, 2002). Some researchers suggest that salmon should be considered as keystone species because the health of the entire ecological community and its food web in these areas are so dependent on salmon (Naiman 2002; Wilson and Halupka 1995; Cederholm et al. 2000). A study in Washington and Oregon noted that 138 species were predators or scavengers of salmon at one or more stages of a salmon's life (Cederholm et al. 2000).

These ecological cycles and delicate interdependencies emphasize the importance of assessing both the direct and indirect effects of human-related disturbances on terrestrial and aquatic ecosystems at Katmai National Park and Preserve. Altering one minor component of the system's metabolism may have substantial effects on the overall health of the natural system.

## Fish Species Common to Naknek Lake and Brooks River

Brooks River, Naknek Lake, and Lake Brooks provide spawning, rearing, and/or migration habitat for anadromous fish and resident fish. The following section includes brief descriptions of the most prevalent fish species in these waters near the project area, mainly Brooks River and the shallows of Naknek Lake. The section focuses on the sockeye salmon, rainbow trout, and arctic grayling given their significance to the local ecology and park visitation (i.e., attracting anglers, bears, and bear-watchers). The various salmon species all have similar basic habitat requirements and life/migration patterns, although these patterns may vary temporally and spatially.

**Sockeye Salmon (*Oncorhynchus nerka*).** Every June, sockeye salmon return from the sea to enter the Naknek drainage and eventually work their way up to the mouth of Brooks River. Each July, roughly 100,000 or more sockeye salmon return from the sea to spawn in Brooks River, Lake Brooks, and surrounding tributaries (NPS 1996a). This is the largest and most notable salmon run in the project area and is responsible for attracting brown bears to Brooks River during summer months. In addition to bears, salmon also attract many anglers to Brooks River every summer. These salmon are the primary summer food source for many brown bears. The bear activity, in turn, attracts many park visitors to watch the bears in July.

After a brief lull in sockeye salmon migration and associated bear activity in Brooks River in August, another salmon run occurs in Brooks River from late August through September. Fishery records from the mid-20th century also indicated that some sockeye salmon migrate through Brooks River into Lake Brooks during July and return back downstream to spawn in Brooks River in September. However, the majority of salmon that spawn in Brooks River enter from Naknek Lake and do not leave the river (NPS 1996a; Troy Hamon, pers. comm., August 2010). This abundance of sockeye salmon in the river in September once again attracts brown bears back to the project area. The spawned eggs also provide a reliable and robust food source for other Brooks River fish, such as rainbow trout. The concentration of rainbow trout in the river in late summer, in turn, attracts many anglers to the project area. During the following year, the juvenile salmon serve as an important food source for several species of fish as they work their way to the sea via the rivers and lakes of Katmai National Park and Preserve. Most juvenile sockeye salmon spend one to three years in lakes to develop and grow. Smaller numbers rear in streams or immediately migrate to the sea after emerging from the gravel spawning beds, such as those in Brooks River (Burgner 1991). Once the juveniles reach the sea, they grow there for another one to four years, where they will increase their body weight anywhere from 10 to 100 times (Hartman and Burgner 1972; Kozlowski 2007).

After developing in ocean waters, adult sockeye salmon migrate from the sea back into freshwater rivers and lakes, including Naknek Lake and Brooks River. On average, sockeye salmon that return to spawn are roughly five years old (Kozlowski 2007). During this migration back to the freshwater spawning grounds, the adult sockeye swim upstream in schools along the river edge and through the lakes. This allows the salmon to conserve energy because the current speed is generally lower at the river edge and bottom. During the entire journey and through the entire spawning process, the salmon rely solely on their own fat and protein reserves for energy (Kozlowski 2007).

Good water quality and flow conditions are essential for the salmon as they travel upstream to and through their natal rivers. For example, an adequate water current is necessary to signal direction to the fish (i.e., guide them to swim against the current). Low flows, weak currents, and occasionally turbidity can impact the chances of the salmon reaching their spawning grounds (Brannon 1972). The sockeye salmon that are successful at reaching their natal rivers begin spawning behaviors that are common to all salmon species. First, the female sockeye brushes out a depression (bed) in the streambed gravel. Then, just as she deposits her eggs in the bed, the male sockeye releases his sperm. The female then immediately covers the eggs with gravel (Kozlowski 2007).

Ideal spawning habitat for sockeye salmon is often associated with groundwater springs along river bottoms, which provide clear, cool, oxygen-rich water to the developing embryos. In addition, the sockeye spawning habitat in rivers and streams is usually associated with an adjacent lake that is used for juvenile rearing (Burgner 1991). Naknek Lake is a prime rearing area for young salmon but has less shoreline spawning habitat. Thus, in the vicinity of the project area, most of the sockeye spawning occurs in Brooks River (Kozlowski 2007).

Most fish spawning in Brooks River occurs upstream of the existing floating bridge. However, a limited number of fish spawn beneath and downstream of the bridge (Troy Hamon, pers. comm., August 2010). This number is just a small fraction of the overall annual Brooks River spawning fish population.

The spawned salmon eggs and the yolk-sac fry that remain in the gravel after hatching are quite vulnerable to environmental disturbances in river water quality. For example, river siltation can result in poor water circulation around the gravel-covered eggs, which may cause the eggs to hatch prematurely (Kozlowski 2007). Although the yolk-sac fry have mechanisms that help them cope with poor water conditions, these mechanisms burn important energy reserves and alter the fry development. This can result in fully formed yet smaller fry (Bams 1969). Smaller fry are more vulnerable to predation by fish such as rainbow trout (Burgner 1991).

The newly emerged sockeye fry occupy the shallow waters or limnetic zones of nearby lakes from early June through mid-July. The limnetic zones of Naknek Lake serve as the initial rearing ground for Brooks River sockeyes. In mid-July, the fry begin moving into the deeper, open water or littoral zones of the lakes to feed (Kozlowski 2007). While in the limnetic areas, the fry primarily feed on aquatic insects when adequate light conditions exist. After reaching the littoral zone, they tend to feed on zooplankton. When sockeye fry populations are large, littoral habitat overlap with other Naknek Lake resident species and may cause food source competition (Burgner et al. 1969). Other fish species that often compete for the same food source include threespine sticklebacks, ninespine sticklebacks, pond smelt, and pygmy whitefish. Several other large fish species prey on the sockeye fry in the rivers, lakes, and migration corridors. These predators include rainbow trout, coho salmon, lake trout, arctic char, Dolly Varden char, and northern pike (Buck et al. 1978). If the sockeye fry survive their time in the lake rearing grounds, they eventually transform into smolt and begin their migration to the sea (Kozlowski 2007).

**Coho Salmon (*Oncorhynchus kisutch*).** During the time of sockeye spawning in Brooks River, a smaller coho salmon run (several hundred) occurs in the river (NPS 1996a). The peak spawning period for the coho salmon is usually in early September (Kozlowski 2007). The coho salmon are an important sport fish for anglers in Brooks River. Juvenile coho salmon are also a predator of sockeye salmon fry in lake waters.

**Chinook Salmon (*Oncorhynchus tshawytscha*), Chum Salmon (*Oncorhynchus keta*), and Pink Salmon (*Oncorhynchus gorbuscha*).** Chinook salmon, chum salmon, and pink salmon are much less abundant in Brooks River than the coho or sockeye salmon (Kozlowski 2007, Buck et al. 1978). However, past fish migration monitoring in the 1960s indicated that a small number of Chinook, chum, and pink salmon migrate up Brooks River to spawn (USFWS 1964). Although the Chinook is not a common species in the Naknek system, they are one of the main sport and subsistence fish taken in Naknek River (Kozlowski 2007).

**Rainbow Trout (*Salmo gairdneri*).** Rainbow trout is an important species of fish in Brooks River. Their large size and high numbers support a world-class sport fishery and attract many anglers to Brooks Camp in late summer. Rainbow trout are slow growing, freshwater, resident fish that inhabit the large lakes and rivers in the Naknek drainage, including Brooks River (Kozlowski 2007). In most cases, rainbow trout remain in Naknek Lake in the winter and migrate to Brooks River to feed and spawn from March to July, as spring warming allows. However, some rainbow trout permanently reside in rivers (NPS 1999b; ADF&G 2008a). Most of the rainbow trout spawning in Brooks River occurs from mid-May through mid-June, in both the upper and lower reaches of the river. After spawning, most rainbow trout return to Naknek Lake or Lake Brooks. Very few rainbow trout stay in Brooks River during the main sockeye salmon migration in July; the sockeye are known to harass rainbow trout in the river (NPS 1996a). However, in late August when the salmon spawning starts to increase, rainbow trout return to Brooks River from Lake Brooks and Naknek Lake to feed on the abundant freshly laid salmon eggs. Rainbow trout concentrations in Brooks River tend to be concurrent with the peak of the sockeye salmon spawning in later September.

**Arctic Grayling (*Thymallus arcticus*).** The arctic grayling are freshwater residents of the Naknek system and are considered an important sport fish. Important grayling spawning habitat exists in the lower Brooks River from the river's mouth to approximately 0.75 mile upstream (ADF&G 2007). The floating bridge is in the middle of this spawning area. Typically, the grayling begin spawning in Brooks River in early May. In a 1980 Brooks River fish survey, an estimated 300–500 arctic grayling were documented in the river. arctic grayling feed on drifting aquatic and terrestrial insects, salmon eggs, salmon smolt, and occasionally on small mammals swimming on the water surface (e.g., shrews (Kozlowski 2007).

**Other Fish Species.** Several other freshwater fish species occupy Brooks River, including, but not limited to, Dolly Varden char (*Salvelinus malma*), round whitefish (*Prosopium cylindraceum*), pygmy whitefish (*Prosopium coulteri*), humpback whitefish (*Coregonus pidschian*), least cisco (*Coregonus sardinella*), arctic lamprey (*Lampetra japonica*), Alaskan brook lamprey (*Lampetra alaskense*), threespine stickleback (*Gasterosteus aculeatus*), ninespine stickleback (*Pungitius pungitius*), rainbow smelt (*Osmerus mordax*), pond smelt (*Hypomesus olidus*), and longnose sucker (*Catostomus catostomus*). Some of these are resident species of the river and others are migrants to the river from other areas of the Naknek drainage system. However, most of these species use Brooks River to spawn at various times during the summer months.

## VEGETATION AND WETLANDS

### Vegetation

The vegetation cover in the vicinity of the project area consists of a variety of plant associations, ranging from upland communities to wetland communities. In addition to the portions of the project area being dictated by the hydrology of Brooks River and adjacent wetlands, the project area also lies along the southern and western extent of the Alaska Peninsula boreal forest. In Katmai National Park and Preserve, roughly 128,000 acres of open- and closed-canopy white spruce forest exists. About 31,000 acres of this forest is within a 12-mile radius of the project area (NPS 1996a). These upland areas of the project area are characterized by closed and open mixed needleleaf and deciduous forest of white spruce (*Picea glauca*), Kenai birch (*Betula papyrifera* var. *kenaica*), and balsam poplar (*Populus balsamifera*). The understory consists of various willow species (*Salix* spp.) and alder (*Alnus* spp.), as well as high bush cranberry (*Virburnum edule*), Labrador tea (*Ledum* spp.), and other low shrubs (URS 2009b; Viereck et al. 1992). The Brooks Camp campground is in a prominent stand of balsam poplar. As the elevation increases while moving up Dumpling Mountain (northwest of the project area), the dominant spruce forest transitions to a tall shrub community, which eventually gives way to tundra (NPS 1996a). The Brooks River riparian corridor and adjacent wetland complexes near the project area have a mosaic of dense alder thickets and tall grass meadows interspersed with bogs and marshes that are dominated by wetland vegetation such as various sedges, reedgrasses, and willows.

Most of the herbaceous meadows are dominated by bluejoint reedgrass (*Calamagrostis canadensis*), field horsetail (*Equisetum arvense*), and fireweed (*Epilobium angustifolium*) (URS 2009b).

Nonnative, invasive plant species found in the area include shepherd's purse (*Capsella bursa-pastoris*), narrowleaf hawksbeard (*Crepis tectorum*), pineapple weed (*Matricaria discoidea*), common plantain (*Plantago major*), prostrate knotweed (*Polygonum aviculare*), white clover (*Trifolium repens*), dandelion (*Taraxacum officinale*), annual bluegrass (*Poa annua*), and bird vetch (*Vicia cracca*). Most of the invasive plant species populations found near the project area may have originated from inadvertent importation by visitors' footwear and other soil-disturbing NPS projects (URS 2009a).

In addition to invasive plants, the spruce bark beetle has altered vegetation in the area, despite being a native species. Many large spruce trees between employee housing units have been killed by the beetle in recent years, and there are also many dead spruce trees standing throughout the project area (Coffman Engineers 2009). Hazard trees are removed by NPS staff each spring (URS 2009a).

## Wetlands Overview

A substantial portion of Alaska's 175 million acres of wetlands is on the Alaska Peninsula, in areas such as Katmai National Park and Preserve, particularly on the Bristol Bay side of the peninsula (Hall and Frayer 1994; Kozlowski 2007). Wetlands in this region are maintained by surface and groundwater flows from heavy rainfall, glacial melt water, river flooding, beaver activity, snowmelt, impermeable soils, and bedrock.

Katmai wetlands include marine, estuarine, riverine, palustrine, and lacustrine environments, with estimates exceeding 1 million acres of Katmai wetlands in total (Kozlowski 2007). The park's wetlands typically represent transitional zones between uplands and water bodies. The spatial variability of plant species in Katmai wetlands is high because slight changes in elevation yield substantial changes in vegetation type. Similarly, the temporal variability is also high because of the constantly changing surface water depth and groundwater levels, which are tied to precipitation, evaporation, infiltration, and thermokarst activity (Kozlowski 2007).

Most of the wetlands in the project area are palustrine wetlands that occupy low-lying areas near and along Brooks River. Palustrine wetlands are known to have several ecological functions. Some of the major functions of wetlands include the following: (1) discharge of groundwater; (2) flood control; (3) water quality control; (4) stabilization of sediments and retention of nutrients; (5) fish and wildlife habitat; and (6) biomass production and export (URS 2009b; Larson et al. 1989).

In terms of social or human values, wetlands also provide benefits such as aesthetic open space and places for recreational activities such as birding, wildlife watching, photography, and nature appreciation. The wetlands adjacent to the Brooks River project area provide a high level of these social values given their location near a very popular park visitation area (i.e., Brooks Camp, bear watching areas, and launching point for trips to Valley of Ten Thousand Smokes).

## Delineated Wetlands in Project Area

Preliminary wetlands delineations were conducted on August 19–21, 2009 (URS 2009b) and on June 18-19, 2012 (NPS 2012). The surveys documented jurisdictional wetlands within the project area, which included the following:

- Brooks Camp and surrounding area

- northern shoreline of Brooks River and east of Brooks Camp
- southern shoreline of Brooks River near the existing floating bridge
- existing barge landing site and access road
- the proposed barge landing site and access road to the south of the river

The 2012 survey focused on determining the extent of wetlands within the footprint of the proposed road route to a new barge landing facility and turnaround/storage area near Naknek Lake, approximately 0.5 mile south of Brooks Camp. This survey mapped the wetland boundaries more accurately than the 2009 survey. One small wetland was identified in the 2012 survey that wasn't included in the 2009 survey.

Thirteen individual wetlands were delineated in the project area (figures 10 and 10a) and descriptions are provided below. The functional values of each of the individual wetlands are provided in table 5. (See also the functional assessment of wetlands in appendix B.) The wetland identification letters and descriptions correspond directly to the identification letters in the August 2009 report by URS Group, Inc. (2009b). The classification system in this report and following table applies the Cowardin system (Cowardin et al. 1979).

**TABLE 5. ECOLOGICAL FUNCTION OF WETLANDS DELINEATED IN PROJECT AREA[1]**

| Ecological Functions | Delineated Wetlands in the Project Area (A through L and X) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | E | F | G | H | I | J | K | L | X |
| Wildlife habitat for waterfowl, shorebirds, moose, brown bear, and a variety of small mammals | x | x | x | x | x | x | x | x | x | x | x | x | x |
| Feeding and brood-rearing habitat for waterfowl such as the common merganser (in open water | | X[2] | | X[2] | | | x | | x | x | | | |
| Fish habitat | | | | | | | | | X[3] | | | | |
| Biomass production and export | x | x | x | x | x | x | x | x | x | x | X | x | x |
| Flood control or moderation | | | | | x | x | x | x | x | x | | | |
| Discharge of groundwater | | | | | | | X[4] | | | | | | |
| Water quality control, stabilization of sediments and retention of nutrients | | | | | x | x | x | | x | | | | |

Source: URS Group 2009 and NPS 2012

1. All of these wetlands were delineated in 2009 and 2012, except for wetland X, which was delineated in the 2012 survey.
2 Identified in the 2012 survey but not the 2009 survey.
3. The open water of wetland I is the only wetland that provides any substantial functions as habitat for fish. The southern portions of this wetland are at the normal flow level of Brooks River and provide food and cover for small fish in the river. This wetland also provides the function of bank stabilization, which protects habitats in other areas of the river.
4. Wetland G may provide this function to some degree, but the lack of an outlet suggests discharge is not substantial.

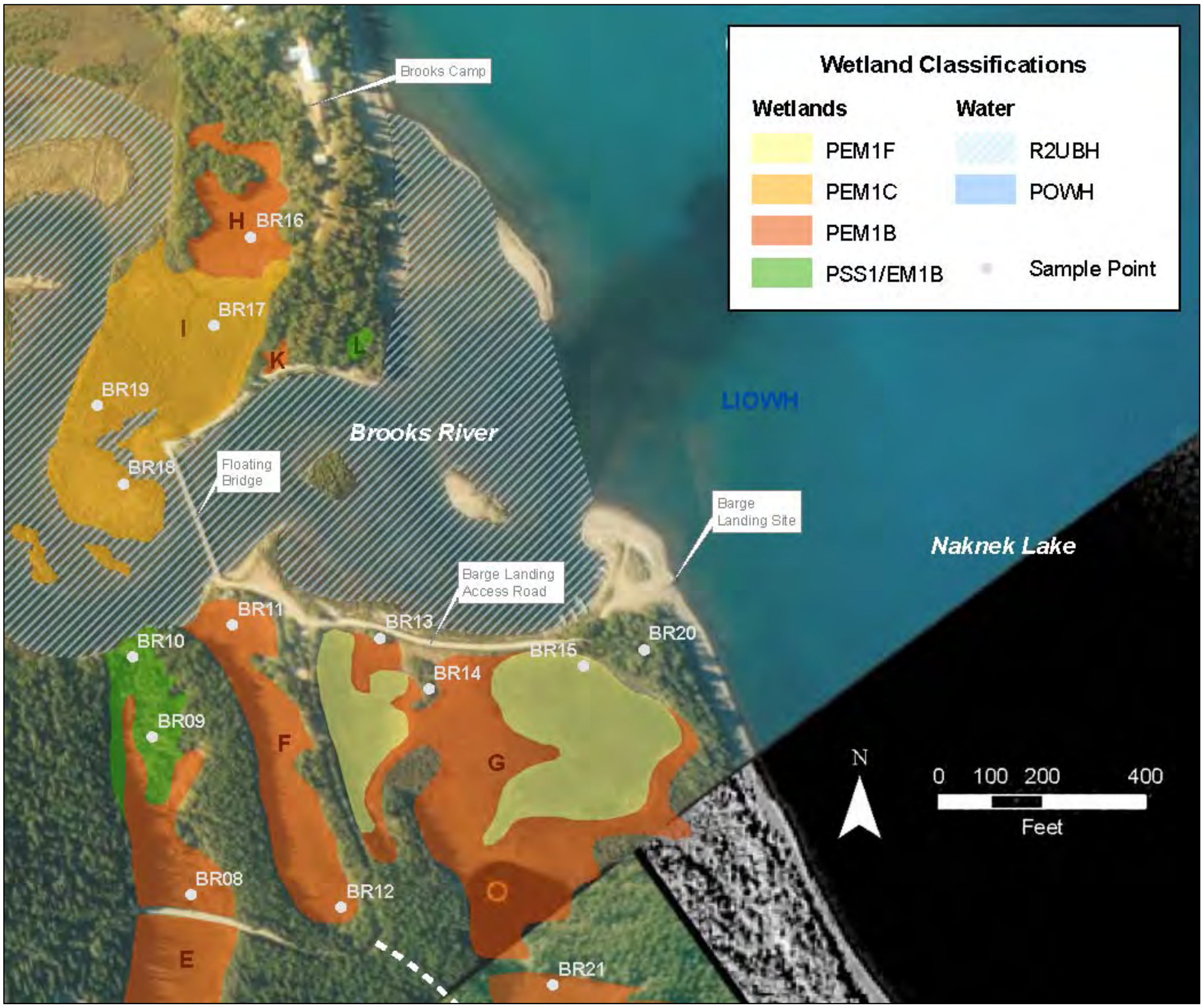
**Vicinity of Southernmost Proposed Barge Landing Site and Access Road.** No wetlands were delineated along the Naknek Lake shoreline in vicinity of the proposed barge landing site (see figure 10b). Although wetlands A, B, C, D, and J are immediately adjacent to the proposed access road route (see figures 10a and 10b), the 2012 survey found that the proposed access road would avoid jurisdictional wetlands, except for a small drainage connecting URS-mapped wetlands D and J.

*Wetland A*—This wetland is a wet herbaceous meadow in a long, narrow (22 ft) depression between two forested ridges paralleling the proposed access road route. The area has been classified as a palustrine, emergent persistent, saturated wetland (PEM1B) (see Cowardin et al. 1979 for all subsequent classifications in this section). The vegetation is dominated by bluejoint reedgrass (*Calamagrostis canadensis)*, followed by marsh horsetail (*Equisetum palustre*). Bebb willow (*Salix bebbiania*) is the only shrub found in this wetland. Individual balsam poplar and white spruce also exist in the slightly elevated areas in the wetland, but are not indicative of the wetland vegetation. The delineation surveys found saturated soils 8 to 12 inches below the surface, with standing water found at 16 inches below the surface.

*Wetland B*—This wetland lies along the proposed access road route to the proposed barge landing and is in the same long, narrow depression as wetland A (but is separated from wetland A by a narrow stretch of uplands). Like wetland A, this area has been classified as a palustrine, emergent persistent, saturated wetland (PEM1B). The dominant vegetation species include bluejoint reedgrass and Northwest Territory sedge (*Carex utriculata*). No trees or shrubs are in this wetland. During the 2009 delineation survey, the primary indicator of wetlands hydrology was saturation of the soil within 12 inches of the surface.

*Wetland C*—This wetland is another narrow depression in the landscape that parallels the south side of the proposed barge landing access road alignment. It is also immediately adjacent to Beaver Pond Lake and near the active eagle nest that exists along the lake. Wetland C has been classified as a palustrine emergent persistent, saturated wetland (PEM1B). The vegetation in this wetland is dominated by Northwest Territory sedge and water-hemlock (*Cicuta mackenziena*), both hydrophytic vegetation. Saturation to the surface and standing water in low areas was also noted on the 2009 delineation survey, which are primary indicators of wetland hydrology.

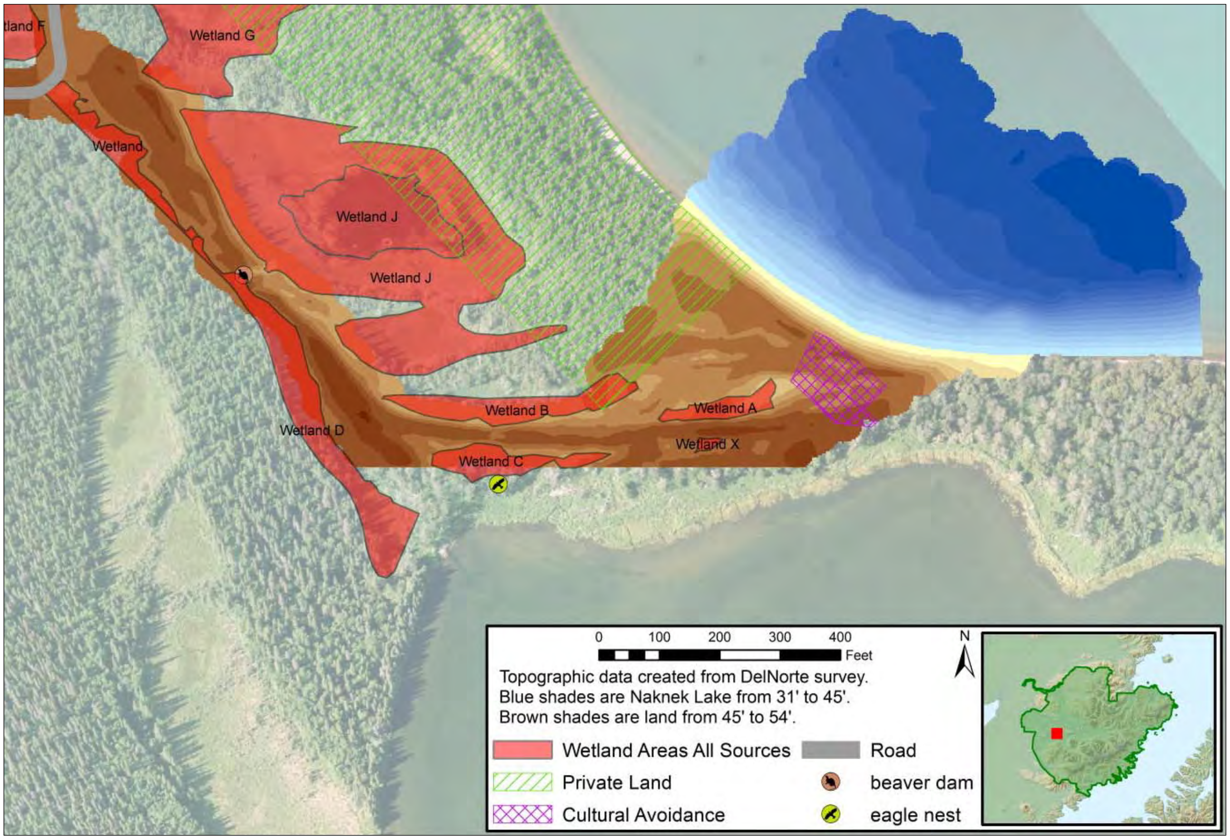
*Wetland D*—Wetland D is a long, narrow depression immediately west of the proposed access road alignment. Although the southern tip of this linear wetland nears Beaver Pond Lake, both surveys indicate that the depression does not appear to connect directly with the lake. The majority of this depression has been classified as a combination of palustrine, emergent persistent, semipermanently flooded wetland (PEM1F) and saturated wetland (PEM1B). The vegetation around the perimeter of this wetland consists of thick emergent vegetation, with open water and aquatic vegetation in the center. Vegetation at the southern end of this linear wetland is dominated by longawn sedge (*Carex machrochaeta*), Northwest Territory sedge, and marsh fivefinger (*Comarum palustris*). Aquatic vegetation in areas of open water consisted mostly of burreed (*Sparganium angustifolium*). Other vegetation in this wetland includes water horsetail (*Equisetum fluviatile*) and water-hemlock. At the northern end of this wetland, vegetation includes dense bluejoint reedgrass in the lower areas, with interspersed Bebb willow and birch. During the 2009 and 2012 delineation surveys, standing water was also noted in several noncontinuous low areas along the length of the wetland.




Source: URS Group, Inc. 2009b

[Note: Aerial photograph was recorded in 2002, before the floating bridge was relocated to its current location; the location of the barge landing access road in this figure is approximate.]

**FIGURE 10A. DELINEATED WETLANDS IN THE PROJECT AREA (NORTH OF THE PROPOSED BARGE LANDING ACCESS ROAD)**




Source: NPS 2012

**FIGURE 10B. DELINEATED WETLANDS ADJACENT TO THE PROPOSED BARGE LANDING SITE AND ACCESS ROAD**

*Wetland J*—This wetland is in a large depression in the landscape to the east of the proposed access road route. The wetland consists of a large emergent marsh around the perimeter with an area of open water in the center. The perimeter marsh has been classified as a palustrine, emergent persistent, saturated wetland (PEM1B), and the center of the wetland has been classified as palustrine, open water, and permanently flooded wetland (POWH). Although it lies immediately south of wetland G, this wetland is not directly connected to wetland G. However, the 2012 survey found a drainage connection between the northern portion of wetland D and wetland J, which the proposed access road would need to cross. The emergent vegetation around the wetland perimeter is dominated by bluejoint reedgrass, longawn sedge, and Northwest Territory sedge. Standing water in the center of the wetland and saturation to the surface along the perimeter marsh were the primary indicators of wetlands hydrology during the delineation surveys.

**DRAINAGE CONNECTING WETLANDS D AND J; WETLAND J IN BACKGROUND**

*Wetland X*—The 2012 survey mapped a very small wetland depression immediately south of wetland A (see figure 10b). This area had Balsam poplar, highbush cranberry and fireweed growing along the elevated margins of the site, but the lower portions of the depression had bluejoint reedgrass, marsh horsetail, and Barclay's willow )(*Salix barclayi*). Saturated soil occurred within 12 inches of the surface and standing water was found within 12 inches of the surface. The area therefore was classified as a palustrine emergent persistent, saturated wetland (PEM1B).

**Vicinity of Existing Barge Landing Site and Access Road.** One wetland was delineated in this area by the 2009 survey.

*Wetland G*—This wetland lies along and immediately south of the existing access road to the existing barge landing. The road parallels the southern shoreline of the Brooks River and acts as a dike to wetland G, which would otherwise drain more to the river. This wetland complex consists of both emergent wetlands and open water areas with aquatic vegetation. The open water areas have been classified as palustrine, open water, permanently flooded (POWH) wetland, and the wettest areas with emergent vegetation have been classified as palustrine, emergent persistent, semi-permanently flooded wetland (PEM1F). The remainder of the marsh has been classified as palustrine, emergent persistent, and saturated wetland (PEM1B). The dominant vegetation in the northwest portion of this wetland includes Northwest Territory sedge and bluejoint reedgrass. Other emergent species include pendent grass (*Arctophylla fulva*), water hemlock, common mare's tail (*Hippuris vulgaris*), and longawn sedge. Aquatic vegetation in the open water in this area primarily consisted of burreed (*Sparganium* spp.).

Vegetation in the northeast portion of this wetland is also heavily dominated by Northwest Territory sedge, with a very small amount of longawn sedge and bluejoint reedgrass. Vegetation in the north central portion of this wetland included the dominant bluejoint reedgrass and two species of willow (diamondleaf willow [*Salix planifolia*] and Barclay's willow). Other species in this area included field horsetail and longawn sedge. The northeast, upland edge of this wetland is dominated by white spruce, paper birch, and Bebb willow, with an understory of bluejoint reedgrass. During the delineation survey, standing water was noted throughout most of this wetland. Thus, the hydrology criteria of wetland delineation was met.

**Vicinity of the Brooks River Bridge—South Shoreline.** Two wetlands were delineated along the south shoreline by the 2009 survey.

*Wetland E*—Wetland E is in a large, low depression extending from the edge of Brooks River near the bear observation platform, southward beyond Valley Road. The southern portion of this wetland has been classified as a palustrine, emergent persistent, saturated (PEM1B) wetland. The northern portion has been classified as a palustrine, scrub-shrub / emergent persistent, saturated wetland (PSS1/EM1B). The vegetation that is common to the central and southern portions of this wetland is dominated by bluejoint reedgrass. Longawn sedge made up only 5 percent of the total, and Northwest Territory sedge was only 1 percent of the cover in this area. A few interspersed diamondleaf willows also exist in this area. The vegetation in the northern portions of this wetland include a fair amount of shrub cover such as Bebb willow, diamondleaf willow, and Barclay's willow, with an understory dominated by bluejoint reedgrass. A few interspersed white spruce and paper birch are also present in the slightly elevated areas of this wetland. The primary indicator of wetland hydrology in much of this wetland is saturation within 7 12 inches of the surface. Other secondary indicators of wetland hydrology include oxidized rhizospheres on living roots and stunted/stressed facultative or upland plants.

*Wetland F*—This wetland is a large wet meadow in a long, narrow depression that extends south from Brooks River near the elevated observation platform and parallels the west side of Valley Road. The area has been classified as a palustrine, emergent persistent, saturated wetland (PEM1B) with small fringe scrub-shrub wetlands. The vegetation in this wetland is mainly herbaceous. Dominant plants include longawn sedge and bluejoint reedgrass. The only other common species is the Northwest Territory sedge. The soil in the northern portion of this wetland consists of a 4-inch layer of fibrous organics over a 7-inch horizon of volcanic ash. A dark brown sandy loam mixed with fibrous organics lies below the horizon of ash, which transitions down to a dark grey sand and gravel matrix. The soil profile in the southern portion of Wetland F includes a 3-inch organic mat over a 7-inch ash horizon. Beneath the ash layer, a thin 1-inch layer of fibrous peat was found, followed by a horizon of gravel. During the delineation survey, no sizable areas of standing water were noted in this wetland. However, about 1 inch of surface water was noted in some areas of the northern edge of the wetland, with standing water found at 5 inches below the surface in other areas. At the south end of the wetland, the survey noted saturation at 10 inches from the surface and standing water at 20 inches from the surface.

**North Side of Brooks River.** Four wetlands were delineated on the north side of Brooks River by the 2009 survey.

*Wetland H*—This wetland is a large grass/sedge wet meadow in a depression on an elevated river terrace just west of Brooks Camp. Wetland H has been classified as a palustrine, emergent persistent, saturated wetland (PEM1B). The 2008 NPS wetland survey near Brooks Camp also classified this area as wetland (Rice 2008). The vegetation in this wetland is uniform over most of the wetland and is dominated by bluejoint reedgrass with only a small amount of Northwest Territory sedge. The plant cover transitions up to shrub habitat on three sides. The hydrology of this wetland at the time of the delineation can be described as saturation to the surface, with small areas of shallow standing water.

*Wetland I*—Wetland I is a large emergent marsh on the northern shoreline of Brooks River, between Brooks Camp and the oxbow of Brooks River. The area has been classified as a palustrine, emergent persistent, seasonally flooded, wetland (PEM1C). The two small islands separated from the main wetland were not sampled but had similar emergent vegetation and were included in Wetland I. Much of this wetland is flooded during high water periods in spring and summer, and the lower portions of the marsh were inundated at the time of the delineation survey. A portion of this marsh was filled in the past to create the northern access to the floating bridge on Brooks River.

The vegetation in the higher portions of this wetland is dominated by bluejoint reedgrass. Other minor species include water horsetail, yellow willowherb (*Epilobium luteum*), bog yellowcress (*Rorippa palustris*), Northwest Territory sedge, and longawn sedge. The slightly lower portions of this wetland in the central areas of this wetland are dominated by the same species. The vegetation in the lowest areas of this wetland only includes bluejoint reedgrass and pendant grass (*Arctophylla fulva*) emerging from the standing water. As previously noted, the southern portion of this wetland was inundated at the time of the survey.

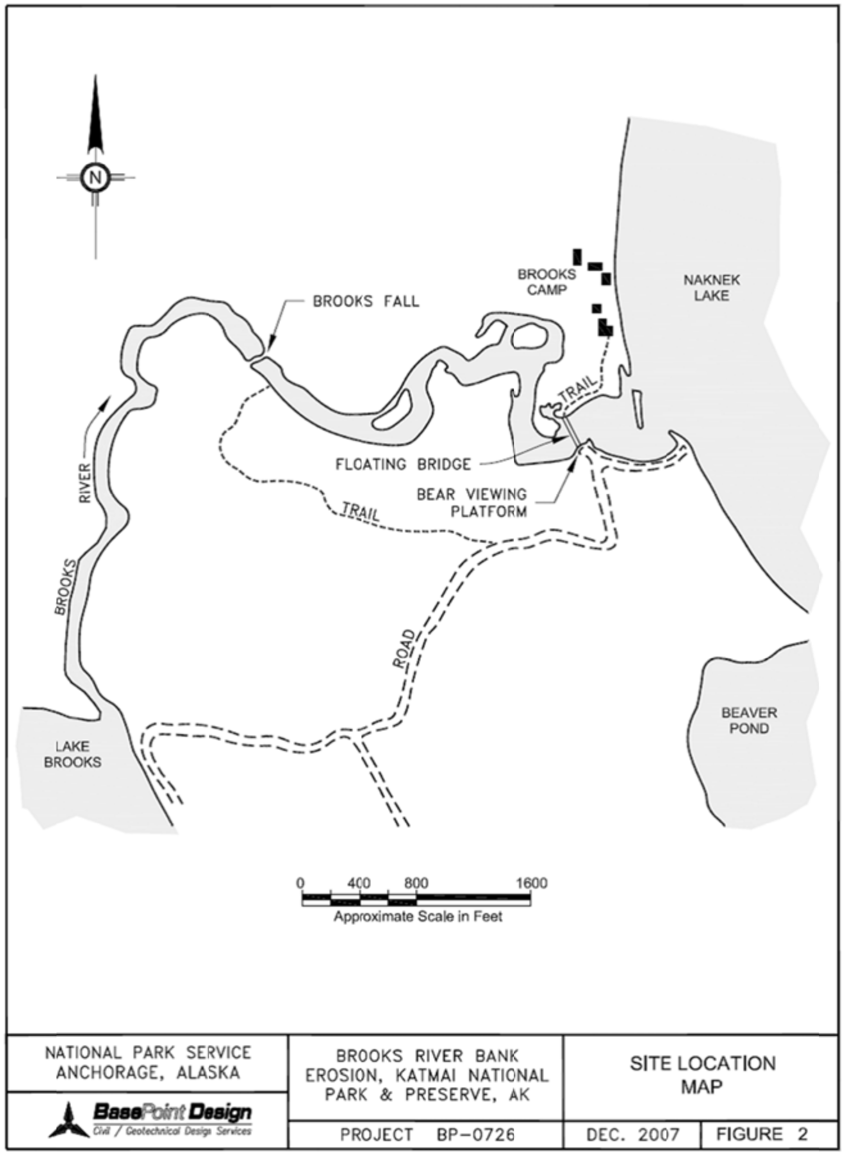
*Wetlands K and L*—Two small wetlands were delineated by NPS staff in a 2008 survey between Brooks Camp and the northern shoreline of Brooks River (Rice 2008). Wetland K has been classified as a palustrine, emergent persistent, saturated wetland (PEM1B). Wetland L has been classified as a palustrine, scrub-shrub / emergent persistent, saturated wetland (PSS1/EM1B).

## HYDROLOGY AND FLOODPLAINS

Naknek Lake and Lake Brooks
In the project area, Naknek Lake receives tributary drainage from the outflow of Brooks River. In turn, Brooks River is primarily fed by Lake Brooks and its subbasin. These are three primary hydrologic features that affect the local hydrology around the project area. Figure 11 provides a map of these features.

Naknek Lake is the largest freshwater lake in Katmai National Park and Preserve, as well as the largest lake within a national park system unit boundary (Kozlowski 2007). A 1969 study by the Alaska Bureau of Commercial Fisheries indicated that Naknek Lake has a maximum depth of 568 ft and an area of 235 square miles, with a surface elevation of about 33 ft above mean sea level. Meanwhile, the smaller and shallower Lake Brooks has a maximum depth of 259 ft and an area of 29 square miles, with a surface elevation of 62 ft above mean sea level (Alaska Bureau of Commercial Fisheries et al. 1964; Burgner et al. 1969; Kozlowski 2007).

Naknek Lake is routinely used by floatplanes and boats near the mouth of Brooks River during the summer months of park visitation. Floatplanes also use Lake Brooks as well.




Source: BasePoint Design Corporation, Inc. 2007

**FIGURE 11. WATER FEATURES IN VICINITY OF PROJECT AREA**

Each year, a limited amount of diesel and gasoline fuels escape into Naknek Lake by leakage or spillage from engines of floatplanes and boats anchored or beached adjacent to Brooks Camp (NPS 2009). Because water quality protection throughout Katmai National Park and Preserve is a high priority, the National Park Service strives to minimize these pollutant sources as much as possible. Maintaining the pristine water quality in the park is one the main reasons given in executive orders that expanded the park since its establishment (NPS 1996a).

## Brooks River

Brooks River flows from the outlet of Lake Brooks for about 1.5 miles until it empties into Naknek Lake at its mouth. Brooks Camp and the project area are located here. For about a third of its length, Brooks River flows in a south to north direction from Lake Brooks. For the remainder of its length, the river generally flows west to east all the way to Naknek Lake. The velocity of the flow is generally slowing from a relatively swift, turbulent flow condition in the upstream portion of the reach to a relatively slower and more tranquil condition near the mouth. A prominent feature of Brooks River is the fault line that cuts across the river at its approximate midpoint between the two lakes. This fault line creates Brooks Falls, the 6-foot waterfall that is a focal point during the July sockeye salmon run and bear feeding.

Most of the water that feeds the river from Lake Brooks drains from the mountains and tundra that surround Lake Brooks, mainly from spring snowmelt (Kozlowski 2007). Brooks River is a dynamic, alluvial river that transitions from a relatively steep boulder- and cobble-bedded river to a meandering sand/gravel/cobble river as it flows into Naknek Lake (BasePoint Design Corporation, Inc. 2007). As the river nears its outfall into Naknek Lake, it meanders through a low alluvial plain. Low banks are common in this stretch, which make the river susceptible to continued meandering processes because of hydrologic and geomorphic processes.

The gradual meandering in the lower stretches of Brooks River is the result of several natural forces. Three primary hydrologic and geomorphic processes are responsible for the river's ever-changing shape and alignment. First, hydraulic forces from the high snowmelt run-off flows each spring and summer cause erosion of the riverbanks and riverbed. Secondly, springtime ice breakage and shifting, as well as freeze/thaw cycles, are capable of eroding riverbanks along the length of the river. Ice dams are also capable of causing channel rerouting and flooding. Lastly, the wind and wave action of Naknek Lake alters and erodes the lake's shoreline and riverbanks near the mouth of Brooks River (BasePoint Design Corporation, Inc. 2007). For example, the mouth of Brooks River has shifted a notable amount in the past 20 years. The combined effect of the meandering and sustained winds from Naknek Lake generate a longshore drift that changes the channel configuration and sediment deposition areas near the river mouth (NPS 1996a).

Changes in the river's alignment generally happen over a long period of time because the various natural forces slowly cut riverbank material from one area and deposit it in another. Meandering typically progresses as the force from the current and flow are greater on the outside edge of river bends (i.e., near the bank) causing greater erosion in this part of the channel. Meanders become more pronounced and shift downstream until a geologic or hydrologic cutoff occurs, redirecting the river flows (BasePoint Design Corporation, Inc. 2007). This process results in shifting cutbanks and evolving oxbows along the river's alignment. Large storms or substantial spring run-off flows are capable of causing instantaneous changes in the river alignment.

The speed and degree of the river's geomorphic changes are dependent on climatic conditions and events, which can vary considerably and become extreme at times. For example, water levels at Naknek Lake and Brooks River can rise as much as 7 ft between spring and late summer, and local flooding around the mouth of Brooks River has occurred up to the elevation of the fish freezing building in Brooks Camp (NPS 1996a).

### Brooks River Floodplain in the Project Area

Floodplains play an essential role in the overall function of a river system. Floodplains influence the hydrology of a watershed by dissipating floodwater energy and serve as a temporary storage area for floodwaters and a deposition area for sediment eroded from the watershed. The flooding that occasionally occurs along Brooks River can result from heavy precipitation, ice buildup in the river, rapid snowmelt in the watershed, or a combination of these factors. Because the lower end of Brooks River flows through an alluvial valley with more gradual (flatter) topography, flooding in this area generally covers a wider area than the upper reaches of Brooks River.

A 100-year floodplain is the elevation to which the river rises during a storm that occurs on average every 100 years. To put it another way, a 100-year floodplain is the flood elevation that has a 1 percent chance of being reached by river floodwater in any given year. Most of the lower Brooks River valley lies within the 100-year floodplain. Although most of Brooks Camp appears to be situated above the 100-year floodplain elevation, the proposed improvements in the project area would all be within the estimated 100-year floodplain (i.e., Brooks River bridge and boardwalk, barge landing sites, and landing access roads). Regardless, storm flooding along Brooks River is somewhat eased because of the size of Lake Brooks and associated water storage above the river. Lake Brooks accounts for about 20 percent of the total Brooks River watershed area. Refer to figure 12 for an illustration of the estimated 100-year floodplain in the project area.

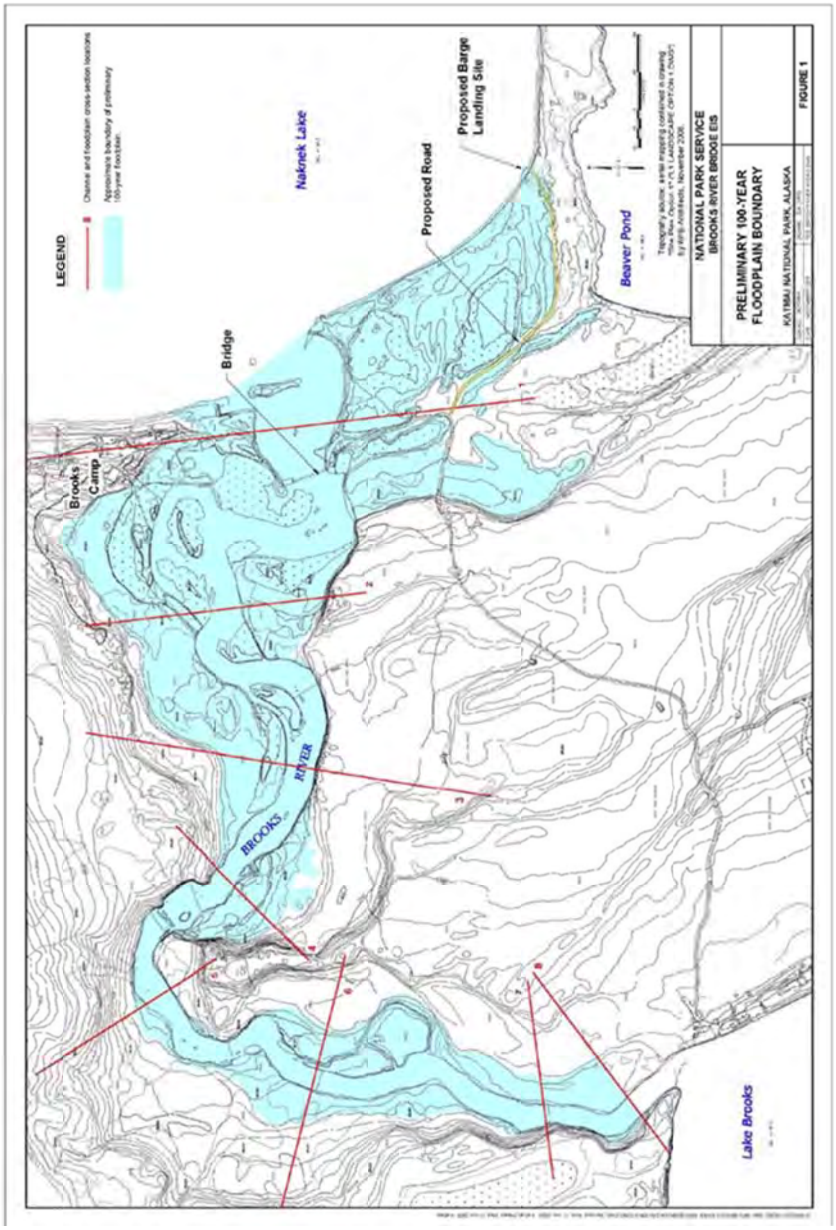
To help identify the flood flows and extents, NPS staff modeled a 100-year flood in the entire Brooks River, from Lake Brooks to Naknek Lake. Eight modeled cross sections were established, where flow velocities and elevations could be estimated. The locations of these eight modeled cross sections are identified in figure 12. Figure 12 also shows the estimated inundation area of the 100-year flood.

The floodwater surface elevation at each cross section, as well as main channel and average floodplain velocities associated with a 100-year event, are summarized in table 6. Because of the surface roughness (trees, brush, surface undulations) of the floodplain, the model predicts that floodplain flow velocities will be less than 1 foot/second in most areas. However, the velocity of the storm flows in the main Brooks River channel are likely to be notably higher (as much as 8 ft/s in the upper portion of the river, and roughly 2 ft/s near Naknek Lake).

**TABLE 6. SUMMARY OF ESTIMATED WATER SURFACE ELEVATIONS AND VELOCITIES ASSOCIATED WITH 100-YEAR RECURRENCE INTERVAL**

| Cross Section | Minimum Channel Elevation (ft) | Water Surface Elevation (ft) | Main Channel Velocity (ft/s) | Floodplain Average Velocity (ft/s) | |
|---|---|---|---|---|---|
| | | | | Left Overbank | Right Overbank |
| 8 | 68.0 | 73.1 | 4.3 | 0.7 | 1.0 |
| 7 | 66.0 | 71.0 | 6.2 | 0.8 | 1.7 |
| 6 | 62.0 | 67.3 | 4.0 | 0.8 | 1.3 |
| 5 | 58.0 | 60.8 | 8.8 | 1.1 | 0.9 |
| 4 | 48.6 | 53.9 | 4.8 | 0.6 | 1.2 |
| 3 | 46.9 | 51.8 | 4.3 | 1.2 | 1.3 |
| 2 | 45.4 | 50.4 | 2.4 | 0.7 | 0.7 |
| 1 | 46.0 | 48.3 | 2.8 | 0.4 | 1.0 |

Source: NPS 2009(c)

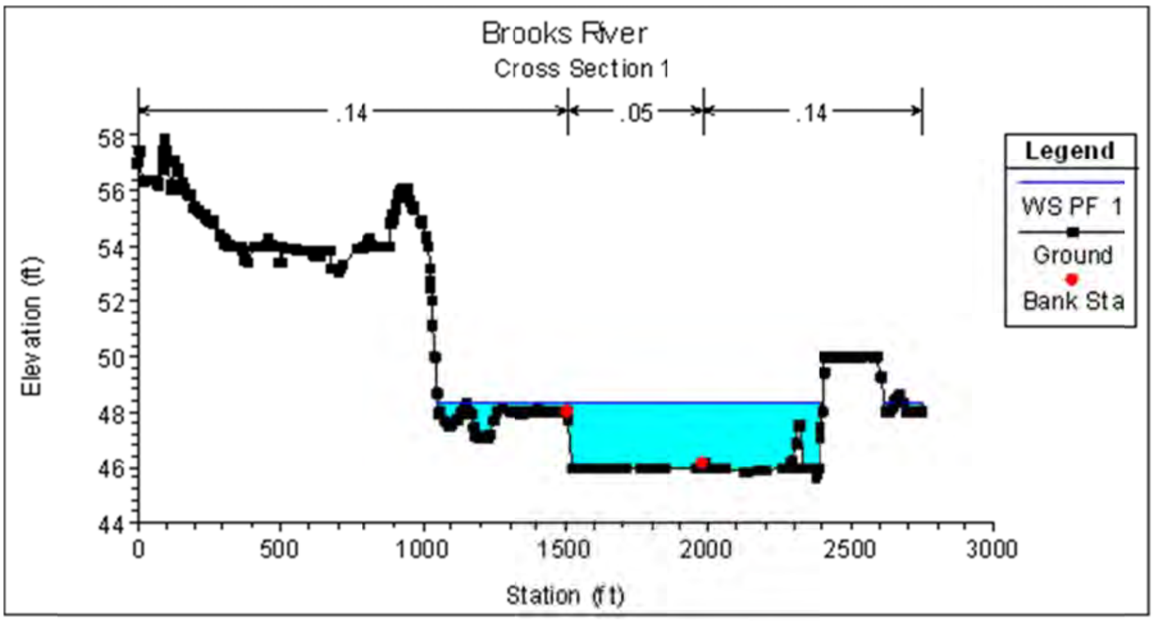



Source: NPS 2009(c)

**FIGURE 12. ESTIMATED 100-YEAR FLOODPLAIN OF BROOKS RIVER NEAR PROJECT AREA**

The minimum channel elevations and the water surface elevations listed in table 6 indicate the expected water depth in the channel during a 100-year flood. Figure 13 shows the estimated flood flow elevations at the cross section near the proposed bridge. As shown in table 6 and figure 12, the estimated floodwater depths in the vicinity of near the proposed elevated Brooks River bridge and boardwalk range from about 2 ft to 5 ft. Floodplain water depths in the vicinity of near the proposed road and barge landing site are likely to be less than 2 ft. In figure 13, the "WS PF 1" in the legend refers to the water surface elevation for a 100-year flood, represented by the solid, continuous line; "Ground" refers to the upland and riverbed ground elevation; "Bank St a" refers to the top of the main channel banks, represented by two dots.

In addition to these anticipated flow velocities and inundation depths and areas, Brooks River would also have bank erosion, channel migration, and riverbed scouring during a 100-year storm. The degree of erosion and channel migration would depend on the severity of the storm, its hydrograph, and other physical factors at the time.




Source: NPS 2009(c)

**FIGURE 13. ESTIMATED FLOOD FLOW ELEVATIONS OF CROSS SECTION NEAR PROPOSED BRIDGE**

## Hydrology and Geomorphology in Vicinity of the Project Area

The project area is near the mouth of Brooks River, adjacent to Brooks Camp on the north side of the river and near the existing bear viewing platform on the south side. The existing floating bridge also demarks the approximate alignment of the proposed permanent bridge. The following discussion focuses on hydrological conditions and processes in the vicinity of the project area.

In a 2007, hydrologic assessment of the project area, the National Park Service and BasePoint Design Corporation noted that the riverbanks on the north and south sides of the river had wave erosion and bank scouring damage near the floating bridge site, with the worst erosion occurring along the north bank. Because the eastern portion of the north bank is wooded, the wave erosion along this area has resulted in some downed trees along the riverbank (BasePoint Design Corporation, Inc. 2007). The Corner trail that connects Brooks Camp and the floating bridge runs along this stretch of eroded riverbank. The ongoing bank erosion near the floating bridge site necessitates annual maintenance to restore and stabilize the shoreline in this area. These annual bank stabilization and sediment removal efforts are needed to mitigate the hydraulic effects of anchoring the floating bridge to the shorelines.

An alluvial peninsula known as the “spit” extends from the south bank of the river near the mouth. The spit was formed by sediment deposition as river flow velocity dropped as the water flows out into Naknek Lake. The National Park Service currently uses the base of the spit as a loading area for barges that take supplies and materials to and from Brooks Camp. In addition to the spit, a small alluvial island also exists in the middle of the river just east of the floating bridge. The 2007 hydrologic assessment indicates that the locations and dimensions of the alluvial spit and island at the mouth of the river are constantly changing from geomorphic processes (BasePoint Design Corporation, Inc. 2007).

Just upstream of and around the bend from the floating bridge crossing, a series of large oxbows exist. These oxbow channels are just northwest of the Brooks Camp area. By inspecting aerial imagery, it is apparent that the size and curvature of the river oxbows in this area have changed considerably over the years as a result of river flow dynamics (as previously described). The current result is a pair of river channel oxbows, with wet meadow areas along the shorelines as well as on islands between the series of oxbows channels.

River geomorphology is quite unpredictable because of its direct correlation to climate conditions and storms. Thus, predicting the future conditions, configuration, and alignments of Brooks River and its associated features is also difficult. However, given past data and knowledge of the dynamic river processes under normal conditions, some limited predictions can be made.

Assuming nonflooding scenarios, the 2007 hydrologic assessment highlighted the following six anticipated geomorphic changes that might be expected in the project area (BasePoint Design Corporation, Inc. 2007). However, it should be noted that the potential implementation of an action alternative in this document may modify the river and riverbank features and/or management needs of the area.

**Oxbow channels and wet meadows west and northwest of Brooks Camp.** This area is on the outside of a river bend that has potential to erode more rapidly than the inside of a bend. As a result, the river could erode soil and migrate into the marshy area west and northwest of the existing trail, and could eventually encroach on the trail itself. If such erosion occurs near the trail, then bank erosion protection may be needed in this area.

**Corner trail (connects Brooks Camp with the floating bridge).** This area is on the outside of a slight river bend, with considerable bank erosion already occurring. Continued bank erosion and river migration could be expected over time.

**River main channel.** Substantial bank erosion would continue to be expected along the outer banks of the river bends. Some sedimentation and bank buildup would be expected on the inside of bends. These river bends tend to erode banks and move laterally and downstream over time.

**The spit.** The spit at the mouth of Brooks River results from the complex interaction between hydraulic processes of the river and Naknek Lake as the river flows into the lake. The river transports sediment in the downstream direction until sediment deposition occurs from reduced river flow velocities at the mouth. Heavy wind and wave action in the lake then pushes and spreads these sediment deposits into a spit formation. Over time, additional sediment deposition and wind/wave action continue to shift, build, and erode the spit. Its location, size, and shape continually changes.

**The island in the river mouth.** The dynamic nature of the island is similar to that of the spit.

**Roadway parallel to the south side of the river mouth (existing barge landing access road).** The portion of the road on the spit would experience change that is similar to that of the spit. The portion of the road along the riverbank is located along a portion of the river that is relatively shallow and has a relatively low current. As a result, this riverbank area would likely continue to be relatively stable. Some instability could result from the lake's wave activity. However, the narrow strip of vegetation that exists between the road and the water would continue to provide bank stability. If erosion becomes evident in this area, some additional bank protection may be necessary, such as planting erosion-resistant shrubs.

## SOUNDSCAPE

The natural soundscape of an area is often described from an anthropocentric perspective, which not only identifies what humans hear, but also captures how humans appreciate or respond to the soundscape. For example, the quiet natural soundscape near Brooks Camp provides a sense of solitude and serenity to park visitors. However, a natural soundscape is also essential from a biological perspective because it can provide the conditions that allow for the continuation of important natural processes. Wildlife that depend on audio communication and quiet surroundings to accommodate this communication are one example of this importance.

According to NPS policy, the natural soundscape in a park unit is defined as

> . . . all natural sounds that occur in a park, including the physical capacity for transmitting those natural sounds and the interrelationships among park natural sounds of different frequencies and volumes. Natural sounds occur within and beyond the range of sounds that humans can perceive, and they can be transmitted through air, water, or solid materials. . . Some natural sounds in the natural soundscape are also part of the biological or other physical resource components of the park (NPS 2006).

A natural soundscape also includes "natural quiet," which is what occurs in the absence of natural and human-caused sound.

The following discussion about the soundscape in vicinity of the project area is presented primarily in a qualitative fashion because limited quantitative data exist for characterizing the Brooks River soundscape. However, in the summer of 2010, a soundscape inventory was conducted in the Brooks Camp area (NPS 2010e).

In general, the Brooks Camp area can be considered a rather quiet place. Near the project area, the natural soundscape is not disturbed by unnatural sounds for roughly half of the year (generally from November to April). During this period, little or no human activities occur along Brooks River and the high quality conditions of the natural soundscape are maintained. During this time, the only sounds one would hear in the area are natural sounds, including sounds produced by wind, flowing water, rain, and wildlife.

For approximately five months of the year, when people are generally present from May through October, unnatural sounds (or noise) foreign to the natural soundscape occur. Noise is generated by park staff, concession employees, and visitors. Human-caused sound from sources such as floatplanes, motor boats, motorized vehicles, power generators at Brooks Camp and Lake Brooks, trail maintenance chainsaws, electronic devices, bear hazing devices, and park visitors can degrade the natural soundscape.

During times of high levels of human activity, the Brooks Camp area can be noisy relative to many other areas in the park. The peak disturbance period to the natural soundscape typically occurs in July when large volumes of salmon, bears, and people converge on the Brooks River corridor. During this time, noise are frequently generated by motorized vehicles, floatplanes, and boats, as well as by anglers, guides, bear-watchers, park staff, and concession employees.

The loudest and most frequently heard noise near the project area is from floatplanes that are landing, taking off, or taxiing to/from the Naknek Lake shoreline near Brooks Camp. Because different types of planes access Brooks Camp (e.g., turbine engines, piston engines), the sound quality of the noise generated by airplanes varies from plane to plane. At the lower viewing platform, noise from aircraft constituted an average of 32 percent of total noise during the 2010 monitoring period and 55 percent of total noise at the Brooks Camp visitor center (NPS 2010e).

Motorized all-terrain vehicle (ATV) use associated with park operations and concessions is another major contributor to unnatural sounds at Brooks Camp. Vehicles regularly cross the floating bridge 6 to 10 times per day. Noise from heavy equipment being used at the barge landing area also can be heard near the bridge, depending on wind direction, two to three times per week when barges are unloading supplies. Other noise sources that were audible at the lower river platform included voices of people (77 percent of the time audible), motors (16 percent of the time audible), and heavy equipment (5 percent of the time audible). Total noise levels were as high as approximately 70 decibels adjusted (dBA) ($L_{max}$) and almost 50 dBA ($L_{eq}$) during the middle of the day (NPS 2010e). ($L_{max}$ is the loudest sound level generated in an area. $L_{eq}$ is the average squared sound pressure level (A weighted) expressed in decibels.)

# CULTURAL RESOURCES

## ARCHEOLOGICAL RESOURCES

The Brooks River Archeological District (designated a national historic landmark in 1993) is comprised of at least 22 well-preserved archeological sites along the beach ridges and river terraces of the approximately 1.5 mile-long Brooks River and adjacent portions of Lake Brooks and Naknek Lake. The archeological resources date from about 2500 BC to historic times and represent nine primary cultural phases. Surface archeological resources include more than 900 recorded depressions that have been documented, in some instances, to represent semisubterranean house sites. Archeological research has demonstrated that surface features likely represent a fraction of the houses preserved beneath the surface. Hearths, storage pits, house floors, human burials, and faunal remains have also been identified. For much of the time that humans have occupied the area, the seasonal salmon runs in Brooks River have served as a primary component of their subsistence base (NPS 1992).

The following cultural traditions, periods, and phases are represented in the district's archeological record (from Dumond 1981). Individual sites frequently contain evidence of multiple phases and occupation periods:

> *Northern Archaic Tradition—Kittewick Period, Brooks River Beachridge Phase (ca. 2500 BC to 1900 BC)*—Primary features associated with this hunting-focused phase include temporary campsites along a ridgeline formed by Naknek Lake. Leaf-shaped knife and lance points of percussion-chipped igneous rock are characteristic artifacts of the phase.
>
> *Kodiak Tradition—Kittewick Period, Brooks River Strand Phase (ca. 2500 BC to 1900 BC)*—People associated with this early phase of the Kodiak tradition are thought to have seasonally hunted caribou in the interior Alaska Peninsula. Among the associated resources are temporary campsites, subcircular dwellings, polished slate knife and lance blades, and D-shaped stone oil lamps.
>
> *Arctic Small Tool Tradition—Gomer Period, Brooks River Gravels Phase (ca.1800 BC to 1100 BC)*—Notable features associated with this period are square, semisubterranean houses with central hearths, passageways, and campsites. Sites have been found on ridges overlooking both sides of Brooks River. Characteristic artifacts include well-fashioned end blades and scrapers, but ceramics are not among the assemblage. The district is thought to contain the largest concentration of cultural material from this phase in Alaska and possibly North America.
>
> *Norton Tradition—Brooks River Period, Smelt Creek Phase (ca. 300 BC to AD 100).* This phase is characterized by small, semisubterranean houses on the lower Naknek River and campsites without constructed hearths along Brooks River. The earliest appearance of ceramic vessels in the area is associated with this phase. Other distinguishing artifacts include asymmetrical side blades, drills, and projectile points with long contracting stems/bases.
>
> *Norton Tradition—Brooks River Period, Weir Phase (ca. AD 100 to AD 600)*—Distinguishing features from this phase include semisubterranean houses and temporary campsites placed in existing depressions. Cylindrically shaped pottery, stemmed projectile points with rounded shoulders, and notched pebble

sinkers (used for fishing) are distinguishing artifacts.

*Norton Tradition—Brooks River Period, Brooks River Falls Phase (ca. AD 600 to AD 1050)*—Short-term campsites associated with this fishing-focused phase are concentrated near Brooks Falls. No distinctive house sites have been identified, although these may have been obscured by subsequent occupations. Clay and bark-lined pits have been identified. Ceramics, small chalcedony projectile points, and polished lance blades are among the artifact assemblage.

*Thule Tradition—Naknek Period, Brooks River Camp Phase (AD 1050 to AD 1450)*—A large concentration of sites from this phase is found on the north side of Brooks River, east of the falls. Temporary campsites, clay-lined pits, burials, and house sites (some with evidence of year-round habitation) have been identified. The phase is characterized by gravel-tempered pottery, clay lamps, cold-trap house entryways, and an extensive use of polished slate for making tools (e.g., barbed dart blades).

*Thule Tradition—Naknek Period, Brooks River Bluffs Phase (ca. AD 1450 to AD 1800)*—A wide variety of features have been identified from this phase, including multiroom houses(suitable for winter habitation), sweathouse, fish-drying rack, and temporary campsites. Defining artifacts include smoothly polished adze blades, projectile insert blades, barbed arrowheads, harpoon dart heads, and ceramics. European trade items are not found among the artifacts.

*Thule Tradition—Naknek Period; Pavik Phase (ca. AD 1450 to AD 1800)*—This phase is differentiated from the Brooks River Bluffs Phase by the presence of a small number of European American trade items; the phase otherwise retains the same traditional cultural items among the artifact assemblage. Scant archeological evidence for the Pavik Phase has been identified in the Brooks River Archeological District.

The district's archeological sites incorporate a large concentration of stratified cultural deposits that significantly enhance understanding of the lifeways of indigenous populations, including the late prehistoric Thule tradition (Brooks River Bluffs Phase) and all preceding cultural phases beginning with prehistoric Northern Archaic peoples. The archeological record indicates that the Brooks River area sustained both seasonal and year-round occupations, supported by a stable and plentiful resource base of caribou (the primary focus of the area's earliest hunters), seasonal salmon runs, other marine and terrestrial fauna, and edible plants. A series of volcanic eruptions during the past 6,500 years have deposited layers of ash that serve as reliable stratigraphic markers, assisting archeologists with site dating and comparative analysis. The primary prehistoric resources are below the ash layer of the 1912 Novarupta Volcano eruption. The district retains the potential to yield further important information regarding cultural history, prehistoric subsistence strategies, settlement systems, and cultural ecology (among other research topics) (NPS 1992).

Areas of anticipated ground disturbance associated with proposed construction activities (i.e., bridge, boardwalks, ramps, and new barge landing site and administrative road) were archeologically surveyed and tested in 2008, 2009, and 2010 by NPS staff. The 2008 work consisted of preliminary investigations of the north side of Brooks River at the Corner and evaluation of archeological remains of the original Northern Consolidated Airlines fish camp. No national register-eligible archeological resources were identified. The 2009 investigations were conducted along possible boardwalk alignment in wetlands on the south side of the river. No archeological resources were identified.

In 2010, archeological shovel testing was completed in advance of geotechnical drilling required to determine the depth of suitable bedrock capable of supporting the bridge and platform footings. Testing conducted in the Brooks Camp area uncovered charcoal, charred bone fragments, ceramic shards, and lithic material likely associated with a previously recorded prehistoric site (XMK-044). The findings demonstrated that although the area had been previously impacted by modern development and construction activities, the site's buried prehistoric resources continue to retain archeological integrity (Vinson 2010a).

Archeological testing along the proposed route of the proposed access road to the barge landing led to the discovery of at least one prehistoric component associated with previously recorded site XMK-037. The site is comprised of three clusters of historic house depressions. The investigations greatly expanded the site boundaries, and lithic artifacts uncovered at the site are anticipated to enhance understanding of prehistoric workshop activities and household economies associated with habitation on Naknek Lake (Vinson 2010b).

## ETHNOGRAPHIC RESOURCES

The National Park Service defines *ethnographic resources* as "a site, structure, object, landscape, or natural resource feature assigned traditional legendary, religious, subsistence, or other significance in the cultural system of a group traditionally associated with it" (NPS 28: *Cultural Resources Management Guideline*). Ethnographic resources typically hold significance for traditionally associated peoples whose shared sense of purpose, existence as a community, and identity as an ethnically distinct people are closely linked to particular resources and places.

Brooks River Archeological District National Historic Landmark, or portions thereof, has also been identified as a potential ethnographic landscape and potential traditional cultural property (i.e., an ethnographic resource meeting the criteria of eligibility for the National Register of Historic Places). The draft traditional cultural property inventory for the Brooks River area (Agli 2006) recognizes the district by its traditional Sugpiat/Alutiiq name, *Kittiwick*, which translates to mean a sheltered place behind a lookout point. For thousands of years, according to oral history and traditions, the Alaska Peninsula Sugpiat people used the area for subsistence hunting, fishing (primarily for redfish/salmon), and plant gathering. These people traditionally built semisubterranean houses using wooden posts and log cribbed roofs. The structures were covered with mud and sod. Related to the Kodiak Island people, the Sugpiat developed a widely diversified subsistence strategy based on land and sea resources. Substantial permanent settlements were established near the mouth of Brooks River and the vicinity of Brooks Camp that persisted until early historic times. Permanent settlement then shifted east to the Savonoski River and the lower Naknek River (Agli 2006; NPS 1999a; URS Group Inc. 2009a).

The Brooks River area is considered the ancestral homeland for many indigenous Sugpiat people who continue to use and revere the area as a place of shared traditions, kinship ties, and other spiritual/cultural connections. The Council of Katmai Descendants, formed in 1994, represents those peoples with cultural ties to the area. The council also serves as an advisory group and source of traditional knowledge for the native descendants (Agli 2006).

Information provided by the Council of Katmai Descendants and identified in published ethnographic and historical sources include several places, resources, and activities contributing to the area's significance as an ethnographic landscape. These include the following:

- water bodies and associated features (e.g., Brooks River, Naknek Lake, Lake Brooks, the spit at the mouth of Brooks River, Beaver Pond)
- archeological sites and burial locations on the north and south sides of Brooks River
- Dumpling Mountain and the trail leading to the top of the mountain
- habitation features in the protected property (conservation easement area as follows: fish racks, net anchors, tents, meat caches, sheds, outhouses, smokehouses, gardens, and boat launching areas
- transit routes from winter homes to seasonal use sites (e.g., from Old Savonoski down Iliuk Arm (pre-1912); from South Naknek and New Savonoski up Naknek River and across Naknek Lake to Brooks River (post-1912); former trails along the shore of Naknek Lake leading from the river mouth to Dumpling Mountain and to the entrance of Iliuk Arm)
- plants and berries traditionally consumed and/or used for medicinal and other purposes
- the annual harvesting of redfish from Brooks River remains a traditionally important activity

The 1912 eruption of Novarupta Volcano resulted in the widespread displacement of the area's traditionally associated people from their former villages and forced Sugpiat inhabitants of Savonoski to abandon their village at the east end of Naknek Lake. The Sugpiat returned to the region after the effects of the eruption diminished, but shifted their traditional redfish harvest to Brooks River where they seined redfish from the north and south banks and established camps, cabins, and boat launching points at the river mouth. The National Marine Fisheries Agency operation at the head of the river and growing numbers of fly-in sports anglers had little effect on the Sugpiat people's ability to conduct traditional activities.

Beginning in the 1950s, development associated with operations of the park concessioner and the National Park Service at Brooks Camp presented greater disturbance to sites and resources and disrupted the traditional use activities of the Sugpiat people. Impacts were compounded by increasing numbers of anglers and visitors to the area. Development actions (e.g., completion of the Valley Road linking Brooks Camp with Valley of Ten Thousand Smokes, NPS use of the spit road and loading ramp, installation of the floating bridge over the river, and construction of the bear viewing platform and boardwalk on the south side of the river) have impinged on the ability of the Sugpiat to conduct activities on Brooks River in a manner and setting to which they were traditionally accustomed.

In 1981, the National Park Service closed Naknek Lake to gill net fishing including the harvest of redfish at Brooks Camp. Although federal law changed in 1996 to allow the harvest of redfish, high numbers of bears and visitors, later closing dates for Brooks Camp, and other regulations continue to discourage the traditional late season redfish harvest.

A land parcel on the south side of the river was originally part of a 160-acre Alaska Native allotment filed by Sugpiat elder Mrs. Palakia Melgenak in 1971. The application was contested for several years and finally settled in 1997 with a court ruling that granted 80 acres to the heirs of Palakia Melgenak. The National Park Service purchased the western two-thirds of the allotment in fee simple and purchased a conservation easement on the eastern one-third of the allotment ("protected property," figure 3). No new development by the National Park Service shall occur on the protected property without the National Park Service first consulting, obtaining, and considering the views of the heirs. The family retained a 7.97-acre "exclusive use area" along the shore of Naknek Lake between the mouth of Brooks River and Beaver Pond. A cluster of log cabins were constructed in this area during the 1920s/1930s. Ten acres on the east end of the Iliuk Arm of Naknek Lake near the mouth of Savonoski River were also conveyed to the heirs of Palakia Melgenak (Agli 2006; NPS 1999a).

No systematic ethnographic investigations of the Brooks River area have been completed to date. The National Park Service initiated an ethnographic resource survey of the area in 2010 that is anticipated to further identify and document sites, resources, and customary uses that have cultural importance to the area's traditionally associated people.

## HISTORIC BUILDINGS, STRUCTURES, AND CULTURAL LANDSCAPES

During the first half of the 20th century (particularly from the 1920s through the 1940s), a number of self-sufficient individuals trapped beaver, fox, and other fur-bearing animals in the Katmai area. In common with trappers throughout Alaska, they built subsistence cabins and other structures near lakes and rivers. They typically supplemented the income they made from trapping during the long winters by working at various Bristol Bay fish canneries during the summer. An expansion of the Katmai National Monument boundaries in 1931 brought those trapping within the monument boundaries into conflict with NPS resource protection policies. This effectively ended the trappers' lifeway in the Katmai area, and only a few instances of illegal trapping have occurred since 1950 when the National Park Service established a management presence at Brooks Camp (NPS 1999a).

Among the historic structures associated with trapping in the general project vicinity is Scott's cabin and associated outbuildings. These were constructed in the late 1920s by trapper Stephen M. Scott (nicknamed "Portland Packer Scotty"). The small log/earthen cabin, caches, and other structures are about midway between Naknek Lake and Lake Brooks, on the south side of Brooks River. The cabin complex has been determined eligible for the National Register of Historic Places (NPS 1999a).

In 1941, the U.S. Fish and Wildlife Service began construction of the National Marine Fisheries Research Station at the eastern end of Lake Brooks near the head of Brooks River. The rustic log research station and field laboratory supported a successful fish research and management program at the site for more than 30 years. The U.S. Fish and Wildlife Service also constructed a salmon-counting weir, a concrete fish ladder bypassing Brooks Falls, and a road linking Brooks and Naknek Lakes. The National Park Service acquired the research station in 1979 and adapted it for employee housing. The research station has been determined eligible for the National Register of Historic Places (NPS 1999a).

The first tourism-related structures at Brooks Camp were constructed in 1950 as part of a sportfishing camp developed by Northern Consolidated Airlines, the park's first concessioner. Most of the camp's original wall tents were later replaced with prefabricated wood cabins. Among the additional structures built by the concessioner during the 1950s and 1960s were a manager's quarters/store, cookhouse, bathhouse, powerhouse, guest cabins, and Brooks Lodge. The National Park Service also undertook initial facility development at Brooks Camp in the 1950s with the construction of a rustic log ranger station (1955) and boathouse (1959). The ranger station was the first permanent NPS station in the park (NPS 1999a). Both the ranger station (currently used as a visitor center) and boathouse (currently used as a ranger station) were listed in the National Register of Historic Places in 2010.

The 22-mile-long Valley Road, constructed in 1962 as part of NPS Mission 66 improvements, linked Brooks Camp with Valley of Ten Thousand Smokes. The road substantially contributed to the growing popularity of Katmai National Park and Preserve as a tourist destination. Also in the 1960s, the National Park Service constructed additional facility buildings and employee housing at Brooks Camp. Existing trails and circulation pathways were expanded and improved during this period as well (NPS 1999a; NPS, Ferreira 2011).

The National Park Service is evaluating the Brooks Camp area as a historic district and cultural landscape with significance linked to its historical associations with the early period of tourism and park management.

## Additional Investigations

All cultural resources within the project area will be inventoried, and potential effects will be assessed to avoid or minimize adverse effects. Archeological surveys including subsurface testing were conducted in July 2010 for areas of potential project ground disturbance within the national historic landmark district (e.g., geological testing for bridge foundations, new road alignment to the barge landing site, and boat storage area). The Brooks Camp Historic District Cultural Landscape Inventory was completed and the Alaska SHPO concurred that the Brooks Camp Historic District is eligible for listing in the National Register of Historic Places. An ethnographic resource survey was initiated in late summer 2010 to document the potential ethnographic cultural landscape comprising the lower Brooks River area. The survey would identify and document places of cultural importance to native Katmai area descendants. The ethnographic traditional use / cultural landscape information would be compiled and a determination of eligibility for listing in the National Register of Historic Places would be submitted to the Alaska SHPO along with a section 106 assessment of project effects on ethnographic resources.

# VISITOR USE AND EXPERIENCE

## VISITOR ACCESS AND TRANSPORTATION

Katmai National Park and Preserve is on the Alaska Peninsula. Park headquarters are in the town of King Salmon, about 290 air miles from Anchorage, Alaska. Brooks Camp is about 35 air miles from park headquarters in the western section of the park.

During the summer, Brooks Camp is only accessible by floatplane or boat. Most visitors fly into Anchorage or King Salmon and purchase a passage on a floatplane to Brooks Camp, which is approximately 30 air miles from King Salmon. Floatplanes can land on Naknek Lake, located directly adjacent to Brooks Camp, or on Lake Brooks, which is upriver from the camp. A park maintenance road south of the river connects Lake Brooks to the Brooks Camp area and provides bus tour access to Valley of Ten Thousand Smokes (southeast of Brooks Camp).

Boats can reach Brooks Camp via Naknek Lake from Lake Camp, which is connected by road to the villages of Naknek and King Salmon west of the park boundary. Several commercially authorized operators provide air taxi and boat access. Visitors must make their own arrangements to arrive to the Brooks Camp area.

Brooks Camp is on the north side of Brooks River. An 8-foot-wide, 320-foot-long floating bridge over the river provides essential access between Brooks Camp and areas on the south side of the river such as the bear viewing platforms, Valley of Ten Thousand Smokes bus parking area, and Lake Brooks floatplane arrival area. This is a seasonal bridge, installed every spring and removed in the fall. The bridge is a pontoon-style made of metal framing and wood coverings and railings. It is used by both pedestrians and light utility vehicles and is managed as a travel corridor, not a viewing platform. Once across the bridge visitors and staff alike must use a trail to access the camp area. This trail passes through a vegetated area on the north bank of the river—the Corner, which often creates a point of congestion for traffic flow during high use periods. The Corner is a site of high bear activity, and consequently "bear jams" occur frequently in this area.

Building materials, fuel, vehicles and equipment, and other NPS administrative supplies are brought to Brooks Camp on a barge. Currently, there is a barge landing at the mouth of Brooks River on the south side. An NPS administrative road connects the barge landing to the floating bridge and to the bus parking area to the south (see "Park Operations" section for more information).

**BROOKS RIVER BRIDGE DURING HEIGHTENED VISITATION**

## VISITOR ACTIVITIES

Although Brooks Camp is now known primarily for viewing bears, it was originally established to accommodate sport fishing, which is still an important recreational use in the area (Sherwonit 1996). An elite group of fly anglers travel to Brooks River to hook trophy rainbow trout in the same waters as the bears that fish for salmon.

A study of Brooks Camp visitors conducted in July 2006 revealed that nearly all visitors came to the site to view bears (97 percent). Most visitors participated in multiple activities, however, which also include photography (80 percent), visiting the visitor center (75 percent), purchasing items in the bookstore (51 percent), dining (47 percent), day hiking (25 percent), attending ranger-led walks (20 percent), picnicking (20 percent), staying in lodging (16 percent), and camping (13 percent). Less common activities (less than 10 percent participation) include taking guided tours, fishing, backpacking, and boating. (Littlejohn and Hollenhorst 2007).

Although fishing is not represented as a common activity in this study, the July timing may have caused the anglers to be underrepresented in the survey sample, as fishing is most popular later in the summer. In 2009, user days spent sport fishing made up 15 percent of total user days at Brooks Camp, as reported by the concessioners (NPS 2009i). User days reflect one person for one day; therefore, if three people are on a trip for two days, this will be represented as six user days (NPS 2010f).

No retention of fish in Brooks River above the floating bridge is permitted due to the difficulty of safely removing fish without causing dangerous bear interactions. A small percentage (~2 percent) of visitors and residents do engage in catch-and-keep fishing downriver of the bridge (Littlejohn and Hollenhorst 2007).

## VISITOR FACILITIES, SERVICES, AND AMENITIES

Bear viewing is the primary activity at Brooks Camp, and viewing platforms and elevated walkways have been installed to facilitate bear viewing while minimizing human-bear interactions and associated impacts. Primary viewing areas include

Brooks Falls platform, Riffles platform, and the Lower River platform on the south shore of Brooks River. These platforms rise nearly 10 ft above grade and were each designed to accommodate up to 40 people at one time.

A trail network exists, linking the Brooks Camp area to nearby attractions such as Brooks Falls, Valley of Ten Thousand Smokes, a reconstructed semisubterranean house exhibit, and Dumpling Mountain. This network includes an elevated walkway to the Brooks Falls viewing area. Anglers are the primary users of several social trails that are unmanaged and unmaintained by park staff, including one along the lakeshore from Brooks Camp to the mouth of the river, one from the north bridge access point west to a point along the river, and a social trail leading from Brooks Camp to the popular oxbow area. Most maintained trail sections in the Brooks River area are universally accessible; however, a few trail sections exceed the minimum grade for accessibility and/or contain uneven surfaces. During periods of low water in Brooks River, which usually occur in June and early July, the ramps and gates on each side of the floating bridge also tend to exceed the minimum grade for accessibility. In addition, persons with mobility impairments would need to be prepared to move from trails or other areas should a bear come into the vicinity. Although there are no data available as to the number of people with mobility impairments that come to Brooks Camp, the way in which visitors answered other questions in the July 2006 study imply that they are a small percentage (less than 5 percent) of visitors (Littlejohn and Hollenhorst 2007).

Overnight accommodations at Brooks Camp include Brooks Lodge and a walk-in campground. Brooks Lodge, operated by concessioner Katmailand, Inc., since 1982, is an overnight facility open between June and September. It has 16 rooms that can accommodate up to four people per room. The lodge also includes a dining area, bar, and visiting area with fireplace.

The Brooks Camp campground, operated by the National Park Service, can accommodate a maximum of 60 campers per night. Campground reservations must be made in advance either online or by phone. The campground includes potable water and two vault toilets. Campers can also purchase hot showers at Brooks Lodge. Three cooking shelters and picnic tables are provided for centralized cooking. Campers can also purchase hot meals from Brooks Lodge. There are not phone or Internet services provided. The campground is surrounded by an electric fence and food and gear storage caches are provided for bear safety. Additionally, all visitors must check in at the Brooks Camp Visitor Center and receive bear and campground orientations.

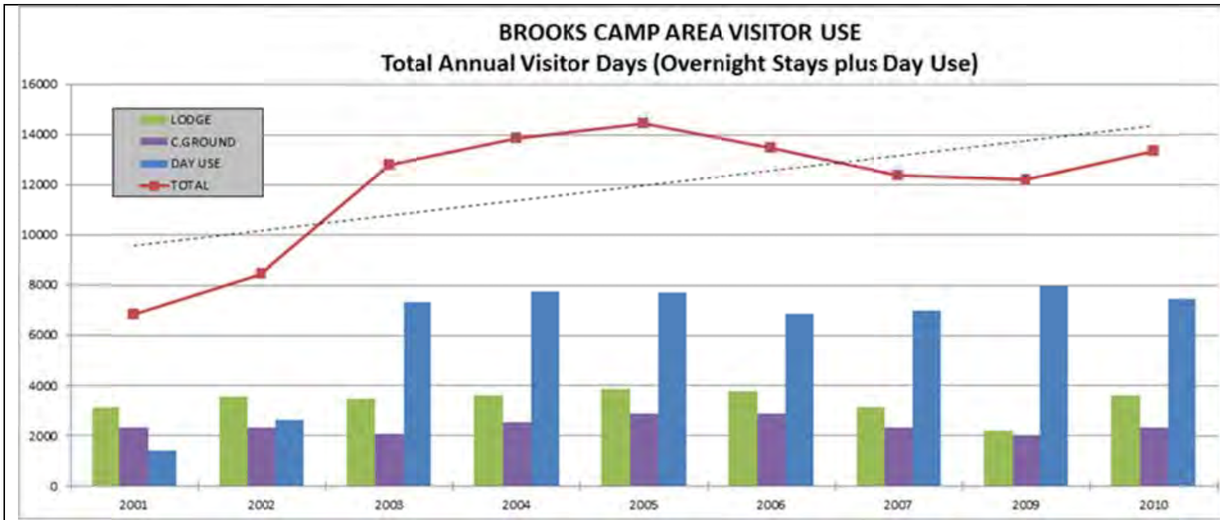
The Brooks Camp Visitor Center is a small log cabin with a modern addition on the shore of Naknek Lake near Brooks Lodge. It provides a central location for presenting the bear orientation program and contains a small gift shop managed as an outlet of the cooperating association, Alaska Geographic.

A variety of NPS interpretive programs are offered at Brooks Camp. According to the July 2006 visitor survey (Littlejohn and Hollenhorst 2007), about 36 percent of visitors reported participating in informational or interpretive programs. Each evening NPS interpretive rangers give illustrated talks at a small auditorium on topics such as the natural and cultural history of the area. Rangers also lead an interpretive program on the bus tours of Valley of Ten Thousand Smokes. Other interpretive programs, such as a cultural walk to the reconstructed semisubterranean house exhibit and hikes to Dumpling Mountain and other nearby sites, are offered on occasion.

Multiple commercial service providers, based outside of Katmai, but operating within the park, function in and around the Brooks Camp area, providing other guided services including bear viewing tours, fishing excursions, kayak trips, and transportation services. These activities are managed by the National Park Service under commercial use authorizations (CUAs).

## VISITOR SEASON AND VISITOR USE LEVELS—OVERALL

Brooks Camp receives approximately 12,000 to 14,000 total visitors annually. (Almost 300 visitors per day use Brooks Camp during peak use periods in July (figure 14). It is the most popular area in Katmai National Park and Preserve (in July 2006, 61 percent of all park visitors reported visiting the Brooks Camp area).




Source: NPS Public Use Statistics

Red line is "total visitors"
Bars are "visitor days"
Note: Data from 2008 was not included due to recording inaccuracies.

**FIGURE 14. ANNUAL VISITOR DAYS (OVERNIGHT STAYS PLUS DAY USE)**

All arriving visitors must check in and receive an orientation on bears at the Brooks Camp Visitor Center (unless they are with a sport fishing guide, in which case the guide conducts the orientation). In 2010, the Brooks Camp Visitor Center had more than 13,000 visitors; most of them came in July (NPS 2011).

The July 2006 visitor study suggests that the most visitors to the Brooks Camp area come for the day only (Littlejohn and Hollenhorst 2007). Figure 14 shows the distribution of day versus overnight use. For the past eight years, overnight use has represented approximately 44 percent of visitor use at Brooks Camp. This use is split between the Brooks Camp campground, Brooks Lodge, and overnight backcountry users.

Although open from June 1 through September 17, the Brooks Camp campground is only at or near capacity from the last week of June through the entire month of July. The campground can accommodate up to 60 campers, and the 10-year average from 2001–2010 is 45 campers per night (total number of monthly visitors divided by the number of nights) in July. In 2010, the average number of visitors per night in July was 59 (NPS 2011). It is important to note, however, that group sizes and lengths of stay varied significantly over this period—groups as large as 44 people and lengths of stay as long as 7 nights were reported.

Similar to the campground the Brooks Lodge is typically full during peak season. During the 2010 season, the lodge had a total of 1,404 (351/month average) room nights or 3,590 (898/month average) bed nights. July is typically the busiest month—in 2010, the lodge had more than 1,300 overnight visits. The operator of Brooks Lodge, the concessioner Katmailand, Inc., provided more than 1,000 Valley Tours, 19 guided wildlife viewing tours, and 22 guided fishing tours in 2010.

## VISITOR USE LEVELS—CROWDING

Visitor use levels and crowding have been a topic of concern at Brooks Camp for several years (Womble and Studebaker 1981). In the July 2006 study, when compared to other areas of Katmai, Brooks Camp visitors reported the highest levels of perceived crowding. Forty percent of visitors rated the crowding as "moderate," 12 percent of visitors rated it as "very crowded," and 4 percent of visitors rated it as "extreme" (Littlejohn and Hollenhorst 2007).

Because of the popularity of the Brooks Falls viewing platform and resulting use levels, this platform's capacity is strictly managed. The platform can accommodate a maximum of 40 people simultaneously. When the platform fills to capacity a waiting line is formed and viewing times are restricted to one hour. During these access restriction times waiting visitors are encouraged to view bears on the Riffles platform until space is available.

Crowding also occurs at the Corner and on the lower river platforms during bear jams, when the bridge is closed due to bears blocking safe access. While foot traffic is halted, waiting for the bears to move, many visitors who would otherwise be spread out are directed by NPS staff to remain on the lower bear viewing platform or near the Corner for extended periods, which causes visitors to become bunched together. Data collected in 2011 shows that bridge closures are frequent, with more than 20 per day most days in July and more than 30 per day in September. Most closures are brief, less than 10 minutes long, but most days in July and September for which there are data had closures of more than 30 minutes in length, some more than 60 minutes. Staff experience indicates that the length and frequency of delays is strongly affected by the salmon run and water levels. Multiple years of data would be needed to assess the specific numbers more appropriately.

Despite the increased level of crowding, 48 percent of visitors reported that bridge closures "added to" their experience and only 7 percent reported that it detracted from their experience (Littlejohn and Hollenhorst 2007). Bear jams add to visitor experience by providing an intimate yet safe bear encounter. The presence of uniformed rangers provides reassurance of safety, while the proximity to wild bears gives visitors a sense of adventure.

## VISITOR SAFETY

While bear viewing is the primary reason visitors come to Brooks Camp, it also presents the most significant visitor safety concerns (human-bear interactions are detailed in the "Natural Resources" section of this chapter).

Human-bear interactions are of primary concern in the lower Brooks River area during the salmon run and spawning seasons. In July and September, visitors regularly come into close proximity to bears when fishing in the river, walking around the Corner area, travelling along the trail connecting the campground to the lodge, and travelling along the trail from the lower river platform to the falls platform. The lower river area and location of the floating bridge coincides with an important feeding ground for bears. The fact that the floating bridge is at ground level also contributes to opportunities for human-bear interactions. Consequently, visitors are frequently prevented from crossing the river, often for extended lengths of time, while waiting for the bears to move out of the area. As a result, NPS staff has posted an advisory notice on its website informing visitors to take these delays into consideration when planning their daily itinerary. Another major safety concern involves recreational anglers coming into contact with bears in the waters of Brooks River or on its banks. Human-bear interactions are also common on the beaches along the shores of Naknek Lake.

NPS staff, including interpretive, resources management, and law enforcement rangers, is stationed at Brooks Camp during the season to ensure visitor safety, among other duties. All visitors arriving at Brooks Camp must check in at the visitor center and the majority participate in a bear orientation program. This 20-minute program provides visitors with essential information on how to behave in bear country, e.g., storing food, fishing activities, what to do in case of wildlife encounters, and other important topics. The only excepted visitors are those who are guided sport fishing anglers; the sport fishing guides who are part of the Brooks River Guide Program are required under a commercial use authorization to attend a bear orientation and pass the information along to their clients. Guides are also responsible for staying within sight of their clients while at Brooks Camp.

Other bear safety measures include a designated cooking facility and food storage caches at the campground, which is also surrounded by an electrical fence to deter bear encroachment. Food storage caches and designated outdoor eating areas for day visitors are next to the Brooks Camp Visitor Center and at Lake Brooks. All backcountry users must carry and use bear-proof food storage containers.

Because of this management presence, the 10-year average from 2000–2009 of bear charges (including hop and bluff charges) is only two per year and of incidents involving bears accessing human food is only four per year. The average number of dominance interactions, defined as competition for space occurring between bears and humans when a bear is not surprised (NPS 2009g), per year is a higher number at 12 per year, which is still a remarkably good statistic based on the amount of opportunity for human-bear interactions (NPS 2009h). No fatalities and only a couple of mauling incidents have been recorded. It is important to note, however, that successfully protecting visitors from bears is contingent on an intensive visitor use and bear management program. Under current conditions, this program relies on significant staff time, proactive education and information efforts, and strict enforcement and monitoring.

## VISUAL RESOURCES/SCENERY

Nestled on the shores of Naknek Lake at the mouth of Brooks River among poplar trees and lush vegetation is the Brooks Camp area, known for its natural scenery. Naknek Lake is one of the largest lakes in the national park system. Its glacial waters frame the foreground for views of distant mountain peaks such as Mount Dumpling. Brooks River is surrounded by lush riparian vegetation, creating a superlative backdrop for bear viewing and other recreational activities. The combination of water, vegetation, and mountains produces a characteristically Alaskan backcountry scene that is integral to the Brooks Camp experience.

Most notably, Brooks Camp is known for its opportunity to view bears in their natural habitat. One of the most picturesque and popular areas for bear viewing is Brooks Falls, about 1 mile from Brooks Camp. At the falls, as well as along other segments of Brooks River, bears can be seen fishing for salmon during seasonal spawning runs.

There are several structures at Brooks Camp that facilitate access and bear viewing opportunities (which are presented earlier in this chapter). Existing buildings and structures are generally screened from view by the poplar stands, spruce forests, and low vegetation surrounding them. However, several structures, especially those near Brooks River and Naknek Lake shorelines, are noticeable in the otherwise natural and largely undeveloped landscape. The floating access bridge, made primarily of wood with a metal substructure, stands out and is clearly visible from both shorelines as it crosses Brooks River. In addition, one wooden viewing platform is near the river to facilitate bear viewing. Two other wooden viewing platforms and an elevated walkway in the Brooks Falls area are also present, with the structures rising nearly 10 ft above the ground in places. All of these structures are noticeable against the surrounding natural landscape.

Finally, human use affects visual resources in the Brooks Camp area. Crowds of up to 50 people at one time consistently form on and near the floating bridge during and immediately after bear jams. Furthermore, floatplanes sometimes cluster along the beach of Naknek Lake by Brooks Camp, occasionally numbering 15 or more planes, and there are often several boats in the cove on the south side of the river's mouth.

**BROWN BEARS AT BROOKS FALLS**

# SOCIOECONOMIC ENVIRONMENT

## OVERVIEW

Katmai National Park and Preserve resides within the boundaries of four boroughs—Lake and Peninsula Borough, Kodiak Island Borough, Kenai Peninsula Borough, and Bristol Bay Borough. Bristol Bay Borough includes a small portion of the western tip of the park and includes the population centers nearest to the park and preserve. Therefore, the influence area for economic and social consideration associated with Katmai National Park and Preserve and this visitor access draft environmental impact statement would primarily focus on Bristol Bay Borough, which includes the communities of Naknek, South Naknek, and King Salmon, as well as connections to and relationships between Anchorage and the park and preserve.

The movement of most goods, supplies, commodities, and people in Alaska flow through Anchorage, and the city's transportation and economic ties to King Salmon and Katmai National Park and Preserve are strong. The park's transportation and economic connections to Anchorage are mentioned herein where appropriate. The communities of King Salmon and Naknek are also discussed given the economic links between these communities and Katmai National Park and Preserve. King Salmon is the community nearest the park, home to NPS headquarters and the King Salmon Visitor Center, and serves as the transportation hub for the region.

### Bristol Bay Borough

The Bristol Bay Borough is southwest of Anchorage and is often referred to as the "Gateway to Katmai National Park and Preserve." This borough is on the Alaska Peninsula at the head of Kvichak Bay, an arm of Bristol Bay. This borough is one of 12 organized boroughs in the state that represents the more populated parts of the state and functions similar to a county in the Lower 48 (U.S. Census Bureau 2005).

Bristol Bay Borough was established in 1962, the first borough in the state. It is the official governing body for South Naknek, King Salmon, and Naknek (the borough seat). Naknek and South Naknek are situated on opposite sides of Naknek River on the western side of the borough, where the river meets Bristol Bay. South Naknek is a more traditional Alaskan community with no road between it and outside communities; the area's economy was and continues to be dominated by fishing and related industries (Bristol Bay Borough 2010).

### King Salmon

King Salmon serves as the regional transportation center. It is connected to the Naknek area via the Alaska Peninsula Highway. Although sparsely populated, King Salmon is directly connected to Anchorage via two commercial airlines.

The federal government has played a role in the community for decades—since the King Salmon Air Station was built at the beginning of World War II. The air station has been used as a fuel and support base, forward operating base, and as part of the nation's permanent air defense system. In 1959, the state acquired the airfield, which today serves as the commercial airport. The air station was placed in caretaker status in 1994, but daily military activities continue, including training missions and North American Air Defense missions. The Bristol Bay Borough, State of Alaska, and U.S. Fish and Wildlife Service use buildings at the airfield (Bristol Bay Borough 2010 and Alaska Department of Commerce 2010).

Today, King Salmon's economy is driven by transportation, government jobs, and fishing-related employment (Alaska Department of Commerce 2010). A portion of the transportation, retail, and service industries in the community is supported by the many tourists and sportsmen visiting the region, including Katmai National Park and Preserve and Brooks Camp.

### Naknek

Naknek is a fishing community about 15 miles west of King Salmon along the Alaska Peninsula Highway. It sits at the mouth of Naknek River where the river meets Kvichak Bay and Bering Sea. The population (552) was greater than King Salmon (409) as of 2008.

The economy is dominated by fishing and government employment. Salmon fishing and processing and the corresponding surge of people who come to fish each season is a major economic driver. Over 100 (approximately 25 percent) residents held commercial fishing permits in 2009 and several thousand people move to the area during fishing season. A cargo dock is located here, which is operated by Bristol Bay Borough and serves as the port of Bristol Bay. Naknek is the seat of Bristol Bay Borough and government employment is concentrated here (Alaska Department of Commerce 2010). In addition, most of the equipment and supplies for construction of the bridge and boardwalk would arrive by ocean barge to Naknek.

## DEMOGRAPHICS

### Population

Bristol Bay Borough's population was 1,410 in 1990 and was estimated to have decreased by 457 people by 2008. Each of the population centers in the borough also had a decrease in population between 1990 and 2008. King Salmon and South Naknek had the largest percentage decrease in population, 36 percent and 50 percent respectively (U.S. Census Bureau 1990b, 2000, 2008; Alaska Department of Labor and Workforce Development 2010a). See table 7.

**TABLE 7. POPULATION OF BRISTOL BAY BOROUGH AND POPULATION CENTERS**

| | 1990 | 2000 | 2008 | Percent Change 1990–2000 |
|---|---|---|---|---|
| Bristol Bay Borough | 1,410 | 1,258 | 953 | –11 percent |
| King Salmon | 696 | 442 | 409 | –36 percent |
| Naknek | 575 | 678 | 552 | –4 percent |
| South Naknek | 136 | 137 | 68 | –50 percent |

Source: U.S. Census Bureau 1990b, 2000, and 2008 and Alaska Dept. of Labor & Workforce Development 2010a

Note: King Salmon, Naknek, and South Naknek data represents the respective census designated place.

## ECONOMY AND EMPLOYMENT

The ability to earn a living in this area remains challenging because of its geographic isolation, lack of connectivity with major land transportation corridors, small population, and the seasonality of employment opportunities. The seasonal nature of employment is a direct result of the dominant industry in the area—harvesting and processing wild sockeye salmon. The salmon fishing season typically runs from June to August, but differs depending on the species being fished (ADF&G 2007). Tax revenue is generated through property taxes, a raw fish tax, and a bed tax. There is no sales tax in the borough (Alaska Department of Commerce 2010).

The port of Bristol Bay is in Naknek and is the major cargo hub in southwest Alaska. Cargo destined for King Salmon is delivered to the Bristol Bay port and then trucked to King Salmon. The port, which is operated by the borough, is also the main location for offloading salmon from boat to shore. The Bristol Bay red salmon fishery is large and a critical source of employment and borough tax revenue, serving a critical role in the region's economy (Alaska Department of Commerce 2010). In 2007, there were 29.5 million fish harvested in Bristol Bay, with a preliminary estimated value of $106 million (Resource Development Council for Alaska, Inc. 2010).

The large salmon runs result in many people traveling to the area, for work and pleasure. Both commercial and sport fishing helps to support the air services industry, a large employer in King Salmon and the region. The salmon industry also helps to support the 34 residents of King Salmon and the 173 borough residents that held commercial fishing permits in 2008, as well as the many local residents that participate in net-fishing. The red salmon of this area not only impacts the economy through harvesting and processing, but tourists flock to the area, particularly to Brooks Camp in Katmai National Park and Preserve to watch bears feeding on salmon (Alaska Department of Commerce 2010). Spending at restaurants, bars, and hotels in King Salmon and the Bristol Bay area generate income for local business owners as well as tax revenue to provide government services.

### Employment

The unemployment rate in Bristol Bay Borough decreased from 6.3 percent in 2004 to 4.3 percent in 2009, and was below that of Anchorage from 2006–2009. The unemployment rate has also been lower than that of the state as a whole since 2006 (Alaska Dept. of Labor and Workforce Development 2010c).

The average employment in Bristol Bay Borough for all industries, including the government, was 1,287 people per month in 2008. The borough's average monthly employment for all industries between 2004 and 2008 fluctuated from a low of 1,227 in 2005 to a high of 1,371 in 2007 (Alaska Dept. of Labor and Workforce Development 2010b).

Government also plays a role in the borough economy, employing 238 people, or more than 18 percent of the workforce (Alaska Dept. of Labor and Workforce Development 2010b). Government jobs also contribute to King Salmon's economy. State and local government employed 56 people in 2008. Total federal employment figures are unavailable for King Salmon, but the National Park Service and U.S. Fish and Wildlife Service are employers in King Salmon. The other industries with the most workers in 2008 were trade, transportation and utilities and educational and health services (Alaska Dept. of Labor and Workforce Development 2010a).

### Economic Contributions of Katmai National Park and Preserve

Katmai National Park and Preserve serves an important role in the local and regional economy in the form of park operations, capital expenditures, federal payments in lieu of taxes, and visitor expenditures. The park and preserve contributes both directly and indirectly to economic activity locally, regionally, and statewide. Direct spending by the park and the indirect effect of employee spending in King Salmon support local businesses and generate tax revenue. Visitor spending in King Salmon, Anchorage, and elsewhere benefits those respective economies. Much of the park's economic activity is related to Brooks Camp. The camp is a primary destination in the park and has many visitors as a result of wildlife watching and fishing opportunities.

The exact economic impact associated with visitation to Katmai National Park and Preserve is difficult to determine. The reasons for this are varied. Unique challenges to Katmai National Park and Preserve include the fact that the park is very geographically isolated and reaching it often involves purchasing flights or cruise packages outside of the park and outside of Alaska. For example, trips often originate in Homer, Soldotna, and Kenai. As a result, expenditure locations and amounts are difficult to isolate. The best available economic impact data try to account for the complexities unique to Alaska and is included below.

Data included in table 8 are based on the number of visitors to Katmai National Park and Preserve as a whole and are not isolated to Brooks Camp. Table 8 has three rows—the first row shows expenditures that were made within the Katmai National Park and Preserve boundary; the second row shows those expenditures made outside of the Katmai National Park and Preserve boundary; and the third row is weighted expenditures outside Katmai National Park and Preserve. Row 3 was calculated to more accurately "credit" Katmai National Park and Preserve visitor expenditures to better reflect the relative role Katmai National Park and Preserve played in overall Alaska trip plans. For example, if visitors came primarily to visit Katmai National Park and Preserve, then all of their expenditures in the state are credited to Katmai National Park and Preserve. If their trip to Katmai National Park and Preserve was unplanned, then fewer of their expenditures outside the park are credited to Katmai National Park and Preserve. Therefore, the weighted numbers are a conservative set of estimates (Fay and Christensen 2010).

**TABLE 8. EXPENDITURES PER PERSON PER TRIP (2009 DOLLARS)**

| | Day Trip | Day Package | Overnight in Katmai NPP |
|---|---|---|---|
| Expenditures inside Katmai National Park and Preserve | $134 | $501 | $1,005 |
| Expenditures outside Katmai National Park and Preserve | $1,046 | $2,547 | $1,701 |
| Expenditures outside Katmai National Park and Preserve (weighted) | $455 | $1,131 | $1,081 |

Source: Fay and Christensen 2010

Visitor spending inside the park related to day trip and day packages was highest for transportation expenses (including airfare), followed by guide fees and charges. Overnight visitor spending inside the park and preserve was highest for transportation expenses (including airfare), followed by lodging and spending at restaurants and bars (Fay and Christensen 2010).

Table 9 shows that more than $51 million was spent in the state by visitors to the park and preserve and almost $32 million was spent in the five-borough region considered in the Fay and Christensen (2010) report, which includes the boroughs of Bristol Bay, Kodiak Island, Lake and Peninsula, and Kenai Peninsula as well as the Municipality of Anchorage. About 61 percent of the dollars spent in the five-borough region was outside the park and preserve, whereas, about 76 percent of expenditures in the state occurred outside the park and preserve. Visitor expenditures in the state by visitors to Katmai National Park and Preserve supported 647 jobs, generated $73 million in total industrial output, $23 million in labor income, and added a value of $37 million to the Alaska economy (Fay and Christensen 2010).

### Concessions

As of 2008, Katmai National Park and Preserve had contracts with 10 concessioners to provide visitor services. The combined annual franchise fees for all contracts in 2008 were slightly less than $90,000. The services provided by these companies range from food and service operations to fishing guide services. By far the largest concessioner operating in the park is Katmailand, Inc., which operates the 64-bed Brooks Lodge and Grosvenor Lodge. The services they provide at Brooks Lodge include providing visitors with overnight accommodations, food services, showers, and restrooms. In addition, Katmailand, Inc., operates bus tours from the south side of the river at Brooks Camp to Three Forks Overlook at Valley of Ten Thousand Smokes.

### Commercial Use Authorizations

Section 418 of the National Parks Omnibus Management Act of 1998, Public Law 105-391, authorizes the National Park Service, upon request, to issue commercial use authorizations to individuals, corporations, and other entities to provide commercial services to park and preserve area visitors. These commercial use authorizations are used to authorize commercial services to park and preserve area visitors, but they are not concession contracts. They are intended to provide a simple means to authorize suitable commercial services to visitors in park and preserve areas in the limited circumstances described in park and preserve establishing legislation. In 2008, there were 116 commercial use authorizations issued by Katmai National Park and Preserve. Of the 116, about 75 percent reported actual activity and therefore paid fees accordingly. In 2009, 123 applications for commercial use authorizations were received, and of those about 75 percent reported economic activity and paid fees accordingly. Of those that reported activity, the gross receipts for Brooks Camp commercial use authorizations in 2009 were about $482,000.

## KATMAI NATIONAL PARK AND PRESERVE OPERATING BUDGET

To fulfill the park and preserve mission to protect resources and provide for safe and memorable visitor opportunities, Katmai National Park and Preserve has an annual budget that supports NPS operations, including employees working in King Salmon and Brooks Camp. Tables 10 and 11 represent those funds and NPS staff authorized in each fiscal year budget for the park and preserve as a whole and Brooks Camp alone.

Table 10 includes the authorized park operating budget and full-time equivalent (FTE) employees for fiscal years 2006–2010. During the past five years, the authorized amount for the park and preserve has increased by almost $1 million to pay for additional staff hired to ensure visitor safety and pay for continued maintenance and operational needs.

**TABLE 9. EXPENDITURES IN FIVE-BOROUGH REGION AND ALASKA BY VISITORS TO KATMAI NATIONAL PARK AND PRESERVE IN 2007 (2009 DOLLARS)**

| | |
|---|---|
| Total Direct Expenditures inside Katmai National Park and Preserve | $12,335,897 |
| Total Direct Expenditures outside Katmai National Park and Preserve in Alaska (weighted for Katmai National Park and Preserve influence) | $19,411,823 |
| Subtotal (expenditures in the five-borough region) | $31,747,721 |
| Total Direct Expenditures outside Katmai National Park and Preserve in Alaska (expenditures outside five-borough region) | $19,426,482 |
| **Total Expenditures in Alaska** | **$51,174,203** |

Source: Fay and Christensen 2010

Table 11 highlights the costs to operate Brooks Camp by division, as well as the number of FTE employees by division for the federal fiscal years 2006–2010. As shown in table 11, three of the approximately eight total FTE staff hired since fiscal year 2006 were additional interpretation staff at Brooks Camp (one full-time-equivalent employee could be two employees working part time). The interpretation staff was hired as full-time seasonal employees, replacing volunteers who had traditionally filled those positions.

In 2010, the operating cost of Brooks Camp comprised roughly 30 percent of the overall Katmai National Park and Preserve authorized budget and Brooks Camp FTE staff comprised about 42 percent of all NPS FTE employees working at the park. These figures only include the costs for direct operations at Brooks Camp and do not reflect the extensive amount of work done in the off-season related to planning work, hiring, procurement, training, repair, and maintenance of equipment, contracting, and aviation.

**TABLE 10. KATMAI NATIONAL PARK AND PRESERVE OPERATING BUDGET**

| Fiscal Year | Authorized Amounts | Park FTE |
|---|---|---|
| 2006 | $2,960,500.00 | 24.0 |
| 2007 | 3,024,100.00 | 27.0 |
| 2008 | 3,286,400.00 | 31.5 |
| 2009 | 3,596,100.00 | 33.2 |
| 2010 | 3,878,000.00 | 31.8 |

Source: National Park Service, Katmai National Park and Preserve

Note: FTE refers to full-time-equivalent staff.

**TABLE 11. BROOKS CAMP OPERATING COSTS (2006–2010)**

| | Interpretation | | Resource Management | | Law Enforcement | | Maintenance | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| FY | Cost | FTE | Cost | FTE | Cost | FTE | Cost | FTE | Cost | FTE |
| 06 | $76,218 | 2.0 | $143,937 | 1.8 | $101,606 | 1.6 | $423,441 | 4.6 | $745,202 | 10.0 |
| 07 | 110,017 | 1.9 | 132,299 | 1.4 | 107,592 | 1.7 | 461,545 | 4.7 | 811,452 | 9.7 |
| 08 | 254,009 | 5 | 121,451 | 1.5 | 143,751 | 1.5 | 523,345 | 5.1 | 1,042,555 | 13.0 |
| 09 | 229,464 | 4.8 | 121,938 | 1.8 | 158,882 | 1.6 | 543,273 | 4.9 | 1,053,558 | 13.2 |
| 10 | 254,826 | 5.0 | 102,500 | 1.7 | 147,787 | 1.5 | 630,890 | 5.0 | 1,136,002 | 13.2 |

Source: National Park Service, Katmai National Park and Preserve

Note: These are only costs for operations and do not reflect expenditures in the off-season.

# 4

# Environmental Consequences

# INTRODUCTION

The National Environmental Policy Act requires that environmental documents discuss the environmental impacts of a proposed federal action, feasible alternatives to that action, and any adverse environmental effects that cannot be avoided. In this case, the proposed federal action would be the construction of a bridge, boardwalks, and a barge landing site at Brooks Camp in Katmai National Park and Preserve. This chapter analyzes the environmental impacts of five alternatives on natural resources, cultural resources, visitor experience, visual resources/scenery, and socioeconomics

This chapter begins with a description of the methods and assumptions used for each impact topic. Impact analysis discussions are organized by impact topic and then by alternative under each impact topic. All of the impact topics are assessed for each alternative.

The analysis of the no-action alternative (the continuation of current management) identifies the future conditions in the Brooks River area if no major changes to facilities or NPS management occurred. The four action alternatives are compared to the no-action alternative to identify the changes in conditions that would occur because of changes in park facilities

Each alternative discusses cumulative impacts; these are identified when this project is considered in conjunction with other actions occurring in the park and preserve and the region. The discussion of cumulative impacts is followed by a conclusion statement. The impacts of each alternative are briefly summarized at the end of "Chapter 2: Alternatives Including the Preferred Alternative."

# METHODS AND ASSUMPTIONS FOR ANALYZING IMPACTS

The planning team based the impact analysis and the conclusions in this chapter primarily on past environmental assessments, information provided by NPS and other experts, review of existing literature and studies, and staff insights and professional judgment. The team's method of analyzing impacts is further explained herein. It is important to remember that all the impacts have been assessed assuming that mitigation measures would be implemented to minimize or avoid impacts (e.g., timing of construction). If mitigation measures described in the "Alternatives Including the Preferred Alternative" chapter were not applied, the potential for adverse resource impacts and the magnitude of those impacts would increase.

The environmental consequences for each impact topic were identified and characterized based on impact type, intensity, context, and duration.

*Impact intensity* refers to the degree or magnitude to which a resource would be beneficially or adversely affected. Each impact was identified as minor, moderate, or major, in conformance with the definitions for these classifications provided for each impact topic.

*Context* refers to the setting within which an impact may occur, such as the affected region or locality. In this document, most impacts are localized (site-specific).

*Impact duration* refers to how long an impact would last. Impacts can either be short term and temporary in nature, generally occurring during the construction period, or long term, lasting several years beyond the construction period or perhaps permanently. Although an impact might only occur for a short duration at one time, if it occurs regularly over a longer period of time the impact may be considered a long-term impact. For example, the noise from an administrative small vehicle driving over the bridge would be heard for a short time and intermittently, but because vehicles would be driving over the bridge for many years, the impact on the natural soundscape would be considered long term.

Impact intensity, context, and duration are defined for each impact topic.

Effects also can be direct or indirect. Direct effects are caused by an action and occur at the same time and place as the action. Indirect effects are caused by the action and occur later or further away, but are still reasonably foreseeable. This document discloses and analyzes both direct and indirect effects, but does not differentiate between them in the discussions to simplify the narrative.

The project area for this draft environmental impact statement includes Brooks Camp, Brooks River between the oxbow and river mouth, and the land south of the river from approximately the Valley Road Administrative Area east to Naknek Lake.

The impacts of the action alternatives describe the difference between the no-action alternative and the action alternatives. To understand a complete "picture" of the impacts of any of the action alternatives, the reader must also take into consideration the impacts that would occur under the no-action alternative.

For purposes of analysis, it is assumed that the new barge landing site and access road would be built before the bridge and boardwalk system. The bridge, boardwalk, electric utility line, and septic pump-out line would be built concurrently.

It is also assumed that all of the viewing/pullout areas proposed for each alternative would be built.

## NATURAL RESOURCES

The effects of the alternatives on brown bears, bald eagles, salmon and other fish, wetlands and vegetation, hydrology and floodplains, and natural soundscapes are analyzed in this chapter. For all of these impact topics, the effects of the action alternatives are compared against the no-action alternative (alternative 1).

**Note:** The following context and duration threshold definitions apply to all natural resource impact topics except the natural soundscape impact topic.

**Duration**

- **Short-term impacts:** Effects that occur during implementation and up to three years after the project is completed.
- **Long-term impacts:** Effects that occur beyond three years after project is completed.

**Context**

- **Localized impacts:** Effects would occur in the project area and/or in the immediate vicinity of the project area, including the lands and waters of Brooks Camp, the mouth of Brooks River, the adjacent Naknek Lake shoreline, and areas along the river corridor within visual or audible range.
- **Regional or parkwide impacts:** Effects would occur beyond the vicinity of the project area and would extend to the surrounding habitats and adjacent water bodies throughout and beyond the park.

### Brown Bear

The analysis of the effects of the alternatives on brown bears was based on the importance of affected habitat type, habitat location, and changes in habitat quality. Behavioral changes of brown bears and the potential for habituation to humans could result from changes in habitat quality. *Adverse impacts* are defined as reduced area or reduced quality of brown bear habitat. *Beneficial impacts* increase the area or improve the quality of brown bear habitat.

The impact intensities for brown bear are defined as follows:

- **Minor:** Effects on brown bear habitat quality would not be expected to be outside the natural range of variability and would not be expected to have any notable effects on brown bear or the natural processes sustaining habitat. The effects could result in minimal changes to bear habituation to humans, if any.
- **Moderate:** Effects on brown bear habitat quality would cause changes to brown bear feeding, mating, or caring for young. The effects could be intermittently outside the natural range of variability. Some limited changes to bear habituation to humans would be expected. Less than half of the brown bears using the Brooks River area would be affected. Changes to the regional brown bear population would be minimal.
- **Major:** Effects on brown bear habitat quality would cause substantial changes to brown bear feeding, mating, or caring for young. The effects would be expected to be outside the natural range of variability. Distinct changes to bear habituation to humans would be expected. More than half of the brown bears using the Brooks River area would be affected. Changes to

regional brown bear populations would be apparent.

### Bald Eagle

The analysis of the effects of the alternatives on bald eagles was based on the importance of affected habitat type, habitat location, and changes in habitat quality. *Adverse impacts* are defined as reduced area or reduced quality of bald eagle habitat. *Beneficial impacts* increase the area or improve the quality of bald eagle habitat.

The impact intensities for bald eagle are defined as follows:

- **Minor:** Effects on bald eagle habitat quality would not be expected to be outside the natural range of variability and would not be expected to have any notable effects on bald eagles or the natural processes sustaining habitat.
- **Moderate:** Effects on bald eagle habitat quality would cause changes to bald eagle feeding, mating, nesting, or caring for young. The effects could be intermittently outside the natural range of variability. Changes to the regional bald eagle population would be minimal.
- **Major:** Effects on bald eagle habitat quality would cause substantial changes to bald eagle feeding, mating, nesting, or caring for young. The effects would be expected to be outside the natural range of variability. Changes to regional bald eagle populations would be apparent.

### Salmon and Other Fish

This topic includes all fish species (anadromous and nonanadromous) that use Brooks River and surrounding wetland habitats at some time during the populations' life cycles. The analysis of impacts was based on changes to aquatic habitat quality due to changes in water surface area, water quality, and/or riverbed substrate area. *Adverse impacts* reduce the area or quality of fish habitat; *beneficial impacts* increase the area or improve the quality of fish habitat.

The intensities of impacts on salmon and other fish are defined as follows:

- **Minor:** Effects on fish habitat quality would not be outside the natural range of variability and would not be expected to have any notable changes to native fish or the natural processes sustaining aquatic habitat.
- **Moderate:** Effects on fish habitat quality could be intermittently outside the natural range of variability and would result in some changes to native fish or the natural processes sustaining aquatic habitat. Changes to the regional fish populations would be minimal.
- **Major:** Effects on fish habitat area or quality would be expected to be outside the natural range of variability and would result in substantial changes in native fish or the natural processes sustaining aquatic habitat. Changes to regional fish populations would be perceptible.

### Wetlands and Upland Vegetation

This impact topic covers wetlands and all vegetation within the project area. Measurement of impacts was based on area, quality, or continuity of wetlands and upland vegetation communities. Affected wetland values could include habitat, biomass production, groundwater recharge/discharge, water quality control, and flood control. *Adverse impacts* reduce the area, reduce the quality, or disrupt the continuity of wetlands or upland vegetation communities. *Beneficial impacts* increase the area, improve the quality, or enhance the continuity of wetlands or upland vegetation communities. (**Note:** Wetland impacts are also addressed in appendix D.)

The following thresholds define the intensity of the impacts on wetlands and vegetation:

- **Minor:** Effects on wetland area, quality, or continuity would be slight. The overall viability of the wetland resource(s) or upland vegetation would not be affected. Effects on upland vegetation communities would be slight. This could include changes in abundance, distribution, or composition of individual plant species, but would not involve changes that would affect the viability of the local vegetation communities.
- **Moderate:** Effects on wetland(s) would be sufficient to cause measurable changes in wetland area, quality, or continuity. Small losses or gains of wetland acreage could occur. Effects on upland vegetation communities would result in measurable changes in abundance, distribution, or composition of individual plant species and could affect the viability of portions of the local vegetation communities.
- **Major:** Effects on wetland(s) would result in measurable change to all three parameters (area, quality, and continuity). Losses or gains of wetland acreage would occur. Effects on upland vegetation communities would either be severe or highly favorable. This could include changes in abundance, distribution, or composition of individual plant species and would affect the viability of large areas of the local vegetation communities and possibility surrounding communities.

## Hydrology and Floodplains

This impact topic covers changes to the Brooks River hydrology and floodplains. Impacts were determined based on river water flow, hydraulics, channel and riverbank erosion, and river geomorphology during both low and high river flows. *Adverse impacts* reduce hydrological functions and values for natural river and floodplain processes; *beneficial impacts* improve hydrological functions and values for natural river and floodplain processes. (**Note:** Floodplain impacts are also addressed in appendix D.)

The impact intensities for hydrology and floodplains are as follows:

- **Minor**: Isolated and minimal changes to hydrology, channel or bank erosion, river geomorphology, or floodplain processes could occur within the project area but would not be outside the range of natural variability. These changes would not have any measurable effect on the overall hydrologic system of the area.
- **Moderate**: Multiple changes to hydrology, channel or bank erosion, river geomorphology, or floodplain processes would occur in the project area and could exceed the range of natural variability. These changes could have detectable effects on the overall hydrological system of the project area.
- **Major:** Multiple substantial changes to hydrology, channel or bank erosion, river geomorphology, or floodplain processes would occur in the project area and far exceed the range of natural variability. These changes would have substantial effects on the overall hydrologic system of the project area.

### Natural Soundscape

- **Short-term impacts:** Impacts would last during implementation and up to one year after the project is completed.
- **Long-term impacts:** Impacts would last more than one year after project is completed.

The impacts on the natural soundscape were based on the type, intensity, and consistency of human-induced sounds. *Adverse impacts* reduce the quality of the natural soundscape, while *beneficial impacts* improve the quality of the natural soundscape.

The intensities of the impacts on the natural soundscape are defined as follows:

- **Minor:** Noise would be greater than natural ambient sound levels for a small portion of the day, and/or there would often be substantial periods of time between noise events. Noise would rarely cover up or mask natural ambient sounds in the area.
- **Moderate:** Noise would often be greater than natural ambient sound levels for part of the day, but there still would be large periods of time between noise events. Although noise would often cover up or mask natural ambient sounds, there still would be many opportunities to hear natural ambient sounds in the area.
- **Major:** Noise would be greater than natural ambient sound levels for most of the day, and/or there would rarely be more than short periods of time between noise events. Noise would frequently mask natural ambient sounds, and there would be few, if any, times that natural ambient sounds would be heard in an area.

## CULTURAL RESOURCES

The effects of the alternatives on archeological resources; historic structures, sites, and cultural landscapes; and ethnographic resources are described in this chapter.

### Section 106 of the National Historic Preservation Act and Impacts to Cultural Resources

Impacts on cultural resources are described in terms of type, context, duration, and intensity, which is consistent with the regulations of the Council on Environmental Quality that implement the National Environmental Policy Act. These impact analyses are intended, however, to comply with the requirements of both that act and section 106 of the National Historic Preservation Act. In accordance with Advisory Council on Historic Preservation (ACHP) regulations implementing section106 of the National Historic Preservation Act (36 CFR 800, *Protection of Historic Properties*), impacts on cultural resources were also identified and evaluated by (1) determining the area of potential effects; (2) identifying cultural resources present in the area of potential effects that are either listed in or eligible to be listed in the National Register of Historic Places; (3) applying the criteria of adverse effect to affected national register eligible or listed cultural resources; and (4) considering ways to avoid, minimize or mitigate adverse effects.

Under ACHP regulations, a determination of either *adverse effect* or *no adverse effect* must also be made for affected national register-listed or -eligible cultural resources. An *adverse effect* occurs whenever an impact alters, directly or indirectly, any characteristic of a cultural resource that qualifies it for inclusion in the National Register of Historic Places, e.g., diminishing the integrity (or the extent to which a resource retains its historic appearance) of its location, design, setting, materials, workmanship, feeling, or association.

Adverse effects also include reasonably foreseeable effects caused by the alternatives that would occur later in time, be farther removed in distance, or be cumulative (36 CFR 800.5, *Assessment of Adverse Effects*). A determination of *no adverse effect* means there is an effect, but the effect would not diminish the characteristics of the cultural resource that qualify it for inclusion in the national register.

CEQ regulations and NPS Director's Order 12: *Conservation Planning, Environmental Impact Analysis, and Decision-making* also call for a discussion of mitigation, as well as an analysis of how effective the mitigation would be in reducing the intensity of a potential impact, e.g., reducing the intensity of an impact from major to moderate or minor. Any resultant reduction in intensity of impact due to mitigation, however, is an estimate of the effectiveness of mitigation under the National Environmental Policy Act only. It does not suggest that the level of effect as defined by section 106 is similarly reduced. Cultural resources are nonrenewable resources, and adverse effects generally consume, diminish, or destroy the original historic materials or form, resulting in a loss in the integrity of the resource that can never be recovered. Therefore, although actions determined to have an adverse effect under section 106 may be mitigated, the effect remains adverse.

For the action alternatives section 106 summaries are included in the impact analyses for archeological resources; ethnographic resources; historic structures, sites and districts; and cultural landscapes. The section 106 summary is an assessment of the effect of the undertaking (implementation of the alternative), based upon the criterion of effect on national register eligible or listed cultural resources only, and criteria of adverse effect found in ACHP regulations.

From a NEPA standpoint, the following definitions for duration and context apply to all of the cultural resources being analyzed:

**Duration**

- **Short-term impacts:** Changes that occur to cultural resources during project implementation.
- **Long-term impacts:** Changes that occur after (and extend beyond) project completion.

**Context**

- **Localized impacts:** Effects would occur to cultural resources (e.g., archeological and ethnographic resources/sites, historic structures, cultural landscape features) and/or portions of these resources within the boundaries of the Brooks River Archeological District.
- **Regional or parkwide impacts:** Effects on cultural resources would occur beyond the Brooks River Archeological District and would extend to other areas of cultural significance throughout and beyond the park and preserve.

## Archeological Resources

The impacts on archeological resources are described in terms of the potential to diminish or protect the ability of archeological resources to yield information important in prehistory or history.

The intensities of impacts on archeological resources are defined as follows:

- **Minor:** *Adverse*—Disturbance of a site(s) results in little loss of integrity. *Beneficial*—Minimal efforts are undertaken to maintain and preserve a site(s) in situ.
- **Moderate:** *Adverse*—Site(s) is disturbed with a noticeable loss of integrity, but is not obliterated.

*Beneficial*—Efforts are undertaken to stabilize a site(s) in situ.
- **Major:** *Adverse*—Site(s) is disturbed to the extent that most or all of its informational potential is lost or obliterated. *Beneficial*—Measures to preserve a site(s) in situ include more extensive and/or active intervention.

## Historic Structures, Sites, and Cultural Landscapes

Impacts on these cultural resources were measured by analyzing the potential to diminish or protect their integrity or character-defining features.

The impact intensity thresholds for historic structures are defined as follows:

- **Minor:** *Adverse*—Impacts would affect a character-defining feature(s), but would not diminish the overall integrity of the structure, site, or cultural landscape. *Beneficial*—Stabilization/preservation of character-defining features is conducted in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties*.
- **Moderate:** *Adverse*—Impacts would alter a character-defining feature(s), diminishing the overall integrity of the structure, site, or cultural landscape to the extent that its national register eligibility could be jeopardized. *Beneficial*—Rehabilitation is conducted in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties*.
- **Major:** *Adverse*—Impacts would alter a character-defining feature(s), diminishing the integrity of the structure, site, or cultural landscape to the extent that it would no longer be eligible to be listed in the national register. *Beneficial*—Restoration is conducted in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties*.

## Ethnographic Resources

Impacts on ethnographic resources were analyzed by examining changes in the potential to diminish or protect the integrity of (and access to) resources and places having particular importance and value to culturally associated groups

The following intensity thresholds were used to describe impacts to ethnographic resources:

- **Minor:** *Adverse*—Impacts would be slight and would neither appreciably alter resource conditions, such as traditional access or site preservation, nor alter the relationship between the resource and the associated group's body of beliefs and practices. *Beneficial*—Impacts would allow access to and/or accommodate a group's traditional practices or beliefs.
- **Moderate:** *Adverse*—Impacts would be apparent and would alter resource conditions or interfere with traditional access, site preservation, or the relationship between the resource and the associated group's beliefs and practices, even though the group's practices and beliefs would survive. *Beneficial*—Impacts would facilitate traditional access and/or accommodate a group's practices or beliefs.
- **Major:** *Adverse*—Impacts would alter resource conditions. Proposed actions would block or greatly affect traditional access, site preservation, or the relationship between the resource and the associated group's body of beliefs and practices to the extent that the survival of a group's

beliefs and/or practices would be jeopardized. *Beneficial*—Impacts would encourage traditional access and/or accommodate a group's practices or beliefs.

## VISITOR EXPERIENCE

Visitor experiences are multidimensional and involve a variety of characteristics or components. This impact analysis considers various qualitative aspects of visitor use and experience in the Brooks River Camp area, including recreational opportunities (such as visitor activities), visitor use levels and crowding, visitor transportation and access, and visitor safety.

- **Recreational Opportunities**—analyzes the opportunity for visitors to participate in various kinds of recreational activities. For example, fishing, watching bears, and hiking are all activities commonly participated in by Brooks Camp visitors. This analysis identifies whether visitors would have greater or fewer opportunities to participate in recreational activities.
- **Visitor Use Levels and Crowding**—examines whether the proposed alternative would have an effect on visitor use levels and perceived crowding in the Brooks Camp area, especially at key attraction areas and points in time that are integral to the overall experience such as when watching bears from a platform during fish spawning runs.
- **Visitor Transportation and Access**—describes the impacts associated with the way in which visitors arrive to and circulate through the Brooks Camp area, including accommodations for visitors with mobility impairments.
- **Visitor Safety**—focuses on potential risk or safety concerns that may arise as a direct result of the actions proposed in each alternative. Very few incidents have historically occurred at Brooks Camp. Nevertheless, this analysis focuses on the likelihood of the alternative to improve or reduce the potential risks to visitor safety, particularly associated with human-bear and pedestrian-vehicle interactions or conflicts.

The analysis was based on the results of public scoping, scientific research, and management experience. Other information that was considered in the analysis includes the park's annual visitor use levels (information was gained from the NPS Public Use Statistics Office), including overnight stays and travel and tourism data. Qualitative measures from these sources were used to determine the overall effect on visitor experience.

The duration and context of visitor experience impacts are defined as follows:

**Duration**

- **Short-term impacts:** Changes that occur during implementation and up to one year after the project is completed.
- **Long-term impacts:** Changes that occur more than one year after the project is completed.

**Context**

- **Localized impacts:** Effects would occur in the project area and/or in the immediate vicinity of the project area, including the lands and waters of Brooks Camp, the mouth of Brooks River, the adjacent Naknek Lake shoreline, and areas along the river corridor within sight or sound.
- **Regional or parkwide impacts:** Effects would occur beyond the vicinity of the project area and would extend to the surrounding

areas throughout and beyond the park.

*Adverse impacts* are considered changes that would reduce visitor experience quality, including recreational opportunities, use levels, visitor access and accessibility, and visitor safety. *Beneficial impacts* are changes that would improve visitor experience quality, including recreational opportunities, use levels, visitor access and accessibility, and visitor safety.

The intensities of impacts to visitor experience are defined as follows:

- **Minor**: Changes to visitor experience would be slight, affecting a few visitors (less than 10 percent), and not appreciably affect recreational opportunities, use levels, visitor access, and risk to visitor safety in the Brooks Camp area.
- **Moderate:** Changes to visitor experience would affect many visitors (up to 50 percent) and result in some changes to recreational opportunities, use levels, visitor access, and risk to visitor safety in the Brooks Camp area.
- **Major**: Changes to visitor experience would affect most visitors (greater than 50 percent) and result in several changes to recreational opportunities, use levels, visitor access, and risk to visitor safety in the Brooks Camp area.

## VISUAL/SCENIC RESOURCES

This impact topic focuses on changes this project would have to visual resources or to the natural scenery of the Brooks Camp area. The analysis focuses on the immediate Brooks Camp area and in particular those sites affected by the proposed project—the current and proposed bridge and barge landing sites. Bridge, boardwalk, and barge landing infrastructure and design elements are considered in relation to the surrounding natural landscape. The analysis is based on professional judgment and design renderings and principles.

The duration of impacts would be the same as previously described for visitor experience. The context for scenic resources impacts includes both views from the immediate vicinity of the bridge, such as along the shores of the river or from boardwalks, as well as from a distance, such as from a plane. *Localized impacts* would be considered those effects that would occur in the project area and/or in the immediate vicinity of the project area, including the lands and waters of Brooks Camp, the mouth of Brooks River, the adjacent Naknek Lake shoreline, and areas along the river corridor within visual or audible range. *Regional or parkwide impacts* would include effects that would occur beyond the vicinity of the project area and would extend to the surrounding landscape, throughout and beyond the park.

Impacts on visual/scenic resources were based on qualitative measures of the extent to which the existing and proposed Brooks River bridge, barge landing, and related infrastructure would intrude into the predominantly natural landscape. Impacts are based on the extent and type of development compared to the foreground, middle ground, and background of the viewshed. An *adverse impact* would increase the extent to which the bridge and supporting infrastructure intrude into the natural landscape; a *beneficial impact* would decrease the extent to which the bridge and related infrastructure intrude into the surrounding natural landscape.

The impact intensity of a development on visual resources would depend on the type of development, its location, and what mitigation is applied. For example, a development in the foreground of a viewshed has a much larger impact than the same development 3 miles away. Mitigation could involve unobtrusive design or colors. All three factors are evaluated together to determine the level of impact a proposed development would have.

For the purposes of this analysis, a viewshed is defined as the landscape seen from key observation points identified in "Chapter 3: Affected Environment." The foreground is defined as that part of the viewshed from the observation point to the first horizon/line of sight (e.g., a ridge top) or a line 2 miles away, whichever is closer. Middle ground is defined as that part of the viewshed 2 to 5 miles from the observation point. The background is everything more than 5 miles from the observation point.

The intensities of impacts on visual/scenic resources are as follows:

- **Minor:** The action would be noticeable to some observers but would not detract from or improve natural views. There could be small changes to existing form, line, texture, or color in the background.
- **Moderate:** The action would be noticeable to most observers and may detract from or improve natural views in a limited portion of a viewshed. There could be modest changes to existing form, line, texture, or color in the middle ground or background.
- **Major:** The action would be immediately noticeable and would detract from or improve views of the natural setting in most of a viewshed. It would result in large changes to existing form, line, texture, or color in the foreground, middle ground, or background, or portions of the natural viewshed would be obstructed.

## SOCIOECONOMICS

This section focuses on the effects of the alternatives on components of the economy, including employees and employers. Available economic, visitor use, and park data were used to identify and evaluate likely effects. The analysis relied on the following main factors in the alternatives:

- construction spending and jobs
- federal spending on equipment, supplies, and staffing
- commercial services and CUA services in the park
- visitor spending

The duration and context of socioeconomic impacts are defined as follows:

### Duration*

- **Short-term impacts:** Effects that occur during project implementation and up to three years after the project is completed.
- **Long-term impacts:** Effects that occur beyond three years after the project is completed.

[*Note: *Duration* differs from other impact topics; the longer time frame better captures general time frames of socioeconomic conditions in response to changes in management actions.]

### Context

- **Localized impacts:** Effects would occur within Bristol Bay Borough, including the communities of King Salmon, Naknek, and South Naknek.
- **Regional impacts:** Effects would occur over a broad geographic region of south central and southwest Alaska, including communities in Bristol Bay Borough, as well as in Anchorage and communities on the Alaska Peninsula, Kenai Peninsula, Lake

and Peninsula Borough, and Kodiak Island.

- **Multistate:** Effects would occur in Alaska as well as areas in the Lower 48.

*Adverse impacts* are changes that would diminish the social and economic environment.

*Beneficial impacts* are changes that would improve the social and economic environment.

The intensities of socioeconomic impacts are defined as follows:

- **Minor:** The action would affect few people and would not be expected to alter the social and economic environment.
- **Moderate:** The action would affect a relatively small number of people and could alter the social and economic environment.
- **Major**: The action would affect a large number of people and could have a substantial effect on the social and economic environment.

# CUMULATIVE IMPACT ANALYSIS

A cumulative impact is described in CEQ regulation 1508.7 as follows:

> *Cumulative impacts* are the impacts that result from incremental impacts of the action when added to other past, present, and reasonably foreseeable actions, regardless of what agency (federal or nonfederal) or person undertakes such other action. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over time.

Each cumulative impact analysis is additive, considering the overall impact of the alternative when combined with effects of other actions—both inside and outside the park—that have occurred or that would likely occur in the foreseeable future.

To determine potential cumulative impacts, past, present, and reasonably foreseeable future potential actions and developments within and surrounding Brooks Camp were considered by the planning team. The primary area considered for cumulative impacts is the Naknek River drainage basin, including Lake Brooks and part of Naknek Lake. The area considered for socioeconomic cumulative impacts was broader, primarily focused on the Bristol Bay Borough, including the communities of King Salmon and Naknek.

Katmai National Park and Preserve is a remote park. Brooks Camp is only accessible by air or boat, and it is surrounded by federal lands (with a few native allotments). Virtually all of the actions considered in the cumulative impact analysis were NPS actions. No new actions or developments are foreseen adjacent to the Brooks Camp area that would affect park resources and uses. No changes in landownership and management of adjacent lands are expected to occur that would directly or indirectly affect the area. No new uses of the area or changes in transportation to Brooks Camp are considered likely, independent of what is proposed in the alternatives. Brooks Camp visitation has risen in the recent past, but it is not known how much use will increase in the future.

## PAST ACTIONS

Past NPS actions considered in the cumulative impact analysis include the following:

- past actions that have occurred in the Brooks Camp area (e.g., initial construction of visitor and operational facilities, installation of the floating bridge, and improvements to the Brooks Camp picnic area)
- past, present, and future operation of the above facilities and infrastructure, including repairs

## PRESENT AND FUTURE ACTIONS

The development of the Valley Road Administrative Area and removal of the facilities at Lake Brooks are ongoing and future actions that are considered in the cumulative impact analysis, while the relocation of Brooks Camp to the Beaver Pond Terrace area is considered as a future action. Map 2 in chapter 1 shows the locations of all of these facilities.

Of all the present and future actions considered in this cumulative impact analysis, the relocation of Brooks Camp would have by far the highest potential for creating an additive impact to the alternatives considered in this environmental impact statement. (See chapter 1 for the probable timeline for relocation of the Brooks Camp facilities.)

For the cumulative impact analysis it is expected that visitation at Brooks Camp would not substantially change over the time frame being analyzed.

## Valley Road Administrative Area

The Valley Road Administrative Area complex would include maintenance facilities and employee housing (two duplex cabins), which would be replaced or relocated from Brooks Camp and Lake Brooks. The goal is to reduce administrative activity at Brooks Camp to protect natural and cultural resources, reduce the potential for human-bear encounters, and address failing utilities and infrastructure. The placement of facilities at the Valley Road Administrative Area will take place in a sequential process as funding and labor become available. The maintenance building is largely complete, and utility infrastructure construction is in progress. The existing gravel pit along the Valley of Ten Thousand Smokes Road would be used as a gravel source.

**Maintenance Facility.** The National Park Service has taken steps to relocate some maintenance facility operations to the south side of the river to address goals identified in the 1996 development concept plan (NPS 1996a). In 2008, site development for the new maintenance building area within the Valley Road Administrative Area was initiated. The area is intended to serve as the core area for electrical, water and sewer line utilities for the south side of Brooks Camp. In addition, the Lake Brooks' generators and fuel storage would be relocated to the new maintenance facility area. During 2008, the access road and gravel pad were constructed. The gravel pad is approximately 250 ft by 200 ft, has a 400-foot-long access road, and would support the new maintenance facilities. This project is expected to be completed in 2013 (NPS 2009e).

**Housing.** Employee housing would be located on a single loop road, which would be constructed adjacent to the recently constructed gravel pad for the new maintenance facility. The west side of the loop would contain service buildings, a community building, and housing for NPS employees, while the east side of the loop would contain building sites and service facilities for the Brooks Lodge concessioner. This layout incorporates long sweeping curves to enhance visibility for potential bear encounters. The loop maintains its role as an infrastructure corridor, minimizing the impact of development on the forest vegetation. The utilities (water, wastewater, power, heat) would run on a central spine; the building placement on each side of the path would allow branching of the utility lines (NPS 2009e).

A driveway would connect the head of the loop with the Valley of Ten Thousand Smokes Road. The gravel roadway will be approximately 1,800 ft long and 11 ft wide. A utility corridor/foot trail approximately 280 ft long and 8 ft wide would connect with the maintenance facility (NPS 2009e).

The project site would be cleared of the existing trees and stripped of the organic materials only as required for the construction of the access road, housing units, and utilities. Approximately 6 acres will be cleared. Vegetation clearing for building construction or relocation would occur in phases and only when a facility is ready to be sited. A 30-foot fire perimeter would be maintained around all structures (NPS 2009e).

## Lake Brooks Facilities

Maintenance facilities at Lake Brooks consist of several small sheds totaling approximately 2,300 $ft^2$ of interior floor space, and approximately 32,000 $ft^2$ (0.73 acre) of yard space, all of which are located immediately adjacent to the 1 mile, 14-foot-wide road from Lake Brooks to Brooks Camp. All facilities on the shore of Lake Brooks would be removed and the area revegetated, except the historic fisheries cabin. Other structures associated with the fisheries cabin would either be preserved and adaptively reused or removed. The cabin will be retained and used as a visitor contact station and shuttle stop during times when floatplanes land on Lake Brooks (NPS 1996a). Any of these structures nominated for the National Register of Historic Places would undergo consultation with the Alaska SHPO before any adverse action is taken.

### Beaver Pond Terrace Area

Brooks Camp (including the lodge) would be moved to the Beaver Pond Terrace area south of Brooks River. Proposed facilities as described in the 1996 *Brooks River Area—Final Development Concept Plan and Environmental Impact Statement* would include a lodge and related facilities, campground, and interpretive facilities. A one lane, hardened gravel access road (about 0.5 mile long and 14 ft wide) would be constructed to connect the Valley of Ten Thousand Smokes Road with the Beaver Pond Terrace area (NPS 1996a).

### North Side of Brooks River

After relocation of Brooks Camp, the only facilities on the north side of the river would be the existing floatplane access, ranger/visitor contact station, and day use facilities (vault toilet and picnic area).

**Note:** The cumulative impact analysis does not address the future of the national register-listed ranger station, boathouse, and other potential historic structures in the area. Although the 1996 development concept plan called for the relocation of Brooks Camp, the above structures were subsequently determined to be historic structures. It is premature to analyze what would happen to these facilities in this current document; before the actual relocation of Brooks Camp, the future of the structures would be reevaluated and the effects of these options would be assessed.

# NATURAL RESOURCES

## BROWN BEAR

### Alternative 1

**Analysis.** Under Alternative 1, brown bears (*Ursus arctos*) would continue to encounter NPS staff, contractors, and pedestrians at ground level between Brooks Camp and the bus parking area and along the south bank and near the river mouth during barge landing activities. Certain portions of the trail/road between Brooks Camp and the bus parking area would continue to have high levels of pedestrian use. In the areas near the floating bridge access points at the Corner and along the south bank, park visitors and NPS service vehicles would continue to congregate and encounter bears while waiting to cross the floating bridge if a bear forces adherence to the 50-yard buffer regulation. Under alternative 1, this would continue to result in extended periods with people standing near bears at ground level. Generally, there would continue to be no clear path from along the north bank of Brooks River to the Naknek Lake beach that bears could traverse without the likelihood of encountering people at ground level.

This frequency of encounters between bears and humans would further contribute to human habituation of bears along the Brooks River corridor. In addition to reinforcing the habituation of the bears that have occupied the Brooks Camp area in past years, these interactions with humans would also help habituate bear cubs and new bears that move into the area. As described in chapter 3, the human habituation of bears can have adverse effects on bears, particularly if the bears move off protected park lands. Habituated bears may have a greater tendency to approach people, which may lead to dangerous interactions resulting in bears being shot and injured or killed.

These effects are most important from late August through September, when bear activity near the river mouth and along the lake shoreline peaks. The presence of the floating bridge across the full width of the river during peak bear use periods would continue to be an impediment to movement of bears up and down the river—the bridge would continue to be an obstacle to bears walking in this part of the river. However, the bridge has been present for years and bears have adapted to its presence. Bears would continue to be able to swim under the bridge and walk on land around the bridge. This would have no notable effects on brown bear numbers or habitat.

With the continuation of the ground level trails in this alternative, brown bears and humans that do not see one another would continue to have ground level encounters at very close distances. This would continue the risk for human-bear interactions and/or human habituation of bears. Although it would be a violation of park policy, some park visitors would likely continue to disregard the 50-yard buffer from bears at ground level.

Because of the limited construction season, ongoing Brooks Camp operations and maintenance work would continue to necessitate relatively frequent barge loading/unloading activities near the river mouth during the summer when bear activity in the area peaks. Bear activity at the river mouth would continue to be disturbed and bears displaced by the presence of people and machinery, affecting their fishing and obtaining food from this area. There also would continue to be the potential for human-bear confrontations and bears being injured or killed.

With the ongoing ground level human activity along the trails through wooded areas, bears would continue to have limited areas in which they can reliably expect to rest and/or avoid ground level disturbances from humans in and around nearby visitor use areas of the project area and the river.

Overall, alternative 1 would continue to result in a long-term, moderate, adverse, and primarily localized impact to brown bears. (Some parkwide adverse effects could occur if habituated bears from Brooks Camp move to other areas in the region and retained their habituated behavior.) The effects on brown bear habitat could cause or continue to cause changes to brown bear feeding, resting, mating, or caring for young. These adverse effects relate to the continued types and levels of human-bear interactions at ground level, habitat disturbance, and human habituation of bears. The interactions, disturbances, and habituation would primarily result from continuing park visitor activities and park staff/concessioner activities during the visitation season. It is believed that less than half of the brown bears using the Brooks River area would be affected by continuing actions in alternative 1, and changes to the regional brown bear population would be minimal.

**Cumulative Impacts.** Various other past, present, and reasonably foreseeable future projects in and near the project area have and would continue to affect brown bears and their habitat. These projects relate to facility development, recreation access, site restoration, and program development.

Multiple past actions have had notable effects on brown bears in the project area, particularly in the vicinity of Brooks Camp and along the Brooks River corridor. Most of these past actions have had adverse effects on habitat and have primarily involved the facility development and expanded recreational access associated with Brooks Camp over the years (e.g., lodge, campground, visitor center, restrooms, operations facilities, utilities, guest cabins, staff housing, floating bridge, trails, and viewing platforms). The short-term adverse impacts relate to the temporary noise and human activity disturbances associated with the construction and material movement at each respective development or recreation improvement. These short-term effects could alter bear behavior, such as feeding and resting, and could temporarily displace individual bears into less desirable areas. The long-term effects have generally resulted from displaced bear habitat from facility footprints, fragmented habitat from roads and trails, and/or reduced quality of bear habitat from the resulting regular human activity in all of these areas. When all of the existing (past) developments in the Brooks River area are considered, a total of approximately 85 acres of bear habitat have been modified or lost to development (Brooks Camp: 6 acres; Brooks River area: 40 acres; Brooks Falls trail: 4 acres; Lake Brooks development: 3 acres; contractor camp: 2 acres; and access roads: 30 acres). Although these past actions generally have had little effect on local and regional bear population numbers, they have certainly led to more human-bear interactions and human habituation of bears over time.

In addition, present and reasonably foreseeable future actions would also affect brown bear habitat in the project area. Such actions could include additional facility improvements around the Brooks River area (e.g., the maintenance and housing development at the Valley Road Administrative Area); the removal (and site restoration) of Lake Brooks maintenance and housing facilities; and the overall relocation of Brooks Camp and its associated uses to the south of Brooks River (near Beaver Pond Terrace). When all new developments are considered, along with areas where vegetation would be restored (e.g., areas where current facilities are on the north side of the river), a total of approximately 57 acres of bear habitat would be modified or lost to development in the future (proposed Beaver Pond Terrace: 45 acres; Valley Road Administrative Area: 15 acres; and the removal of facilities on north side of river and at Lake Brooks: 3 acres and 0.3 acre, respectively). Most of this habitat, however, would not be prime bear habitat. The short-term effects of these actions would relate to the disturbances to bear habitat from construction and project mobilization activities, including the transport of materials through the area's roads/trails. The adverse, long-term effects of some of these actions could involve further displacement and/or fragmentation of bear habitat in localized parts of the project area from facility improvements or expansions and the development of the Beaver Pond Terrace area and the Valley Road Administrative Area. The present and future actions would result in the removal of substantial levels of facilities and human activity from prime bear habitat in the Brooks River corridor (e.g., near the Corner area, river mouth, Naknek Lake shoreline, and near the Lake Brooks outlet into Brooks River). Restoration of this habitat would benefit brown bears.

When the likely adverse effects of alternative 1 are added to the effects of these other past, present, and reasonably foreseeable future actions, there would be a long-term, moderate, adverse, and primarily localized cumulative impact on brown bears. (Parkwide cumulative impacts could occur if bears that become habituated to humans at Brooks Camp leave the project area and move into other areas in the region.) Alternative 1 would contribute an appreciable, adverse increment to the overall moderate, adverse cumulative impact.

**Conclusion.** Alternative 1 would result in continuing long-term, moderate, adverse, and localized impacts on the brown bear. Adverse parkwide effects could occur if habituated bears from Brooks Camp move in to other areas in the region. These adverse effects would primarily result from continuing ground level human-bear interactions between Brooks Camp and the bus parking area on the south side of Brooks River. The interactions would continue to result from the physical overlap of human high use areas at ground level (visitors and staff) and brown bear high use areas (along the river, near the mouth, and along Naknek Lake). Occasional unsafe human-bear interactions would be expected to continue as well as the resulting human habituation of bears, with the potential for bears being injured or killed.

## Alternative 2

**Analysis.** The proposed elevated bridge would eliminate the need for a floating bridge, which is an obstruction to bears moving up and down Brooks River (while in the water). An elevated bridge should allow for greater access to habitat, less stress, and easier movement by bears than under the current situation. Bear numbers could also increase in this area (NPS 2009f). In addition, bears would have an open travel route from the lower Brooks River to Naknek Lake via the river's north bank and the Corner and avoid interacting with humans at ground level, particularly during late summer and autumn peak use times. This could also provide greater access to habitat, reduce stress in bears, and increase the number of bears using the area.

Under alternative 2, bears would regularly encounter pedestrians (i.e., visitor groups, individual visitors, and staff) elevated overhead on the boardwalk and bridge instead of at ground level. The decks of the bridge and boardwalks would be about 10 ft above the river and ground, respectively. Alternative 2 (map 4) includes a total of about 2,045 linear ft of elevated boardwalks available for pedestrian use (760 ft for the north boardwalks, 925 ft for the south boardwalks, and 360 ft for the bridge). Approximately 1,610 ft of this total length would be used mostly by park visitors. The use of these elevated boardwalks would result in bears having substantially less interactions with human pedestrians at ground level. People moving along raised boardwalks would generally affect bear behavior less than they would at ground level on the same trails that bears use (NPS 2009f). Bears would also have more advanced warning of approaching humans because people walking on a wooden boardwalk deck would typically emit a louder noise than walking on soil or gravel, and views of approaching humans would be less obstructed by thick ground vegetation. This would benefit the bears by reducing the potential for dangerous incidents (for the involved bears or humans)—there would be a lower likelihood of bears being injured or killed. These effects could also reduce the potential for human habituation, which could benefit the bears if they move out of the Brooks Camp area into other areas in the region.

Most bears over time would be expected to become accustomed/habituated to the existence and use of the new bridge and boardwalks (NPS 2009f). However, behavioral evidence from bears near the existing elevated boardwalk to Brooks Falls indicates that overhead human activity could intimidate, alter movement/behavior of, or possibly scare off some individual bears (DeBruyn et al. 2004). Thus, some bears may not adapt well to the 1,610 linear ft of elevated travelways for pedestrians in this alternative. This could result in these individuals altering their preferred river access routes or avoiding river stretches that provide the most favorable salmon fishing. Some bears may avoid the new structures for the short-term, but then return to the area. Some may choose to avoid the area entirely because of overhead pedestrian activity. Although humans would be separated from bears by about 10 vertical ft, park visitors on the bridge or boardwalks would not be asked/required to apply the 50-yard buffer rule that they would otherwise use at ground level. Thus, humans would regularly be near bears near the mouth of the river and near Brooks Camp under this alternative. This could contribute to human habituation of bears.

Traffic patterns and noise on raised structures have at least as much potential to affect bear behavior as the structures themselves (NPS 2009f). This alternative includes 995 linear ft of elevated access for motorized vehicles (425 ft for the north boardwalk/ramp, 360 ft for the bridge, and 210 ft for the south ramp). Bears would encounter NPS/concessioner service vehicles overhead on the boardwalk/bridge structure instead of at ground level, resulting in bears having less direct ground level interaction with vehicles and less potential for habituation. However, some bears might not adapt well to overhead vehicles and could avoid the area entirely.

In alternative 2 bears would be exposed to increased noise from motorized vehicles running on the wood deck of the bridge and boardwalks instead of gravel or soil (for about 995 ft). In addition, motorized vehicles would likely make additional noise while climbing the vehicle ramps near the south bank of the river and near the Corner. Increased noise in the area could alter the feeding and resting behavior of some bears.

Human activity (pedestrians and NPS/concessioner vehicles) would be more visible to bears that are farther upriver because of the 10-foot elevation of the bridge and the exposed portions of the north boardwalk that would run to the west of existing shrub and tree cover. However, wooded areas on the south side of the river would provide some visual boardwalk screening to views from both upriver and downriver. Although some of the visual disturbance would be at a distance, some bears may alter their behavior or activity after seeing more human activity in the area. Sounds from human activity on the boardwalks and bridge would carry farther because of the elevation of the activity and the placement of the elevated walkway outside wooded areas that would otherwise buffer the noise. Assuming there is judicious use of quiet vehicles on the bridge and boardwalks, there should be little effect on most bears in the area (NPS 2009f). The most notable areas of sound exposure would be on the bridge (exposed to upriver and downriver areas) and along the north boardwalk, which would be partially exposed to upriver areas. Trees and shrubs on the south side of the river would provide some screening that would limit noise propagation. However, even with the use of relatively quiet vehicles, elevating noise sources may result in some bears hearing more nearby human activity and altering their behavior or activity.

Under this alternative, bears would encounter less ground level human activity along the river corridor because the elevated structures would route pedestrians across the river with minimal time congregating along the north or south bank waiting to cross the floating bridge.

Bears would have a region of wooded area with minimal ground level human activity near the mouth of the river (on both north and south sides) where they could expect to rest or forage without human intrusion. Most notably under this alternative, the north boardwalk would avoid the Corner area (which is currently fragmented by the ground trail/road). Removing the existing trail through the Corner would allow for increased use of the trail, riverbank, woods, and beach around the point by bears (NPS 2009f). This effect would be most valuable to the bears from late August through October when the bears congregate near the mouth of Brooks River to feed on dead or dying salmon.

Under alternative 2 the separated vehicle ramp and pedestrian boardwalk on the north side of the river would enlarge the area of human activity somewhat near Brooks Camp. Similarly, the bus parking area south of the river would be served by two separate travel routes from the bridge (elevated boardwalk with pedestrian activity and the existing service road for NPS vehicles). Under alternative 1 only one shared access route is used for both pedestrians and vehicles on both sides of the river. The divergences of the pedestrian access and vehicle access in alternative 2 would create two separate corridors of regular human activity on each side of the Brooks River (although NPS vehicle use would be relatively intermittent compared to visitor/pedestrian use). In turn, this would increase the geographic area of human disturbance to bears on both sides of the river.

However, this separated boardwalk alignment would reduce the amount of pedestrian activity at ground level near the southern end of Brooks Camp because it would route pedestrians directly to the Brooks Camp lodge. The boardwalk alignment would provide a buffer to the west and north of the Corner area where human activity would be minimal. This effect would be particularly important from late August through October when the bears frequent the Corner to access the river mouth and the Naknek Lake shoreline.

Under this alternative, the barge landing site would be moved from the river mouth to a location approximately 2,000 ft south along Naknek Lake (figure 3). Thus, brown bears that are resting or foraging along both shores of the river mouth would not encounter NPS vessels being loaded and unloaded at the barge landing site or vehicles traveling along the south bank to/from the landing on the access road (which would be reclaimed under this alternative). Relocating the facilities should substantially reduce bear impacts—more bears would likely be present in the river mouth area where they could feed on fish and fewer bears would likely be present farther away from the river corridor. The effect of this relocation would be most notable from late August through October when most of the bear activity is concentrated near the mouth of Brooks River.

However, the proposed access road that would serve the new barge landing site (figure 3) would introduce occasional human disturbances into the area between Brooks River and Beaver Pond. The roadway length would be approximately 1,500 ft, and most of the disturbances to bear habitat would involve NPS/concessioner motorized vehicle traffic. Increased noise and human disturbances along the access road and at the landing could alter bear resting, movement, and other behaviors of some bears in a new area that has not been disturbed.

The construction activities associated with the bridge and elevated boardwalks would have various adverse effects on the brown bear and its habitat. Some construction would occur for a few months each year for 3 years. Construction disturbances to bears could include heavy construction equipment operation, noise from handheld construction tools (power tools and manual), construction transport vehicles, worker voices, and generators. The degree of impact on bear habitat would be dependent on the type and intensity of the construction activity and the time of year the construction activity occurs (as it relates to the June and September peaks of bear activity in the area). Construction activity during peak feeding times in July and September-October have more potential for impacts and human-bear interaction than other months (NPS 2009f). Given the proposed construction schedule, the most notable impacts would occur (1) from late August through mid-September of the first year during the construction mobilization phase; and (2) from late June through July and from late August through October in the second year (when boardwalk decking and handrail construction takes place). To help minimize these effects, particularly during July and September, work time limits, construction noise restrictions, and other mitigation measures would be applied (e.g., limiting to small power tool use, containing construction worker food and garbage) (NPS 2009f). In spite of these mitigation measures, if hazing of bears becomes necessary, which would be a small possibility, the behavior of a few bears may be altered during the construction period and some may be temporarily displaced from areas they might otherwise use. This could affect feeding activities and competition with other bears.

The construction activities associated with the new barge landing site (figure 3), new access road (about 1,500 ft long), and restoration of the existing access road (map 4) would also have various adverse impacts on the bears. These construction and restoration activities would occur over a few months in the spring and fall of one year. Most construction impacts would result from heavy construction equipment operation (e.g., road grading), material transport vehicles, and human presence. The most notable impacts would occur during the late summer and autumn construction phase (August through mid-November), a period when the bears become very active feeding on spawned-out salmon along Brooks River. The intensity of the impact to bears would lessen as the construction activity moves farther away from Brooks River. In addition, to help minimize these effects, various mitigation measures would be applied to construction activities, such as maintaining mufflers on construction equipment and generators, limiting construction to daylight hours, and actively containing food/garbage of construction workers.

Overall, alternative 2 would result in short- and long-term, moderate, adverse, and primarily localized impacts to brown bears due to human disturbances to bears and their habitat. Short-term impacts would be due to construction activities, while long-term impacts would be due to use of the facilities. (Some parkwide adverse effects could occur if habituated bears from Brooks Camp move to other areas in the region and retained their habituated behavior.) The effects of alternative 2 on brown bear habitat could cause changes to brown bear feeding, resting, mating, or caring for young. These adverse effects relate to habitat disturbances from human activity on the proposed 2,045 ft of elevated boardwalks, increased habitat fragmentation from separated vehicle/ pedestrian travel on both sides of the river, human habituation of bears, and continued human-bear interactions at ground level (in areas where people do not use the elevated boardwalks). The interactions, disturbances, and habituation would primarily result from park visitor activities and park staff/concessioner activities during the visitation season. It is believed that less than half of the brown bears using the Brooks River area would be affected by the actions and developments in alternative 2, and changes to the regional brown bear population would be minimal.

Compared to alternative 1, alternative 2 would likely result in a decrease in adverse effects on brown bears due to the elimination of the floating bridge, the restoration of an open travel route from the lower Brooks River to Naknek Lake via the river's north bank and the Corner, and the vertical separation of humans and bears throughout the project area, which would result in less ground level interactions and possibly reduced habituation. Bears along the Brooks River corridor would also benefit from the relocation of the barge landing and access road away from the river. However, because the 50-yard horizontal buffer rule would no longer apply to people on the elevated boardwalks and bridge, this alternative would result in notably shorter horizontal distances between humans and bears. This could contribute to an increase in habituation of bears.

**Cumulative Impacts.** Various other past, present, and reasonably foreseeable future projects in and near the project area have and would continue to affect brown bears and their habitat. These projects relate to facility development, recreation access, site restoration, and program development, and have affected (or would affect) the Brooks River area as described in the preceding "Cumulative Impacts" section under alternative 1.

When the likely effects of alternative 2 actions (e.g., construction and use of the bridge, boardwalks, and barge landing site) are added to the effects of other past, present, and reasonably foreseeable future actions, there would likely be a long-term, moderate, adverse, primarily localized cumulative impact on brown bears. (Parkwide adverse cumulative impacts could occur if bears that become habituated to humans at Brooks Camp leave the project area and move into other areas in the region.) Alternative 2 would contribute an appreciable, adverse increment to this overall adverse cumulative impact.

**Conclusion**. Alternative 2 would result in short- and long-term, moderate, adverse, and primarily localized impacts on brown bears due to human disturbances to bears and their habitat. There still would be potential for human habituation of bears, and some potential for occasional unsafe human-bear interactions and bears being injured or killed. These adverse effects would mainly result from the notable distance of overhead human activity above bears and bear habitat in the area (pedestrians and vehicles), a decrease in the horizontal separation between bears and humans (i.e., people on the elevated structures), an increase in the visual and audio exposure of human activities, and disturbance to bear habitat in the project area with construction-related activities and noise.

## Alternative 3

**Analysis.** The proposed elevated bridge in alternative 3 would eliminate the need for a floating bridge, which is an obstruction to bears moving up and down Brooks River. In addition, bears would have an open travel route from the lower Brooks River to Naknek Lake via the river's north bank and the Corner and avoid interacting with humans at ground level. This should allow for greater access to habitat, less stress, easier movement by bears, and possibly increased numbers of bears using the area.

Under alternative 3, bears would regularly encounter pedestrians (i.e., visitor groups, individual visitors, and staff) elevated overhead on the boardwalk and bridge instead of at ground level. The decks of the bridge and boardwalks would be approximately 10 ft above the river and ground, respectively. Alternative 3 includes a total of about 945 ft of elevated boardwalks for pedestrian use (330 ft for the north boardwalk, 200 ft for the south boardwalk, and 415 ft for the bridge; see map 5). The entire length of the bridge and boardwalks would be shared by pedestrian visitors, staff, and NPS/concessioner vehicles. The shared use of the elevated boardwalk would result in bears having less interaction with pedestrians at ground level. People moving along raised boardwalks would generally affect bear behavior less than they would at ground level on the same trails that bears use (NPS 2009f). Bears would also have more advanced warning of approaching humans because people walking on a wooden boardwalk deck would typically emit a louder noise than walking on soil or gravel, and views of approaching humans would be less obstructed by thick ground vegetation. This would benefit the bears by reducing the potential for dangerous incidents (for the involved bears or humans)—there would be a lower likelihood of bears being injured or killed. These effects could also reduce the potential for human habituation, which could benefit the bears if they travel out of the Brooks Camp area into other areas in the region.

Most bears over time would be expected to become accustomed/habituated to the existence and use of the new bridge and boardwalks (NPS 2009f). However, behavioral evidence from bears near the existing elevated boardwalk to Brooks Falls indicates that overhead human activity could intimidate, alter movement/behavior of, or possibly scare off some individual bears (DeBruyn et al. 2004). Thus, some bears may not adapt well to the 945 ft of elevated boardwalks for pedestrians in this alternative. This could result in these individuals altering their preferred river access routes or avoiding river stretches that provide the most favorable salmon fishing. Some bears may avoid the new structures for the short-term, but then return to the area. Some may choose to avoid the area entirely because of the overhead pedestrian activity. Although humans would be separated from bears by about 10 vertical ft, park visitors on the bridge or boardwalks would not be asked/required to apply the 50-yard buffer rule that they would otherwise use at ground level. Thus, humans would regularly be very near bears near the mouth of the river and near Brooks Camp under this alternative. This reduced (horizontal) separation of humans and bears could contribute to human habituation of bears.

Bears would also encounter NPS/concessioner service vehicles overhead on the boardwalk/bridge structure instead of at ground level. This alternative includes 945 linear ft of elevated access for motorized vehicles, which would result in bears having less direct ground level interaction with vehicles and less potential for habituation. However, some bears might not adapt well to overhead vehicles and could avoid the area entirely.

In alternative 3 bears would be exposed to increased noise from motorized vehicle tires running on the wood deck of the bridge and boardwalks instead of gravel or soil (for about 945 ft). In addition, motorized vehicles would likely make additional noise while climbing the ramps near the south bank of the river and near the Corner.

Also in alternative 3 human activity (pedestrians and NPS/concessioner vehicles) would be more visible to bears that are upriver because of the 10-foot elevation of the bridge. However, the north boardwalk would be relatively screened due to its alignment through the existing trees in the Corner area. Although some of the elevated visual disturbance would be at a distance, some bears may alter their behavior or activity after seeing more human activity in the area.

Sounds from human activity on the boardwalk and bridge would carry farther due to the elevation of the activity and the placement of the elevated walkway outside wooded areas that would otherwise buffer the sounds. Assuming there is judicious use of quiet vehicles on the bridge and boardwalks, there should be little effect on most bears in the area (NPS 2009f). Noise from the elevated bridge would be somewhat muted under this alternative because this boardwalk would be routed through existing trees on the north side of the river. However, even with the use of relatively quiet vehicles, elevating noise sources may result in some bears may hear more nearby human activity and alter their behavior or activity.

Under this alternative, bears would encounter less ground level human activity along the river corridor because the elevated structures would route pedestrians across the river with no time congregating along the north bank waiting to cross the floating bridge. This alternative would still allow pedestrians to congregate along the south bank (i.e., the elevated boardwalk would not continue south of the river).

Bears would have a region of wooded area with minimal ground level human activity near the mouth of the river where they could rest or forage without human intrusion. This effect would be most valuable to the bears from late August through October, when the bears congregate near the mouth of the Brooks River to feed on dead or dying salmon. However, the routing of the elevated walkway and vehicle ramp through the Corner area would allow existing levels of human activity and potential disruption for bears to continue in this area (despite being elevated). In addition, human disturbances to bears along the south bank and near the barge landing would also continue at ground level.

Also, human activity at ground level would be prominent next to the fish freezing building because the elevated walkway would terminate here under alternative 3. The location of the boardwalk terminus would likely cause a visitor gathering area in a location that is immediately adjacent to the Corner, and an area that is frequently used by bears. This could disturb resting bears and increase the potential for habituation. This effect would have the most impact on bears from late August through October when the bear activity near the Corner is highest.

Under this alternative, the barge landing site would be moved from the river mouth (about 200 ft south along Naknek Lake), but the access road would remain relatively unchanged for most of its length (figure 5). The small offset of the proposed barge landing from the river mouth (and behind existing shrubs and trees) would reduce noise and human activity disturbances to bears in the river mouth. But, NPS/contractor activities at the landing site and along the access road would continue to disturb bear activity near and along the river.

The construction activities associated with the bridge and elevated boardwalks would have various adverse effects on the brown bear and its habitat. Most construction would be scheduled for times when bears are not present or are present in smaller numbers. However, some construction activities would still affect some bears in the summer and fall. Construction disturbances to bears could include heavy construction equipment operation, noise from handheld construction tools (power tools and manual), construction transport vehicles, worker voices, and generators. The degree of impact on bear habitat would be dependent on the type and intensity of the construction activity, and the time of year the construction activity occurs (as it relates to the June and September peaks of bear activity in the area). Construction activity during peak feeding times in July and September-October have more potential for impacts and human-bear interaction than other months (NPS 2009f). Given the proposed construction schedule, the most notable impacts would potentially occur (1) from late August through mid-September of the first year during the construction mobilization phase, and (2) from late June through July and from late August through October in the second year (when boardwalk decking and handrail construction takes place). To help minimize these effects, particularly during July and September, work time limits, construction noise restrictions, and other mitigation measures would be applied (e.g., limiting to small power tool use and containing construction worker food and garbage) (NPS 2009f). In spite of these mitigation measures, if hazing of bears becomes necessary, which would be a small possibility, the behavior of a few bears may be altered during the construction period and some may be temporarily displaced from areas they might otherwise use. This could affect feeding activities and competition with other bears.

Alternative 3 includes a relocated barge landing (approximately 200 ft south of the existing landing) and a relatively short reroute of the barge landing access road near the mouth of the Brooks River (figure 5). These construction activities would occur over a few months in the spring and fall of one year. The construction activities associated with the new barge landing site and short access road reroute would impact bear habitat. The most notable impacts would likely occur during the late summer and autumn construction phase (August through mid-November), a period when the bears become very active River feeding on spawned-out salmon along the Brooks. To help minimize these effects, various mitigation measures would be applied to construction activities, such as maintaining mufflers on construction equipment and generators and limiting construction to daylight hours, and actively containing food/garbage of construction workers.

Overall, alternative 3 would result in short- and long-term, moderate, adverse, and primarily localized impacts to brown bears, due to human disturbances to bears and their habitat. Short-term impacts would be due to construction activities, while long-term impacts would be due to use of the facilities. (Some parkwide adverse effects could occur if habituated bears from Brooks Camp move to other areas in the region and retained their habituated behavior.) The effects of alternative 3 on brown bear habitat could cause changes to brown bear feeding, resting, mating, or caring for young. These adverse effects relate to habitat disturbances from human activity on the proposed 945 ft of elevated boardwalks, human habituation of bears, and continued human-bear interactions at ground level (in areas where people do not use the elevated boardwalks). The interactions, disturbances, and habituation would primarily result from park visitor activities and park staff/concessioner activities during the visitation season. It is believed that less than half of the brown bears using the Brooks River area would be affected by the actions and developments in alternative 3, and changes to the regional brown bear population would be minimal. Compared to alternative 1, alternative 3 would likely result in a decrease in adverse effects on brown bears due to the elimination of the floating bridge, and vertical separation of humans and bears in portions of the project area (mainly across and north of the river), which would result in less ground level interactions and possibly reduced habituation. However, because the 50-yard horizontal buffer rule would no longer apply to people on the elevated boardwalk or bridge, this alternative would result in notably shorter horizontal distances between humans and bears. This could contribute to an increase in habituation of bears.

**Cumulative Impacts.** Various other past, present, and reasonably foreseeable future projects in and near the project area have and would continue to affect brown bears and their habitat. These projects relate to facility development, recreation access, site restoration, and program development, and have affected (or would affect) the Brooks River area as described in the "Cumulative Impacts" section under alternative 1.

When the likely effects of alternative 3 actions are added to the effects of these other past, present, and reasonably foreseeable future actions, there would be a long-term, moderate, adverse, primarily localized cumulative impact on brown bears. (Parkwide cumulative impacts could occur if bears that become habituated to humans at Brooks Camp leave the project area and move into other areas in the region.) Alternative 3 would contribute an appreciable, adverse increment to this overall adverse cumulative impact.

**Conclusion**. Alternative 3 would result in short- and long-term, moderate, adverse, and primarily localized impacts on brown bears. There still would be potential for human habituation of bears and some potential for occasional unsafe human-bear interactions and for bears being injured or killed. These adverse effects would mainly result from the proposed overhead human activity above bears and bear habitat in the area (pedestrians, staff, and vehicles), a decrease in the horizontal separation between bears and humans (i.e., people on the elevated structures), an increase in the visual and audio exposure of human activities on the boardwalks and bridge, disturbance to the bear habitat in the project area with construction-related activities and noise, and continued ground level interactions between bears and humans (primarily on the south side of the river where elevated boardwalks terminate).

### Alternative 4

**Analysis.** The proposed elevated bridge would eliminate the need for a floating bridge, which is an obstruction to bears moving up and down Brooks River (while in the water). In addition, bears would have an open travel route from the lower Brooks River to Naknek Lake via the river's north bank and the Corner where they could avoid interacting with humans at ground level, particularly during late summer and autumn. This should allow for greater access to habitat, less stress, easier movement by bears, and possibly increased numbers of bears using the area.

Under alternative 4 bears would regularly encounter pedestrians on the (i.e., visitor groups, individual visitors, and staff) elevated overhead on the boardwalk and bridge structures instead of at ground level. The decks of the bridge and boardwalks would be approximately 10 ft above the river and ground, respectively. Alternative 4 includes about 1,540 linear ft of elevated boardwalk for visitor or staff pedestrian use (560 ft for the north boardwalk, 630 ft for the south boardwalk, and 350 ft for the bridge). The entire length of the bridge and boardwalks would be shared by pedestrians and vehicles. The use of this elevated boardwalk would result in bears having substantially less interactions with human pedestrians at ground level. People moving along raised boardwalks would generally affect bear behavior less than they would at ground level on the same trails that bears use (NPS 2009f). Bears would also have more advanced warning of approaching humans because people walking on a wooden boardwalk deck would typically emit a louder noise than walking on soil or gravel, and views of approaching humans would be less obstructed by thick ground vegetation. This would benefit the bears by reducing the potential for dangerous incidents (for the involved bears or humans)—there would be a lower likelihood of bears being injured or killed. These effects could also reduce the potential for human habituation, which could benefit the bears if they travel out of the Brooks Camp area into other areas in the region.

Most bears over time would be expected to become accustomed/habituated to the existence and use of the new bridge and boardwalks (NPS 2009f). However, behavioral evidence from bears near the existing elevated boardwalk to Brooks Falls indicates that overhead human activity could intimidate, alter movement/behavior of, or possibly scare off some individual bears (DeBruyn et al. 2004). Thus, some bears may not adapt well to the 1,540 linear ft of elevated boardwalks for pedestrians in this alternative. This could result in these individuals altering their preferred river access routes or avoiding river stretches that provide the most favorable salmon fishing. Some bears may avoid the new structures for the short-term, but then return to the area. Some may choose to avoid the area entirely because of the overhead pedestrian activity. Although humans would be separated from bears by about 10 vertical ft, visitors on the bridge or boardwalks would not be asked/required to apply the 50-yard buffer rule that they would otherwise use at ground level. Thus, humans would regularly be very near bears near the mouth of the river and near Brooks Camp under this alternative. This could contribute to human habituation of bears.

Bears would also encounter NPS/concessioner service vehicles overhead on the boardwalk/bridge structure instead of at ground level. This alternative includes 1,540 linear ft of elevated access for motorized vehicles, which would result in bears having less direct ground level interaction with vehicles and less potential for habituation. However, some bears might not adapt well to overhead vehicles and could avoid the area entirely.

In alternative 4 bears would be exposed to increased noise volumes from motorized vehicle tires running on the wood deck of the bridge and boardwalks instead of gravel or soil (for 1,540 ft). However, unlike alternatives 2 and 3, motorized vehicles likely would not make additional noise climbing the boardwalk ramps because both the north and south vehicle ramps would be relatively flat (the boardwalk alignment would take advantage of local topography).

Also in alternative 4 human activity (pedestrians and NPS/concessioner vehicles) would be more visible to bears upriver because of the 10-foot elevation of the bridge and the exposed alignment of the north boardwalk that runs to the west of existing shrub and tree cover. However, wooded areas on the south side of the river would provide some visual boardwalk screening to views from both upriver and downriver. Although some of the visual disturbance would be at a distance, some bears may alter their behavior or activity after seeing more human activity in the area.

Sounds from human activity on the boardwalks and bridge would carry farther because of the elevation of the activity and the placement of the elevated walkway outside wooded areas that would otherwise buffer the sounds. Assuming there is judicious use of quiet vehicles on the bridge and boardwalks, there should be little effect on most bears in the area (NPS 2009f). The most notable areas of sound exposure would be on the bridge (exposed to upriver and downriver areas) and along the north boardwalk, which would be fully exposed to upriver areas. Trees and shrubs on the south side of the river would provide some screening that would limit noise propagation. However, even with the use of relatively quiet vehicles, as a result of elevating noise sources some bears may hear more nearby human activity and alter their behavior or activity.

Under alternative 4 bears would encounter less ground level human activity immediately along the river corridor because the path of the elevated structures would route pedestrians across the river with no time congregating along the north or south bank waiting to cross the floating bridge). The pedestrians would access the elevated boardwalk from within Brooks Camp and from near the bus parking area on the south side of the river.

Bears would have a region of wooded area with minimal ground level human activity near the mouth of the river (on both north and south sides) where they could rest or forage without human intrusion. Most notably, under this alternative, the north boardwalk avoids the Corner area, which would otherwise continue to be fragmented by the existing ground trail/ road.

Pedestrians and NPS concessioner vehicles would be routed around and away from the Corner and areas on the south bank near the river mouth. Removing the existing trail would allow for increased use of the trail, riverbank, woods, and beach around the point by bears (NPS 2009f). This effect would be most valuable to the bears from late August through October, when the bears congregate near the mouth of the Brooks River to feed on dead or dying salmon.

Also, under this alternative, the barge landing site would be moved away from the river mouth to a location approximately 2,000 ft south along Naknek Lake (figure 3). Thus, brown bears that are resting or foraging along both shores of the river mouth would not encounter NPS vessels being loaded and unloaded at the barge landing, or vehicles traveling along the south bank to/from the landing on the access road (which would be reclaimed under this alternative). Relocating the facilities should substantially reduce bear impacts—more bears would likely be present in the river mouth area where they could feed on fish and fewer bears would likely be present farther away from the river corridor. The effect of this relocation would be most notable from late August through October when most of the bear activity is concentrated near the mouth of Brooks River.

However, the proposed access road that would serve the new barge landing site (figure 3) would introduce occasional human disturbances into the area between Brooks River and Beaver Pond. The roadway length would be approximately 1,500 ft, and most of the disturbances to bear habitat would involve NPS/ concessioner motorized vehicle traffic. Increased noise and human disturbances along the access road and at the landing could alter bear resting, movement, and other behaviors of some bears in a new area that has not been disturbed.

The construction activities associated with the bridge and elevated boardwalks would have various adverse effects on the brown bear and its habitat. Most construction would be scheduled for times when bears are not present or are present in smaller numbers. However, some construction activities would still affect some bears in the summer and fall. Construction disturbances to bears could include heavy construction equipment operation, noise from handheld construction tools (power tools and manual), construction transport vehicles, worker voices, and generators. The degree of impact on bear habitat would be dependent on the type and intensity of the construction activity and the time of year the construction activity occurs (as it relates to the June and September peaks of bear activity in the area). Construction activity during peak feeding times in July and September through October have more potential for impacts and human-bear interaction than other months (NPS 2009f). Given the proposed construction schedule, the most notable impacts would occur (1) from late August through mid-September of the first year during the construction mobilization phase and (2) from late June through July and possibly from late August through October in the second year (when boardwalk decking and handrail construction takes place). To help minimize these effects, particularly during July and September, work time limits, construction noise restrictions, and other mitigation measures would be applied (e.g., limiting to small power tool use and containing construction worker food and garbage) (NPS 2009f). In spite of these mitigation measures, if hazing of bears becomes necessary, which would be a small possibility, the behavior of a few bears may be altered during the construction period and some may be temporarily displaced from areas they might otherwise use. This could affect feeding activities and competition with other bears in the short term.

The construction activities associated with the new barge landing, new access road (about 1,500 ft in length), and restoration of the two existing access roads (along south bank and the road to the bus parking area) (map 6) would also have various adverse impacts on the bears. These construction and restoration activities would occur over a few months in the spring and fall of one year. Most construction impacts would result from heavy construction equipment operation (e.g., road grading), material transport vehicles, and human presence. The most notable impacts would occur during the late summer and autumn construction phase (August through mid-November), a period when the bears become very active feeding on spawned-out salmon along Brooks River. The intensity of the impact on bears would lessen as the activity moves away from Brooks River. In addition, to help minimize these effects, various mitigation measures would be applied to construction activities, such as maintaining mufflers on construction equipment and generators, limiting construction to daylight hours, and actively containing food/garbage of construction workers.

Overall, alternative 4 would result in a long-term, moderate, adverse, and primarily localized impact to brown bears, even with the bridge and boardwalks, due to human disturbances to bears and their habitat. (Some parkwide adverse effects could occur if habituated bears from Brooks Camp move to other areas in the region and retain their habituated behavior.) The effects of alternative 4 on brown bear habitat could cause changes to brown bear feeding, resting, mating, or caring for young. These adverse effects relate to habitat disturbances from human activity on the proposed 1,540 ft of elevated boardwalks, human habituation of bears, and continued human-bear interactions at ground level (in areas where people do not use the elevated boardwalks). The interactions, disturbances, and habituation would primarily result from park visitor activities and park staff/concessioner activities during the visitation season. It is believed that less than half of the brown bears using the Brooks River area would be affected by the actions and developments in alternative 4, and changes to the regional brown bear population would be minimal.

Compared to alternative 1, alternative 4 would result in a decrease in adverse effects on brown bears due to the elimination of the floating bridge, the restoration of an open travel route from the lower Brooks River to Naknek Lake via the river's north bank and the Corner, and the vertical separation of humans and bears throughout the project area, which would result in less ground level interactions and possibly reduced habituation. Bears along the Brooks River corridor would also benefit from the relocation of the barge landing and access road away from the river. However, because the 50-yard horizontal buffer rule would no longer apply to people on the elevated boardwalk and bridge, this alternative would result in notably shorter horizontal distances between humans and bears. This could contribute to an increase in habituation of bears.

**Cumulative Impacts.** Various other past, present, and reasonably foreseeable future projects in and near the project area have and would continue to affect brown bears and their habitat. These projects relate to facility development, recreation access, site restoration, and program development, and have affected (or will affect) the Brooks River area as described in the “Cumulative Impacts” section under alternative 1.

When the likely effects of alternative 4 actions are added to the effects of these other past, present, and reasonably foreseeable future actions, there would be a long-term, moderate, adverse, and primarily localized cumulative impact on brown bears. (Parkwide cumulative impacts could occur if bears that become habituated to humans at Brooks Camp leave the project area and move into other areas in the region.) Alternative 4 would contribute an appreciable, adverse increment to this cumulative impact.

**Conclusion**. Alternative 4 would result in a long-term, moderate, adverse, and primarily localized impact on the brown bear. There still would be potential for human habituation of bears and some potential for occasional unsafe human-bear interactions and for bears being injured or killed. These adverse effects would mainly result from the notable distance of overhead human activity above bears and bear habitat in the area (pedestrians, staff, and vehicles), a decrease in the horizontal separation between bears and humans (i.e., people on the elevated structures), an increase in the visual and audio exposure of human activities, and disturbance to the bear habitat in the project area with construction-related activities and noise.

## Alternative 5

**Analysis.** The proposed elevated bridge would eliminate the need for a floating bridge, which is an obstruction to bears moving up and down Brooks River (while in the water). In addition, bears would have an open travel route from the lower Brooks River to Naknek Lake via the river’s north bank and the Corner where they could avoid interacting with humans at ground level, particularly during late summer and autumn. This should allow for greater access to habitat, less stress, easier movement by bears, and possibly increased numbers of bears using the area.

Under alternative 5 bears would regularly encounter pedestrians elevated overhead on the boardwalk and bridge instead of at ground level structures (i.e., visitor groups, individual visitors, and park staff). The decks of the bridge and boardwalks would be about 10 ft above the river and ground. Alternative 5 includes a total of about 1,120 linear ft of elevated boardwalks for visitor or park staff pedestrian use (560 ft for the north boardwalk, 210 ft for the south boardwalk ramp, and 350 ft for the bridge; see map 7). The entire length of the bridge and boardwalks would be shared by pedestrians and vehicles. The use of this elevated boardwalk would result in bears having substantially less interactions with human pedestrians (park visitors or staff) at ground level. People moving along raised boardwalks would generally affect bear behavior less than they would at ground level on the same trails that bears use (NPS 2009f). Bears would also have more advanced warning of approaching humans because people walking on a wooden boardwalk deck would typically emit a louder noise than walking on soil or gravel, and views of approaching humans would be less obstructed by thick ground vegetation. This would benefit the bears by reducing the potential for dangerous incidents (for the involved bears or humans)—there would be a lower likelihood of bears being injured or killed. These effects could also reduce the potential for human habituation, which could benefit the bears if they move out of the Brooks Camp area into other areas in the region.

Most bears over time would be expected to become accustomed/habituated to the existence and use of the new bridge and boardwalks (NPS 2009f). However, behavioral evidence from bears near the existing elevated boardwalk to Brooks Falls indicates that overhead human activity could intimidate, alter movement/behavior of, or possibly scare off some individual bears (DeBruyn et al. 2004). Thus, some bears may not adapt well to the 1,120 linear ft of elevated boardwalks for pedestrians in this alternative. This could result in these individuals altering their preferred river access routes or avoiding river stretches that provide the most favorable salmon fishing. Some bears may avoid the new structures for the short-term, but then return to the area. Some may choose to avoid the area entirely because of the overhead pedestrian activity. Although humans would be separated from bears by about 10 vertical ft, park visitors on the bridge or boardwalks would not be asked/required to apply the 50-yard buffer rule that they would otherwise use at ground level. Thus, humans would regularly be very close to bears near the mouth of the river and near Brooks Camp under this alternative. This could contribute to human habituation of bears.

Bears would also encounter NPS and concessioner service vehicles overhead on the boardwalk/bridge structure instead of at ground level. This alternative includes 1,120 linear ft of elevated access for motorized vehicles, which would result in bears having less direct ground level interaction with vehicles and less potential for habituation. However, some bears might not adapt well to overhead vehicles and could avoid the area entirely.

In alternative 5 bears would be exposed to increased noise from motorized vehicle tires running on the wood deck of the bridge and boardwalks instead of gravel or soil (for about 1,120 ft). In addition, motorized vehicles would likely make additional noise climbing the ramp near the south bank of the river. The ramp on the north side (near the center of Brooks Camp) would not have this effect because the boardwalk would take advantage of local topography in this area and use a flatter ramp.

Also in alternative 5 human activity (pedestrians and NPS/concessioner vehicles) would be more visible to bears that are upriver because of the 10-foot elevation of the bridge and the exposed alignment of the north boardwalk that runs to the west of existing shrub and tree cover. Although some of this visual disturbance would be at a distance, some bears may alter their behavior or activity after seeing more human activity in the area.

Sounds from human activity on the boardwalks and bridge would carry farther because of the elevation of the activity and the placement of the elevated walkway outside wooded areas that would otherwise buffer the sounds. Assuming there is judicious use of quiet vehicles on the bridge and boardwalks, there should be little effect on most bears in the area (NPS 2009f). Noise from the elevated bridge would be exposed to upriver and downriver areas, and noise from the north boardwalk would be fully exposed to upriver areas. As a result of elevating noise sources, some bears may alter their behavior or activity after hearing more nearby human activity.

Under alternative 5 bears would encounter less ground level human activity immediately along the river corridor because the path of the elevated structures would route pedestrians across the river with no time congregating along the north bank waiting to cross the floating bridge. However, this alternative would still allow pedestrians to congregate along the south bank (i.e., the elevated boardwalk would not continue to the south of the river).

Bears would have a region of wooded area with minimal ground level human activity near the mouth of the river (on the north side) where they could rest or forage without human intrusion. Under this alternative, the north boardwalk avoids the Corner area, which would otherwise continue to be fragmented by the existing ground trail/road. Removing the existing trail would allow for increased use of the trail, riverbank, woods, and beach around the point by bears (NPS 2009f). This effect would be most valuable to the bears from late August through October, when the bears congregate near the mouth of the Brooks River to feed on dead or dying salmon.

Additionally, under this alternative, the barge landing site would be moved away from the river mouth to a location approximately 2,000 ft south along Naknek Lake (see figure 3). Thus, brown bears that are resting or foraging along both shores of the river mouth would not encounter NPS vessels being loaded and unloaded at the barge landing, or vehicles traveling along the south bank to/from the landing on the access road (which would be reclaimed under this alternative). Relocating the facilities should substantially reduce bear impacts—more bears would likely be present in the river mouth area where they could feed on fish and fewer bears would likely be present farther away from the river corridor. The effect of this relocation would be most notable from late August through October when most of the bear activity is concentrated near the mouth of Brooks River.

However, the proposed access road (figure 3) that would serve the new barge landing would introduce occasional human disturbances into the area between Brooks River and Beaver Pond. The roadway length would be approximately 1,500 ft, and most of the disturbances to bear habitat would involve NPS/concessioner motorized vehicle traffic. Increased noise and human disturbances along the access road and at the landing could alter bear resting, movement, and other behaviors of some bears in a new area that has not been disturbed.

The construction activities associated with the bridge and elevated boardwalks would have various adverse effects on the brown bear and its habitat. Most construction would be scheduled for times when bears are not present or are present in smaller numbers. However, some construction activities would still affect some bears in the summer and fall. Construction disturbances to bears could include heavy construction equipment operation, noise from handheld construction tools (power tools and manual), construction transport vehicles, worker voices, and generators. The degree of impact on bear habitat would be dependent on the type and intensity of the construction activity and the time of year the construction activity occurs (as it relates to the June and September peaks of bear activity in the area). Construction activity during peak feeding times in July and September through October have more potential for impacts and human-bear interaction than other months (NPS 2009f). Given the proposed construction schedule, the most notable impacts would occur (1) from late August through mid-September of the first year during the construction mobilization phase; and (2) from late June through July and possibly from late August through October in the second year (when boardwalk decking and handrail construction takes place). To help minimize these effects, particularly during July and September, work time limits, construction noise restrictions, and other mitigation measures would be applied (e.g., limiting to small power tool use and containing construction worker food and garbage) (NPS 2009f). In spite of these mitigation measures, if hazing of bears becomes necessary, which would be a small possibility, the behavior of a few bears may be altered during the construction period and some may be temporarily displaced from areas they might otherwise use. This could affect feeding activities and competition with other bears in the short term.

The construction activities associated with the new barge landing, new access road (about 1,500 ft in length), and restoration of the existing barge access roads (along the south bank; see map 7) would also have various adverse impacts on bears. These construction and restoration activities would occur over a few months in the spring and fall of one year. Most construction impacts would result from heavy construction equipment operation (e.g., road grading), material transport vehicles, and human presence. The most notable impacts would occur during the late summer and autumn construction phase (August through mid-November), a period when the bears become very active feeding on spawned-out salmon along Brooks River. The intensity of the impact on bears would lessen as the activity moves away from Brooks River. In addition, to helping minimize these effects, various mitigation measures would be applied to construction activities, such as maintaining mufflers on construction equipment and generators, limiting construction to daylight hours, and actively containing food/garbage of construction workers.

Overall, alternative 5 would result in a long-term, moderate, adverse, and primarily localized impact to brown bears due to human disturbances to bears and their habitat. (Some parkwide adverse effects could occur if habituated bears from Brooks River move to other areas in the region and retain their habituated behavior.) The effects of alternative 5 on brown bear habitat could cause changes to brown bear feeding, resting, mating, or caring for young. These adverse effects relate to the habitat disturbances from human activity on the proposed 1,120 ft of elevated boardwalks, human habituation of bears, and continued human-bear interactions at ground level (in areas where people do not use the elevated boardwalks). The interactions, disturbances, and habituation would primarily result from park visitor activities and park staff/concessioner activities during the visitation season. It is believed that less than half of the brown bears using the Brooks River area would be affected by the actions and developments in alternative 5, and changes to the regional brown bear population would be minimal.

Compared to alternative 1, alternative 5 would result in a decrease in adverse effects on brown bears due to removal of the floating bridge, restoration of an open travel route from the lower Brooks River to Naknek Lake via the river's north bank and the Corner, vertical separation of humans and bears throughout the project area, which would result in less ground level interactions and possibly reduced habituation. Bears along the Brooks River corridor would also benefit from the relocation of the barge landing and access road away from the river. However, because the 50-yard horizontal buffer rule would no longer apply to people on the elevated boardwalk and bridge, this alternative would result in notably shorter horizontal distances between humans and bears. This could contribute to an increase in habituation of bears.

**Cumulative Impacts.** Various other past, present, and reasonably foreseeable future projects in and near the project area have and would affect the brown bear. These projects relate to facility development, recreation access, site restoration, and program development, and have affected (or would affect) the Brooks River area as described in the "Cumulative Impacts" section under alternative 1.

When the likely effects of alternative 5 actions are added to the effects of these other past, present, and reasonably foreseeable future actions, there would be a short- to long-term, moderate, adverse, and primarily localized cumulative impact on brown bears. (Parkwide cumulative impacts could occur if bears that become habituated to humans at Brooks Camp leave the project area and move into other areas in the region.) Alternative 5 would contribute an appreciable, adverse increment to this overall adverse cumulative impact.

**Conclusion**. Alternative 5 would result in a long-term, moderate, adverse, and primarily localized impact on the brown bear due to human disturbances to bears and their habitat. There still would be the potential for human habituation of bears, and some potential for occasional unsafe human-bear interactions and for bears being injured or killed. These adverse effects would mainly result from the notable distance of overhead human activity above bears and bear habitat in the area (pedestrians, staff, and vehicles), a decrease in the horizontal separation between bears and humans (i.e., people on the elevated structures), an increase in the visual and audio exposure of human activities, and disturbance to bear habitat in the project area with

## SALMON, RAINBOW TROUT, AND ARCTIC GRAYLING

### Alternative 1

**Analysis.** Under alternative 1, the seasonal floating bridge would continue to be a surface obstacle from May through September to salmon, rainbow trout, and arctic grayling migrating up Brooks River to spawn. The floating structure would continue to occupy the upper level of the water column for the full width of the river during the months of fish migration up the river. Because the flotation devices used to support the bridge extend down a notable length into the water column, the available channel area for migratory fish passage has become reduced by the floating bridge. It is likely, but not known, that fish are schooling below the floating bridge both because of the bridge itself (due to the bridge being a visual barrier or due to surface shadow) and because actual river morphology favors fish resting in that location (T. Hamon, pers. com., 4/8/2011).

The annual placement (in spring) and removal of the floating bridge (in fall) would continue to cause some disturbances to the Brooks River spawning habitat. The placement of the floating bridge in the spring requires heavy equipment to be driven across the river, which disturbs the riverbed and stirs up sediment and turbidity in the downstream water (in the fall, the bridge is removed by hand and no turbidity occurs from its removal). However, the minimal amounts of turbidity produced by the equipment in the river would have little effect on fish migration or spawning.

Similarly, riverbank erosion would continue on both the north and south banks of Brooks River near the floating bridge anchor points. Soil erosion near floating bridge anchor points would continue to result in increases in river turbidity and downstream sedimentation. However, the turbidity and sedimentation associated with this erosion source is quite negligible relative to the sedimentation effects of natural processes such as storm events and geomorphic shifts in the river. Thus, this turbidity and sedimentation would continue to have only limited effects on fish migration or spawning.

The presence of the floating bridge would have little effect on salmon and rainbow trout spawning, as these fish spawn along the entire river, and barely in the area where the bridge is located. The majority of arctic grayling spawn in the vicinity of the bridge, and there could be some adverse effects on some of these fish if they spawn in less desirable areas—fewer eggs and fry may survive than would occur if the bridge were not present. But, the bridge occupies a relatively small area where the grayling are spawning. Thus, it is likely the bridge would continue to have little effect on the overall population of grayling using the river.

Under alternative 1 septic waste would continue to be hauled across Brooks River every spring via a hauling tractor. Crossing at low water, the tractor would continue to stir up sediments along the river bottom and increase turbidity for short periods of time. This could affect salmon, trout, and grayling in the river, although it is likely that turbidity due to the tractor would have little effect on the overall populations of fish in the river.

Overall, the continued annual use of the floating bridge under alternative 1 would have a long-term, minor, adverse, and localized effect on salmon, rainbow trout, and arctic grayling in Brooks River. This continued obstruction to fish passage in the upper water column and riverbed disturbances during its installation and removal, and the hauling of wastes across the river in the spring would only have minimal effects on fish and the natural processes that sustain their habitat. No changes would occur under alternative 1 to regional populations of salmon, rainbow trout, and arctic grayling.

**Cumulative Impacts.** The past management actions that expanded recreation access in the Brooks Camp area and beyond prompted the annual use of the temporary floating bridge across Brooks River. This past action introduced annual adverse effects to fish passage and spawning in Brooks River due to the water column obstacle and riverbed disturbances from bridge placement and removal (including downstream turbidity, sedimentation, and sandbar development).

The present and reasonably foreseeable future projects in or near the project area would have no known effects on salmon, rainbow trout, and arctic grayling populations in the Brooks River.

When the likely adverse effects of alternative 1 are added to the effects of these other past, present, and reasonably foreseeable future actions, there would be a long-term, minor, adverse, localized cumulative impact on salmon, rainbow trout, and arctic grayling in the Brooks River. Alternative 1 would contribute a large, adverse increment to this overall adverse cumulative impact.

**Conclusion.** Alternative 1 would result in continuing short- to long-term, minor, adverse, and localized impacts on salmon, rainbow trout, and arctic grayling in Brooks River. These effects would result from the continued annual use of the floating bridge across Brooks River. The bridge would continue to be an impediment to fish migration in the upper portions of the water column, but fish could still migrate up and downriver. The presence of the bridge and the annual bridge installation would alter spawning habitat by disturbing the riverbed, and could result in some arctic grayling spawning being adversely affected.

## Alternative 2

**Analysis.** The proposed elevated bridge under this alternative would eliminate the need for the temporary floating bridge across Brooks River and the associated impacts to fish migration and spawning habitat (e.g., impeded passage and spring riverbed disturbances, turbidity, and sedimentation).

Under alternative 2, the proposed 360-foot steel truss bridge would have 120-foot spans between foundation pile systems. Each pile system would include a set of two steel piles anchored in the riverbed. At this length and span distance, the bridge would necessitate two sets of steel piles in the river. The piles would (1) affect flow hydraulics, which could lead to riverbed scouring and downstream sediment deposition; and (2) obstruct the flow and passage of debris in the river, which could directly block fish passage and compound the scouring and sediment deposition effect.

Riverbed scouring and sediment deposition could affect the hatch rate of fish eggs deposited downstream of the bridge. These changes would most likely adversely affect arctic grayling spawning in this area and to a much lesser degree salmon and rainbow trout (which spawn along the entire river). In addition, sandbar development downstream of the bridge could reduce the channel's cross section area. The shallower water in the vicinity of the sandbars could obstruct some salmon and rainbow trout migration upstream, although this migration effect would likely be very minimal.

Tree limbs, other vegetation material, and ice chunks could build up on the upstream side of the pile systems. The debris buildup on the piles could be an obstacle to salmon and rainbow trout migration as well as compound the altered river flow hydraulics in the areas around the piles leading to additional riverbed scouring, sediment deposition, and sandbar development on the downstream side of the piles. Some of these effects could be mitigated by debris removal from the bridge piles during the periods of the year when NPS staff are present. In addition, because this alternative only includes two pile systems in the channel, these effects would be limited.

Steel truss bridge foundation construction would involve the installation of two sets of steel piles in the river channel. This construction work would generate two primary disturbance areas in the Brooks River channel (120 ft apart on center), but would also generate channelwide riverbed disturbance because of construction equipment access. The installation would stir up riverbed sediment, which could lead to increases in downstream water turbidity and sedimentation. Pile systems would also be installed on each shoreline relatively near the river, which could also generate turbidity and sedimentation in the area. To minimize some of the effects of in-river construction, various turbidity and sedimentation mitigation measures would be applied, such as diversion of river flows around work areas, cofferdams, and sediment traps. Although the construction would not occur during fish migrations, the sedimentation could negatively affect the hatch rate of the fish eggs that were deposited in the spawning beds downstream of the bridge during the previous autumn. Arctic grayling spawning would be most likely to experience these impacts, while salmon and rainbow trout (whose eggs are present mostly upriver of the bridge) would experience impacts to a much lesser degree.

The fill that has been added over the past several decades to build up and support the trail on the north side of Brooks River (upstream of the floating bridge anchor point) would be removed. Minimal, temporary effects to downstream arctic grayling spawning could occur from turbidity and sedimentation in the river during and shortly after these construction activities. However, this action would eliminate some sedimentation that results from the river eroding the crushed gravel and other fill material over time. Thus, this action would improve fish habitat in this portion of the river.

Overall, the proposed bridge structure under alternative 2, which involves two permanent pile systems in the Brooks River channel, would have short- and long-term, minor, adverse, and localized effect on salmon, rainbow trout, and arctic grayling. In addition to construction disturbances in the riverbed, these impacts would result from the hydraulic effects of the piles and the debris caught on the piles (e.g., scouring, sedimentation), which could result in impediments to fish passage. However, the effects on the fish and the natural processes that sustain them would be minimal. As noted by the Alaska Department of Fish and Game, "[b]ridges that span the floodplain, even with piers within the active channel, offer the best solution for crossing streams." (ADF&G 2011). Removing the temporary floating bridge and its associated negative impacts would reduce the impacts on fish. In addition, alternative 2 would eliminate impacts to fish associated with hauling waste by heavy equipment across the river. There also would be less impact to fish habitat under alternative 2 due to the removal of fill on the north side of the river, which would eliminate a sedimentation source. No changes would occur under alternative 2 to regional populations of salmon, rainbow trout, and arctic grayling.

**Cumulative Impacts.** The past management actions that expanded recreation access in the Brooks Camp area and beyond prompted the annual use of the temporary floating bridge across Brooks River. This past action introduced annual adverse effects to fish passage and spawning in Brooks River due to the water column obstacle and riverbed disturbances from bridge placement (including some downstream turbidity and sedimentation). However, under this alternative, the annual installation and use of the floating bridge would no longer be necessary.

Other present and reasonably foreseeable future projects in vicinity of the project area would have no known effects on salmon, rainbow trout, and arctic grayling populations in Brooks River. Thus, no cumulative impacts would occur.

**Conclusion.** Alternative 2 would result in short- to long-term, minor, adverse, and localized impacts on salmon, rainbow trout, and arctic grayling in Brooks River. These effects would result from the addition of two permanent flow obstructions to the channel (i.e., two bridge pile systems spaced at 120 ft) and the associated construction disturbances in the channel. The support piles, and river debris that catches on them, could obstruct fish passage and alter flow hydraulics, which may result in scouring and sediment deposition in the river. However, salmon, rainbow trout, and arctic grayling would benefit from the elimination of the temporary floating bridge and its associated negative effects on fish passage and spawning habitat.

## Alternative 3

**Analysis.** The proposed elevated bridge under this alternative would eliminate the need for the temporary floating bridge across Brooks River and the associated impacts to fish migration and spawning habitat (e.g., impeded passage and spring/fall riverbed disturbances, turbidity, and sedimentation).

Under alternative 3, the proposed 415-foot steel/wood truss bridge would have 50-foot spans between foundation pile systems. Each pile system would include a set of two piles anchored in the riverbed. At this length and span distance, the bridge would necessitate six sets of piles in the river. The piles would (1) affect flow hydraulics, which could lead to riverbed scouring and downstream sediment deposition; and (2) obstruct the flow and passage of debris in the river, which could directly block fish passage and compound the scouring and sediment deposition effect.

Riverbed scouring and sediment deposition could affect the hatch rate of fish eggs deposited downstream of the bridge. These changes would most likely adversely affect arctic grayling spawning in this area and to a much lesser degree salmon and rainbow trout (which spawn along the entire river). In addition, sandbar development downstream of the bridge could reduce the channel's cross section area. The shallower water near the sandbars could obstruct some salmon and rainbow trout migration upstream, although this migration effect would likely be minimal.

Tree limbs, other vegetation material, and ice chunks could build up on the upstream side of the pile systems. The debris buildup on the piles could be an obstacle to salmon and rainbow trout migration, as well as compound the altered river flow hydraulics in the areas around the piles leading to additional riverbed scouring, sediment deposition, and sandbar development on the downstream side of the piles. Some of these effects could be mitigated by the removal of debris from the bridge piles during periods of the year when NPS staff are present.

Bridge foundation construction would involve the installation of six sets of piles in the river channel. This construction work would generate six primary disturbance areas in the Brooks River channel (50 ft apart on center), but would also generate channelwide riverbed disturbance because of construction equipment access. The installation would stir up riverbed sediment, which could lead to increases in downstream water turbidity and sedimentation. Pile systems would also be installed on each shoreline relatively near the river, which could also generate turbidity and sedimentation in the area. To minimize some of the effects of in-river construction, various turbidity and sedimentation mitigation measures would be applied, such as diversion of river flows around work areas, cofferdams, and sediment traps. Although the construction would not occur during fish migrations, the sedimentation could negatively affect the hatch rate of the fish eggs that were deposited in the spawning beds downstream of the bridge during the previous autumn. Arctic grayling spawning would be most likely to experience these impacts, while salmon and rainbow trout (whose eggs are present mostly upriver of the bridge) would experience impacts to a much lesser degree.

Alternative 3 would include the removal of the fill material that has been added over the past several decades to build up and support the trail on the north side of Brooks River (upstream of the floating bridge anchor point). Minimal, temporary effects to downstream arctic grayling spawning could occur from turbidity and sedimentation in the river during and shortly after these construction activities. However, this action would eliminate some sedimentation that results from the river eroding the crushed gravel and other fill material over time. Thus, this action would improve fish habitat in this portion of the river.

Overall, the proposed bridge structure, which would involve six permanent pile systems in the Brooks River channel, would have short- and long-term, minor, adverse, and localized effect on salmon, rainbow trout, and arctic grayling. In addition to construction disturbances in the riverbed, these impacts would primarily result from the hydraulic effects of the piles and the debris caught on the piles (e.g., scouring, sedimentation), which could result in impediments to fish passage. However, the effects to the fish and the natural processes that sustain them would be relatively minimal. Compared to alternative 1, alternative 3 could increase some impacts to salmon, rainbow trout, and arctic grayling due to the installation of six permanent obstructions in the river (and their hydraulic effects on river geomorphology). Removing the temporary floating bridge and its associated negative effects would reduce the impact on fish. Impacts to fish habitat would be reduced under alternative 3 due to the removal of fill on the north side of the river, which would eliminate a sedimentation source. Alternative 3 would also eliminate impacts to fish associated with hauling waste by heavy equipment across the riverbed. No changes would occur under alternative 3 to regional populations of salmon, rainbow trout, and arctic grayling.

**Cumulative Impacts.** The past management actions that expanded recreation access in the Brooks Camp area and beyond prompted the annual use of the temporary floating bridge across Brooks River. This past action introduced annual adverse effects to fish passage and spawning in Brooks River due to the water column obstacle and riverbed disturbances from bridge placement (including some downstream turbidity and sedimentation). However, under this alternative, the annual installation and use of the floating bridge would no longer be necessary.

Other present and reasonably foreseeable future projects in and near the project area would have no known effects on salmon, rainbow trout, and arctic grayling populations in Brooks River. Thus, no cumulative impacts would result.

**Conclusion.** Alternative 3 would result in short- to long-term, minor, adverse, and localized impacts on salmon, rainbow trout, and arctic grayling in Brooks River. These effects would result from the addition of six permanent flow obstructions to the channel (i.e., six bridge pile systems spaced 50 ft apart) and the associated construction disturbances in the channel. The support piles, and river debris that catches on them, could obstruct fish passage and alter flow hydraulics, which may result in scouring and sediment deposition in the river. However, salmon, rainbow trout, and arctic grayling would benefit from elimination of the temporary floating bridge and its associated negative effects on fish passage and spawning habitat.

## Alternative 4

**Analysis.** The proposed elevated bridge under this alternative would eliminate the need for the temporary floating bridge across Brooks River and the associated impacts to fish migration and spawning habitat (e.g., impeded passage and spring/fall riverbed disturbances, turbidity, and sedimentation).

Under alternative 4, the proposed 350-foot wooden and steel short-span bridge would have a minimum of 24-foot spans between foundation pile systems. Each pile system would include a set of two piles anchored in the riverbed. At this length and span distance, up to 14 sets of piles would be needed in the river. The piles would (1) affect flow hydraulics, which could lead to riverbed scouring and downstream sediment deposition; and (2) obstruct the flow and passage of debris in the river, which could directly block fish passage and compound the scouring and sediment deposition effect.

Riverbed scouring and sediment deposition could affect the hatch rate of fish eggs deposited downstream of the bridge. These changes would most likely adversely affect arctic grayling spawning in this area and to a much lesser degree salmon and rainbow trout (which spawn along the entire river). In addition, sandbar development downstream of the bridge could reduce the channel's cross section area. The shallower water near the sandbars could obstruct some salmon and rainbow trout migration upstream, although this migration effect from sandbars would likely be minimal.

Tree limbs, other vegetation material, and ice chunks could build up on the upstream side of the pile systems. The debris buildup on the piles could be an obstacle to salmon and rainbow trout migration, as well as compound the altered river flow hydraulics in the areas around the piles leading to additional riverbed scouring, sediment deposition, and sandbar development on the downstream side of the piles. Some of these effects could be mitigated by the removal of debris from the piles during the periods of the year when NPS staff are present. However, given the number of piles in the river under this alternative, the altered flow hydraulics (and the associated direct and indirect adverse effects) would likely occur regardless of seasonal debris removal.

Bridge foundation construction would involve the installation of 14 sets of piles in the river channel. This construction work would generate 14 primary disturbance areas in the Brooks River channel (24 ft apart on center) and could also generate channelwide riverbed disturbance because of construction equipment access. The installation would stir up riverbed sediment, which could lead to downstream increases in water turbidity and sedimentation. Pile systems would also be installed on each shoreline relatively near the river, which could also generate turbidity and sedimentation in the area. To minimize some of the effects of in-river construction, various turbidity and sedimentation mitigation measures would be applied, such as diversion of river flows around work areas, cofferdams, and sediment traps. Although the construction would not occur during fish migrations, the sedimentation could negatively affect the hatch rate of the fish eggs that were deposited in the spawning beds downstream of the bridge during the previous autumn. Arctic grayling spawning would be most likely to experience these impacts, while salmon and rainbow trout (whose eggs are present mostly upriver of the bridge) would experience impacts to a much lesser degree.

Alternative 4 would include the removal of the fill that has been added over the past several decades to build up and support the trail on the north side of Brooks River (upstream of the floating bridge anchor point). Minimal, temporary effects to downstream arctic grayling spawning could occur from turbidity and sedimentation in the river during and shortly after these construction activities. However, this action would eliminate some sedimentation that results from the river eroding the crushed gravel and other fill material over time. Thus, this action would improve fish habitat in this portion of the river.

Overall, the proposed bridge structure, which would involve up to 14 permanent pile systems in the Brooks River channel, would have short- and long-term, moderate, adverse, and localized effect on salmon, rainbow trout, and arctic grayling. In addition to construction disturbances in the riverbed, these impacts would primarily result from the hydraulic effects of the piles and the debris caught on the piles (e.g., scouring, sedimentation). The resulting changes to the river flow and morphology (e.g., sandbar development) could alter the natural processes that maintain the aquatic habitat and impede fish passage. Compared to alternative 1, alternative 4 would increase overall adverse impact to salmon, rainbow trout, and arctic grayling fish primarily due to the installation of several permanent obstructions in the river (and their hydraulic effects on river geomorphology). Removing the temporary floating bridge and its associated negative impacts would reduce the impacts on fish. The impacts on fish habitat would be reduced under alternative 4 due to the removal of fill on the north side of the river, which would eliminate a sedimentation source. In addition, alternative 4 would eliminate impacts to fish associated with hauling waste by heavy equipment across the river. Although some minor changes to fish populations in the area could occur (particularly arctic grayling) due to the actions in alternative 4, no changes would occur to regional populations of salmon, rainbow trout, and arctic grayling.

**Cumulative Impacts.** The past management actions that expanded recreation access in the Brooks Camp area and beyond prompted the annual use of the temporary floating bridge across Brooks River. This past action introduced annual adverse effects to fish passage and spawning in Brooks River due to the water column obstacle and riverbed disturbances from bridge placement and removal (including some downstream turbidity and sedimentation). However, under this alternative, the annual installation and use of the floating bridge would no longer be necessary.

Other present and reasonably foreseeable future projects in and near the project area would have no known effects on salmon, rainbow trout, and arctic grayling populations in Brooks River. Thus, no cumulative impacts would result.

**Conclusion.** Alternative 4 would result in short- to long-term, moderate, adverse, and localized impacts on salmon, rainbow trout, and arctic grayling in Brooks River. These effects would result from the addition of up to 14 permanent flow obstructions in the channel (i.e., 14 bridge pile systems spaced at 24 ft) and the associated construction disturbances in the channel. The support piles, and river debris that catches on them, could obstruct fish passage and alter flow hydraulics, which may result in scouring and sediment deposition in the river. However, salmon, rainbow trout, and arctic grayling would benefit from elimination of the temporary floating bridge and its associated negative effects on fish passage and spawning habitat.

## Alternative 5

**Analysis.** The proposed elevated bridge under this alternative would eliminate the need for the temporary floating bridge across Brooks River and the associated impacts to fish migration and spawning habitat (e.g., impeded passage and spring/fall riverbed disturbances, turbidity, and sedimentation).

Under alternative 5 the proposed 350-foot wooden short-span bridge would have a minimum of 24-foot spans between foundation pile systems. Each pile system would include a set of two piles anchored in the riverbed. At this length and span distance, up to 14 sets of piles would be needed in the river. The piles would (1) affect flow hydraulics, which could lead to riverbed scouring and downstream sediment deposition; and (2) obstruct the flow and passage of debris in the river, which could directly block fish passage and compound the scouring and sediment deposition effect.

Riverbed scouring and sediment deposition could affect the hatch rate of fish eggs deposited downstream of the bridge. These changes would most likely adversely affect arctic grayling spawning in this area and to a much lesser degree salmon and rainbow trout (which spawn along the entire river). In addition, sandbar development downstream of the bridge could reduce the channel's cross section area. The shallower water near the sandbars could obstruct some salmon and rainbow trout migration upstream, although this migration effect from sandbars would likely be minimal.

Tree limbs, other vegetation material, and ice chunks could build up on the upstream side of the pile systems. The debris buildup on the piles could be an obstacle to salmon and rainbow trout migration, as well as compound the altered river flow hydraulics in the areas around the piles resulting in additional riverbed scouring, sediment deposition, and sandbar development on the downstream side of the piles systems. With the pile systems only 24 ft apart, sandbar development downstream of each pile system could eventually run together, resulting in a shallower river cross section downstream of the bridge. Some of these effects could be mitigated by debris removal from the piles during periods of the year when NPS staff are present. However, given the number of piles in the river under this alternative, the altered flow hydraulics (and the associated direct and indirect adverse effects) would likely occur regardless of seasonal debris removal.

Bridge foundation construction would involve the installation of up to 14 sets of piles in the river channel. This construction work would generate 14 primary disturbance areas in the Brooks River channel (24 ft apart) and channelwide riverbed disturbance because of construction equipment access. The installation would stir up riverbed sediment, which could lead to increases in downstream water turbidity and sedimentation. Pile systems would also be installed on each shoreline relatively near the river, which could also generate turbidity and sedimentation in the area. To minimize some of the effects of in-river construction, various turbidity and sedimentation mitigation measures would be applied, such as diversion of river flows around work areas, cofferdams, and sediment traps. Although the construction would not occur during fish migrations, the sedimentation could negatively affect the hatch rate of the fish eggs that were deposited in the spawning beds downstream of the bridge during the previous autumn. Arctic grayling spawning would be most likely to experience these impacts, while salmon and rainbow trout (whose eggs are present mostly upriver of the bridge) would experience impacts to a much lesser degree.

Alternative 5 would include the removal of the fill that has been added over the past several decades to build up and support the trail on the north side of Brooks River (upstream of the floating bridge anchor point). Minimal, temporary effects to downstream arctic grayling spawning could occur from turbidity and sedimentation in the river during and shortly after these construction activities. However, this action would eliminate some sedimentation that results from the river eroding the crushed gravel and other fill material over time. Thus, this action would improve fish habitat in this portion of the river.

Overall, the proposed bridge structure, which would involve up to 14 permanent pile systems in the Brooks River channel, would have short- and long-term, moderate, adverse, and localized effect on salmon, rainbow trout, and arctic grayling. In addition to construction disturbances in the riverbed, these impacts would primarily result from the hydraulic effects of the piles and the debris caught on the piles (e.g., scouring, sedimentation). The resulting changes to the river flow and morphology (e.g., sandbar development) could alter the natural processes that maintain the aquatic habitat and impede fish passage. Compared to alternative 1, alternative 5 would increase overall adverse impact to salmon, rainbow trout, and arctic grayling fish primarily due to the installation of the several permanent obstructions in the river (and their hydraulic effects on river geomorphology). Removing the temporary floating bridge and its associated negative effects would reduce impacts on fish. The impacts on fish habitat would be reduced under alternative 5 due to the removal of fill on the north side of the river. Alternative 5 would also eliminate impacts to fish associated with hauling waste by heavy equipment across the riverbed. Although some minor changes to fish populations in the area could occur (particularly arctic grayling) under alternative 5—no changes would occur to regional populations of salmon, rainbow trout, and arctic grayling.

**Cumulative Impacts.** The past management actions that expanded recreation access in the Brooks Camp area and beyond prompted the annual use of the temporary floating bridge across Brooks River. This past action introduced annual adverse effects to fish passage and spawning in Brooks River due to the water column obstacle and riverbed disturbances from bridge placement and removal (including downstream turbidity and sedimentation). However, under this alternative, the annual installation and use of the floating bridge would no longer be necessary.

Other present and reasonably foreseeable future projects in and near the project area would have no known effects on salmon, rainbow trout, and arctic grayling populations in Brooks River. Thus, no cumulative impacts would result.

**Conclusion.** Alternative 5 would result in short- to long-term, moderate, adverse, and localized impacts on salmon, rainbow trout, and arctic grayling in Brooks River. These effects would result from the addition of up to 14 permanent flow obstructions to the channel (i.e., 14 bridge pile systems spaced at 24 ft) and the associated construction disturbances in the channel. The support piles, and river debris that catches on them, could obstruct fish passage and alter flow hydraulics, which may result in scouring and sediment deposition in the river. However, salmon, rainbow trout, and arctic grayling would benefit from the elimination of the temporary floating bridge and its associated negative effects on fish passage and spawning habitat.

## BALD EAGLE

### Alternative 1

**Analysis.** Under alternative 1, the human activity and the related noise associated with Brooks Camp and its facilities would continue to occur throughout the project area during the visitation season. The human disturbances in the vicinity of the slower water near the oxbow and near the mouth of Brooks River would continue to have the most effect on bald eagles. This continued activity would include visitor and staff movement along and across Brooks River; at the bear viewing platform by the floating bridge; and on trails/roads that connect the campground, Brooks Camp, and the bus parking area. Disturbances would also continue to include motorized NPS and concessioner vehicle movement along the various roads in the project area. Collectively, these effects would continue to have the potential to disturb bald eagle behavior in the area (e.g., roosting). Eagles can be flushed from perches due to the presence of people. Flushing distances vary depending on location and individual eagle behavior. In the case of the Brooks River eagles, flushing from ground disturbance occurs at an average distance of 100 ft from the base of the nesting tree (D. Noon, pers. comm., 4/8.2011).

During the breeding season, bald eagles are sensitive to a variety of human activities. Eagle pairs react to human activities in different ways—some pairs nest close to areas of human activity while others abandon nest sites in response to activities much farther away. This variability is probably related to a variety of factors including visibility, duration, noise levels, extent of area affected by the activity, prior experience with people, and tolerance of the individual nesting pair (USFWS 2007c). In the case of the Brooks River nesting pair, these birds have continued to nest in an area with all the disturbances noted above in the area. In addition, as noted in "Chapter 3: Affected Environment," ground level human activity near the existing nest is generally uncommon. Thus, although the potential for disturbances would continue under alternative 1, there is no reason to expect that the eagles would abandon their nest near Beaver Pond.

Overall, the continued visitor activities and park operations in the Brooks River area, such as along the barge landing site and access road, under alternative 1 would have a long-term, minor, adverse, and localized effect on bald eagles. These impacts would continue to occur during the visitation season at Brooks Camp, but would only have minimal effects on bald eagle behavior or the natural processes that sustain their habitat. No changes would occur to the regional bald eagle population.

**Cumulative Impacts.** Various past actions have had effects on bald eagles in the project area, particularly in the vicinity of Brooks Camp and along the Brooks River corridor. Most of these past actions have had adverse effects on eagle habitat and have primarily involved the facility development and expanded recreational access associated with Brooks Camp over the years (e.g., lodge, campground, visitor center, restrooms, operations facilities, utilities, guest cabins, staff housing, floating bridge access, trails, and viewing platforms). Motorized vehicle use on roads associated with this development in the area (e.g., maintenance access, Valley Road) and motorboat use on Naknek Lake and near the mouth of Brooks River have also contributed to disturbances of eagles. In addition, the flight paths for floatplanes flying between Brooks Camp and King Salmon have crossed over the project area (particularly over the existing nest site at Beaver Pond). This plane activity has brought loud, low-altitude noise and plane presence near valuable eagle habitat. USFWS guidelines provide a buffer distance of 1,000 vertical ft for fixed-wing aircraft during nesting periods (USFWS 2007c). The planes flying over the Beaver Pond nest are often below this level. However, it should be noted that even with these disturbances, eagles have still made use of the nest on the north side of Beaver Pond in some years. Indeed, airplanes landing and taking off directly over the nest at less than 50 ft has no apparent effect on behavior. This may be due to adaptation and familiarity of these eagles to the low floatplanes (T. Hamon, pers. comm., 4/8/2011). The overall short-term adverse impacts of the above past actions relate to the temporary noise and human activity disturbances associated with the construction and material movement at each respective development or recreation improvement. The long-term adverse effects have generally involved displaced and degraded eagle habitat for foraging, nesting, and/or roosting that resulted from facilities, roads and trails, vehicles, and the associated human activity in these areas.

Other present and reasonably foreseeable future actions would also affect bald eagles in the project area. In addition to the continuation of low floatplane flights over the nest site and occasional ground level disturbances by visitors to Beaver Pond, other actions could include additional facility improvements around the project area (e.g., the maintenance and housing development at Valley Road Administrative Area), removal (and site restoration) of Lake Brooks maintenance and housing facilities, and overall relocation of Brooks Camp and its associated uses to the Beaver Pond Terrace area). Because eagles use Beaver Pond for fishing, roosting, and nesting, future development near and around Beaver Pond could have the most notable adverse effects. The short-term, adverse effects of these actions would relate to the disturbances to eagle habitat from construction and project mobilization activities, including the transport of materials through the area. The adverse, long-term effects of some of these actions could involve further displacement and/or degradation of eagle habitat in parts of the project area from facility improvements or expansions and the development of the Beaver Pond Terrace area. With the additional impacts from the construction and use of the planned developments near the eagle nests and adjacent foraging areas (e.g., Beaver Pond Terrace development), there would be substantial changes to bald eagle habitat.

Consequently, the likelihood of this area being used for eagle nesting would be reduced. However, this would not result in an apparent change to the regional bald eagle population.

When the effects of alternative 1 are added to the effects of these other past, present, and reasonably foreseeable future actions, there would be a long-term, moderate, adverse, and localized cumulative impact on bald eagles. Alternative 1 would contribute a small, adverse increment to this overall adverse cumulative impact.

**Conclusion.** Alternative 1 would result in a continuing long-term, minor, adverse, and localized impact on the bald eagles in the Brooks River area. These adverse effects would primarily result from the continuance of seasonal human activity throughout the project area. However, the disturbances resulting from alternative 1 would not be expected to affect bald eagle nesting in the area.

## Alternative 2

**Analysis.** The proposed access road that would serve the new barge landing site (roughly 2,000 ft south of the existing barge landing) (figure 3) would introduce occasional human disturbances and noise to an area of bald eagle nesting, foraging, and roosting. The proposed road alignment is immediately adjacent to a bald eagle nest (north of Beaver Pond) and very near the eagle foraging/fishing area on Beaver Pond. The noise and human presence would primarily be associated with NPS and concessioner operations (e.g., motorized vehicles and barge loading/unloading), and these disturbances would primarily occur shortly before, during, and shortly after the

Brooks Camp visitation season (May to October). The disturbances at the barge landing site and along the access road that occur in spring and early summer would have the most impact on the bald eagle, because this would coincide with the critical nesting and fledgling period. Because eagles are sensitive to ground disturbance during this time, the eagles would likely be flushed from the nest more frequently, which could affect the survival of eggs and/or young—eggs would be susceptible to cooling, loss of moisture, overheating, and predation, which could lead to failure of the eggs to hatch, while the young would be vulnerable to the elements and increased potential for mortality. Frequent disturbances near the nest could deter future use of the nest and could possibly lead to permanent nest abandonment (USFWS 2007c; Cain n.d.).

The construction activities associated with the new barge landing and new access road (about 1,500 ft in length) could also have various adverse impacts on the bald eagles. Most of these construction impacts would result from the noise and activity associated with heavy construction equipment operation (e.g., road grading), material transport vehicles, and human presence. The impacts would primarily occur in two phases. First, during late summer and autumn (when earthwork and excavation construction is proposed), most of the impacts would involve disturbances to eagle foraging and roosting around Beaver Pond. Effects on nesting would be avoided because the eaglets would have fledged by then. Then in the following spring (when the barge landing site construction is proposed), the impacts would involve disturbances to eagle nesting at the nest site. To help minimize these effects, various mitigation measures would be applied to construction activities, such as maintaining mufflers on construction equipment and generators. However, there still would be the potential for the eagles to be flushed from the nest, which would increase the potential for egg and/or nestling mortality.

The construction and future pedestrian/vehicle use of the proposed elevated bridge and boardwalk in this alternative would have little or no effects on bald eagle habitat. The eagles do not currently use these areas for foraging or roosting due to the level of human activity in the surrounding area. Thus, increased noise and visual exposure from the boardwalk and bridge would not be expected to affect eagle activity.

Likewise, removal of the existing barge landing site and the access road along the river would have no effect on the bald eagles. These areas also are not used by eagles due to human activity in the surrounding area. Restoration of vegetation along the access road and barge landing site would not be expected to affect eagle activity so long as human activity continues in the project area.

Overall, the construction and future use of the proposed barge landing site and access road under alternative 2 would have short- and long-term, moderate, adverse, and localized effects on the bald eagles in the Brooks River area. These impacts would primarily occur during the visitation season at Brooks Camp, and could cause changes to bald eagle feeding, mating, nesting, or caring for young. Bald eagle behaviors and activities associated with the existing nest site near Beaver Pond would be particularly affected by the construction and use of the proposed barge landing site and access road. Depending on the timing, these activities could adversely affect eagle nesting and Beaver Pond use by bald eagles. However, changes to the regional bald eagle population would be minimal. Compared to alternative 1, alternative 2 would likely increase the adverse impacts on bald eagles and their habitat. The increase in adverse effects primarily relate to the disturbances associated with the new barge landing site and access road (immediately adjacent to the nest site).

**Cumulative Impacts.** Various other past, present, and reasonably foreseeable future projects in and near the project area have and would continue to affect the bald eagle. These projects relate to facility development, recreation access, transport vehicle noise, site restoration, and program development, as described in the "Cumulative Impacts" section under alternative 1 (including the future planned development around Beaver Pond).

When the likely adverse effects of alternative 2 are added to the effects of these other past, present, and reasonably foreseeable future actions, there would be a long-term, moderate, adverse, and localized cumulative impact on the Brooks River bald eagles. The alternative 2 actions would contribute an appreciable adverse increment to this overall adverse cumulative impact.

**Conclusion.** Alternative 2 would result in short- and long-term, moderate, adverse, localized impacts on the bald eagles in the Brooks River area. These adverse effects would primarily result from the construction and future use of a new barge landing area and access road near an eagle nest and Beaver Pond foraging and roosting areas. These activities could adversely affect bald eagle nesting in the Beaver Pond area.

## Alternative 3

**Analysis.** The construction and future pedestrian/vehicle use of the proposed elevated bridge and boardwalk in this alternative would have little or no effects on bald eagle habitat. The eagles do not currently use these areas for foraging or roosting due to the level of human activity in the surrounding area. Thus, increased noise and visual exposure from the boardwalk and bridge would not be expected to affect eagle activity.

Under alternative 3, the relatively small changes to the existing barge landing site and access road (figure 5) would not affect the eagles. The eagles would continue to avoid using this area due to the level of human activity in the surrounding area.

Overall, the construction and future use of the proposed elevated boardwalks, bridge, and changes to the barge landing site and access road under alternative 3 would have no effects on the Brooks River bald eagles. Compared to alternative 1, alternative 3 would have similar effects from human activity in the area, along the access road and barge landing site—a long-term, minor, adverse, and localized impact.

**Cumulative Impacts.** Various other past, present, and reasonably foreseeable future projects in and near the project area have and would continue to affect the bald eagle. These projects relate to facility development, recreation access, transport vehicle noise, site restoration, and program development, as described in the "Cumulative Impacts" section under alternative 1 (including the future planned development around Beaver Pond).

When the effects of alternative 3 are added to the effects of these other past, present, and reasonably foreseeable future actions, there would be a long-term, moderate, adverse, and localized cumulative impact on bald eagles. The actions in alternative 3 would contribute a small, adverse increment to this cumulative impact.

**Conclusion.** Alternative 3 would result in short- to long-term, minor, adverse, and localized impacts on the bald eagles in the Brooks River area. These effects would result from general human activity in the Brooks River area, including continued use of the barge landing site and access road.

## Alternative 4

**Analysis.** The proposed access road that would serve the new barge landing site (roughly 2,000 ft south of the existing barge landing, figure 3) would introduce occasional human disturbances and noise to an area of bald eagle nesting, foraging, and roosting. The proposed road alignment is immediately adjacent to a bald eagle nest (north of Beaver Pond) and near the eagle foraging/fishing area on Beaver Pond. The noise and human presence would primarily be associated with NPS and concessioner operations (e.g., motorized vehicles, barge loading/ unloading) and would primarily occur shortly before, during, and shortly after the Brooks Camp visitation season (May to October). The disturbances at the barge landing site and along the access road that occur in spring and early summer would have the most impact on the bald eagle because this would coincide with the critical nesting and fledgling period. Because eagles are sensitive to ground disturbance during this time, the eagles would likely be flushed from the nest more frequently, which could affect the survival of eggs and/or young—eggs would be susceptible to cooling, loss of moisture, overheating, and predation, which could lead to failure of the eggs to hatch, while the young would be vulnerable to the elements and increased potential for mortality. Frequent disturbances near the nest could deter future use of the nest and could possibly lead to permanent nest abandonment (USFWS 2007c; Cain n.d.).

The construction activities associated with the new barge landing and new access road (about 1,500 ft in length, figure 3) could also have various adverse impacts on the bald eagles. The impacts on the eagles would be the same as described in alternative 2. Although mitigation measures would be applied in alternative 4 to minimize impacts of construction, there still would be the potential for the eagles to be flushed from the nest, which would increase the potential for egg and/or nestling mortality.

The construction and future pedestrian/ vehicle use of the proposed elevated bridge and boardwalk in alternative 4 would have little or no effects on bald eagle habitat. The eagles do not currently use these areas for foraging or roosting due to the level of human activity in the surrounding area. Thus, increased noise and visual exposure from the boardwalk and bridge would not be expected to affect eagle activity.

Likewise, removal of the existing barge landing site and the access road along the river would have no effect on the bald eagles. These areas also are not used by eagles due to human activity in the surrounding area. Restoration of vegetation along the access road and barge landing site would not be expected to affect eagle activity so long as human activity continues in the project area.

Overall, the construction and future use of the proposed elevated boardwalks, bridge, barge landing, and access road under alternative 4 would have short- and long-term, moderate, adverse, and localized effects on bald eagles in the Brooks River area. These impacts would primarily occur during the visitation season at Brooks Camp, and could cause changes to bald eagle feeding, mating, nesting, or caring for young. Bald eagle behaviors and activities associated with the existing nest site near Beaver Pond would be particularly affected by the construction and use of the proposed barge landing site and access road. Depending on the timing, these activities could adversely affect eagle nesting and Beaver Pond use by bald eagles. However, changes to the regional bald eagle population would be minimal. Compared to alternative 1, alternative 4 would likely increase the adverse impacts on bald eagles and their habitat. The increase in adverse effects primarily relate to the disturbances associated with the new barge landing site and access road (immediately adjacent to nest site).

**Cumulative Impacts.** Various other past, present, and reasonably foreseeable future projects in and near the project area have and would continue to affect the bald eagle. These projects relate to facility development, recreation access, transport vehicle noise, site restoration, and program development, as described in the "Cumulative Impacts" section under alternative 1 (including the future planned development around Beaver Pond).

When the adverse effects of alternative 4 are added to the effects of these other past, present, and reasonably foreseeable future actions, there would be a long-term, moderate, adverse, and localized cumulative impact on bald eagles. The actions of alternative 4 would contribute an appreciable, adverse increment to this overall adverse cumulative impact.

**Conclusion.** Alternative 4 would result in short-and long-term, moderate, adverse, localized impacts on the bald eagles in the Brooks River area. These adverse effects would primarily result from the construction and future use of a new barge landing area and access road near an eagle nest and near Beaver Pond foraging and roosting areas. These activities could adversely affect bald eagle nesting in the Beaver Pond area.

## Alternative 5

**Analysis.** The proposed access road that would serve the new barge landing (roughly 2,000 ft south of the existing barge landing, figure 3) would introduce occasional human disturbances and noise to an area of bald eagle nesting, foraging, and roosting. The proposed road alignment is adjacent to and below a bald eagle nest (north of Beaver Pond) and near the eagle foraging/fishing area on Beaver Pond. The noise and human presence would primarily be associated with NPS and concessioner operations (e.g., motorized vehicles and barge loading/ unloading) and would primarily occur shortly before, during, and shortly after the Brooks Camp visitation season (May to October). The disturbances at the barge landing and along the access road that occur in spring and early summer would have the most impact on the bald eagle because this would coincide with the critical nesting and fledgling period. Because eagles are sensitive to ground disturbance during this time, the eagles would likely be flushed from the nest more frequently, which could affect the survival of eggs and/or young—eggs would be susceptible to cooling, loss of moisture, overheating and predation, which could lead to failure of the eggs to hatch, while the young would be vulnerable to the elements and increased potential for mortality. Frequent disturbances near the nest could deter future use of the nest and possibly lead to permanent nest abandonment (USFWS 2007c; Cain n.d.).

The construction activities associated with the new barge landing and new access road (about 1,500 ft in length, figure 3) could also have various adverse impacts on the bald eagles. The impacts on the eagles would be the same as described in alternative 2. Although mitigation measures would be applied in alternative 5 to minimize impacts of construction, there still would be the potential for the eagles to be flushed from the nest, which would increase the potential for egg and/or nestling mortality.

The construction and future pedestrian/ vehicle use of the proposed elevated bridge and boardwalk in alternative 5 would have little or no effects on bald eagle habitat. The eagles do not currently use these areas for foraging or roosting due to the level of human activity in the surrounding area. Thus, increased noise and visual exposure from the boardwalk and bridge would not be expected to affect eagle activity.

Likewise, removal of the existing barge landing site and the access road along the river would have no effect on the bald eagles. These areas also are not used by eagles due to human activity in the surrounding area. Restoration of vegetation along the access road and barge landing site would not be expected to affect eagle activity so long as human activity continues in the project area.

Overall, the construction and future use of the proposed barge landing site and access road under alternative 5 would have short- and long-term, moderate, adverse, and localized effects on bald eagles in the Brooks River area. These impacts would primarily occur during the visitation season at Brooks Camp, and could cause changes to bald eagle feeding, mating, nesting, or caring for young. Bald eagle behaviors and activities associated with the existing nest site near Beaver Pond would be particularly affected by the construction and use of the proposed barge landing site and access road. Depending on the timing, these activities could adversely affect eagle nesting and Beaver Pond use by bald eagles. Changes to the regional bald eagle population would be minimal. Compared to alternative 1, alternative 5 would likely increase the adverse impacts on bald eagles and their habitat. The increase in adverse effects primarily relate to the disturbances associated with the new barge landing site and access road (immediately adjacent to nest site).

**Cumulative Impacts.** Various other past, present, and reasonably foreseeable future projects in and near the project area have and would continue to affect the bald eagle. These projects relate to facility development, recreation access, transport vehicle noise, site restoration, and program development, as described in the "Cumulative Impacts" section under alternative 1 (including the future planned development around Beaver Pond).

When the likely adverse effects of alternative 5 are added to the effects of these other past, present, and reasonably foreseeable future actions, there would be a long-term, moderate, adverse, and localized cumulative impact on bald eagles in the Brooks River area. The alternative 5 actions would contribute an appreciable, adverse increment to this cumulative impact.

**Conclusion.** Alternative 5 would result in short- and long-term, moderate, adverse, and localized impacts on the bald eagles in the Brooks River area. These adverse effects would primarily result from the construction and future use of a new barge landing area and access road near an eagle nest and near Beaver Pond foraging and roosting areas. These activities could adversely affect bald eagle nesting in the Beaver Pond area.

## WETLANDS AND UPLAND VEGETATION

### Alternative 1

**Analysis.** Under the alternative 1, ground level pedestrian and vehicle use on maintained trail surfaces would continue throughout the project area. Minimal vegetation trampling, trail widening, and some social trail development from pedestrian and vehicle use would continue, especially in high use areas such as The Corner and along each bank of the river. In addition to native vegetation displacement, these disturbances would also create areas that are suitable for the establishment and propagation of nonnative invasive plant species.

No new areas of vegetation or wetlands would be displaced by structure, road, or trail development because alternative 1 does not include any such site developments. However, the wetland hydrology and vegetation community of delineated wetlands E, F, and G would continue to be adversely affected by the existing access roads that run along the south bank of the river and from the bridge site to the bus parking area (see wetland delineation report in appendix D for descriptions of these wetlands). The raised roadbeds of fill material and the compaction of native soils below these road surfaces are impediments to surface water and groundwater movement between these wetlands, respectively. Because the access roads run along the wetland perimeters, any eroded sediment or pollutants from the roads would continue to be deposited in the adjacent wetlands.

The construction of a ramp at the existing barge landing site would be in a lacustrine wetland, classified as a limnetic, unconsolidated bottom, permanently flooded wetland (L1UBH) (URS 2009b). Although the ramp would not affect wetlands vegetation, it would affect hydric soils and hydrology—some soils would be altered with the placement of the ramp below the high water mark and on the lake bottom, and shoreline geomorphology and possibly shoreline erosion may occur (see also the discussion of hydrology impacts). However, these adverse effects would be very small and localized, given the size of the ramp and the abundance of this wetland in Naknek Lake.

Overall, alternative 1 would result in the continuation of long-term, minor, adverse, and localized impacts on wetlands and upland vegetation. These adverse effects would relate to a continuation of vegetation trampling from human activity in various portions of the project area on both sides of the river and the continuation of wetland hydrology impacts (wetlands E, F, and G). However, these effects on wetland area, quality, and continuity and on upland vegetation communities would be minimal. The overall viability of the wetland and upland vegetation communities would not be affected.

**Cumulative Impacts.** Several past management actions in and around the project area have had notable effects on vegetation and wetlands. Most of these past actions have had adverse effects on these resources because they resulted in direct displacement of plant communities and/or altered hydrology and habitat value in or near wetland areas. The past actions that have displaced vegetation include the facility development and recreational access associated with Brooks Camp over the years (e.g., lodge, campground, visitor center, restrooms, operations facilities, utilities, guest cabins, staff housing, trails, and access roads). The past actions that have caused disturbances to wetlands primarily relate to access road/trail development and maintenance. Some of these roads appear to have displaced wetland acreage. Others roads have altered wetland surface and subsurface hydrology. The human presence associated with management and recreational use of these facilities and roads/trails has also caused wetland habitat disturbances in various areas through the project area.

Present and reasonably foreseeable future actions would also affect vegetation communities and wetlands in and around the project area. Such actions could include additional facility improvements around the project area (e.g., the maintenance and housing development at Valley Road Administrative Area, removal (and site restoration) of Lake Brooks maintenance and housing facilities, development of an alternative trail between the campground and Brooks Camp, and overall relocation of Brooks Camp and its associated uses to the south of Brooks River (near Beaver Pond Terrace). Most of these effects would be long term. The adverse effects of some of these actions could involve displacement of vegetation and wetlands by structures and roads, altered wetland hydrology, and the introduction of human activity near wetland habitats. The beneficial effects on vegetation would result from the ecological restoration associated with the relocation projects that would remove park facilities from areas along the Brooks River corridor (e.g., the Lake Brooks maintenance area and Brooks Camp).

Although the present and future actions would have notable areas of both vegetation restoration and vegetation displacement, the overall effects would generally be adverse because restored areas often do not fully return to their natural condition (e.g., due to weeds and altered vegetation succession).

When the likely adverse effects of alternative 1 are added to the effects of these other past, present, and reasonably foreseeable future actions, there would be a long-term, moderate, adverse, and localized cumulative impact on vegetation and wetlands. Alternative 1 would contribute an appreciable, adverse increment to this cumulative impact.

**Conclusion.** Alternative 1 would result in the continuation of long-term, minor, adverse, and localized impacts on wetlands and vegetation. These adverse effects would result from continued vegetation trampling and social trails from ground level pedestrian and vehicle use in the Corner area on the north side of the river and between the floating bridge and the bus parking area on the south side of the river. The continued hydrological disturbances to wetlands E, F, and G adjacent to the access roads along the south bank and between the bridge and the bus parking area would also contribute to this adverse effect.

## Alternative 2

**Analysis.** The elevated boardwalk on the north side of the river would reduce vegetation trampling and some social trail development from pedestrian and vehicle use in the area of the Corner and along the north bank of Brooks River. Vegetation in the Corner area and along the north bank would be rehabilitated and restored, and its use would be reserved primarily for bears. However, some social trail development and vegetation trampling would continue in these areas due to other continuing uses such as angling.

Undisturbed vegetation would be displaced by the support piles of the elevated boardwalks to the north and south of river. The 1,685 linear ft of elevated boardwalk and ramps in this alternative would involve single- or double-pile supports spaced 12 ft to 24 ft apart along the full length of the boardwalks. For most of the boardwalk length, the support piles would directly displace native vegetation.

The elevated boardwalk on the north side of river would follow the edge of and cross a portion of delineated wetlands H and I area (see wetland delineation report in appendix D for descriptions of these and other nearby wetlands). This would result in reduced wetland habitat value because of the proximity of human activity to the wetlands. In areas where the boardwalk crosses wetlands H and I, the boardwalk pilings would displace some limited wetland area and functionality. Oils and chemicals from vehicular use of the boardwalk could drain into the adjacent wetlands.

The elevated boardwalk on the south side of river would follow the edge of and cross portions of delineated wetlands E and F. As with the effects of the boardwalk on wetlands H and I, this would result in reduced wetland habitat value and displace some limited wetland area and functionality. The 8-foot-wide boardwalks could also introduce oils and chemicals from vehicular use into the adjacent wetlands.

However, because the elevated boardwalk on the south side of the river would remove a large volume of ground level pedestrian activity between the bridge and the bus parking area, it would reduce vegetation trampling and some social trail development south of the river. The local plant communities in this area would benefit from this reduction in ground level human activity. However, social trail development and vegetation trampling would continue along the south bank and other areas south of the river due to other continuing uses such as angling.

The wetland hydrology and plant community of delineated wetland G near the existing barge landing access road would be improved when the road is removed and the landscape restored (about 600 linear ft in length).

Under alternative 2, the proposed access road that would serve the new barge landing (roughly 2,000 ft south along of the existing site on Naknek Lake shoreline, figure 3) would displace some native vegetation and run between a complex of small emergent wetlands (delineated wetlands A, B, C, D, and J). The roadway length would be approximately 1,500 ft. Because the access road would bisect this wetland complex, wetland continuity could be negatively affected. Although the proposed access road would be routed to avoid crossing the jurisdictional wetlands, a culvert would be needed to cross a small drainage connecting wetlands D and J. This may require a small amount of fill to be placed in the wetlands. Assuming about a 2-foot diameter culvert, around 300 $ft^2$ of the two wetlands would be lost by the construction of the culvert and placement of fill.

The construction of a ramp at the barge landing site would be in a lacustrine wetland, classified as a limnetic, unconsolidated bottom, permanently flooded wetland (L1UBH) (URS 2009b). Although the ramp would not affect wetlands vegetation, it would affect hydric soils and hydrology—some soils would be altered with the placement of the ramp below the high water mark and on the lake bottom, and shoreline geomorphology and possibly shoreline erosion may occur (see also the discussion of hydrology impacts). However, these adverse effects would be very small and localized, given the size of the ramp and the abundance of this wetland in Naknek Lake.

Throughout the project area, an estimated total of 1.6 acres of vegetation (wetland and upland) would be directly displaced by the actions in this alternative (roughly 0.3 acre for bridge and boardwalk development and 1.3 acres for barge landing access road and site development). Conversely, this alternative would include the restoration of approximately 0.45 acre of vegetation (0.15 acre for restored trails and 0.3 acre for the restored barge landing site and access road along the south bank).

The construction of the bridge, elevated boardwalk, barge landing, and landing access road would have multiple direct and indirect effects on the vegetation and wetlands near the construction activities. As noted above, delineated wetlands D, E, F, G, H, I, and J would be directly affected. Some examples of construction-related impacts include incidental ground disturbances to construction site periphery, sedimentation resulting from adjacent disturbed soils, and wetland habitat disturbance from construction activities and human presence. Wetland hydrology also could be adversely affected by soil compaction. However, to minimize or avoid these effects on vegetation and wetlands, mitigation measures, abatement, and construction best management practices would be used. These measures would include a revegetation plan, erosion/ sedimentation controls, maintained construction limits, and appropriate stockpile locations and containment.

In addition, the construction of the bridge, boardwalk, barge landing, and landing access road could have some long-term impacts on vegetation in the area. The ground disturbances associated with the construction activities would create areas that are suitable for the establishment and propagation of nonnative invasive plant species. Some areas of restoration would be reclaimed with active soil preparation and native replanting, while other areas would be left for passive, natural restoration over time. These passively restored areas would be most prone to the spread of nonnative, invasive plants. To minimize this effect, various weed control and revegetation best management practices would be employed (e.g., use of weed-free materials, construction equipment washing, and postconstruction monitoring and weed control).

Lastly, this alternative includes two utility lines (electric and septic pump-out) that would be mounted to the bridge and elevated boardwalks. The only effect these utilities could have on vegetation in the project area would be in the areas where the lines transition from above the ground (attached to boardwalk structure) to being buried underground. On the north end of the utility lines, a small ground disturbance from these lines could occur near the fish freezing station at the south end of Brooks Camp. On the south end, a small ground disturbance could occur from the septic pump-out line at the end of the vehicle ramp relatively near the south riverbank. The electric line would be buried along the existing roadbed from the end of the boardwalk to the bus parking area (about 100 ft).

Overall, alternative 2 would result in a short- to long-term, moderate, adverse, and localized impact to wetlands and upland vegetation due to the development of the bridge, boardwalk, and barge landing access road, and the continuing ground level human activities on both sides of Brooks River. There would be some direct loss of wetlands along the proposed boardwalks and access routes for wetlands D, E, F, H, I, and J. The effects on upland vegetation would cause measurable changes to the abundance and distribution of individual plant species, and could continue to affect the viability of portions of the local vegetation communities. These adverse effects primarily relate to direct displacement of vegetation and the reduced quality of upland vegetation communities from the development of the bridge, boardwalks, and new barge landing access road. Compared to alternative 1, alternative 2 would result in an increase in adverse effects to wetlands and upland vegetation due to the expanded areas of boardwalk and road development. However, compared to alternative 1, reductions in vegetation trampling from park visitors and improved hydrology and vegetation cover near wetland G would be expected from the restoration of the adjacent access road.

**Cumulative Impacts**. Various other past, present, and reasonably foreseeable future projects in and near the project area have and would continue to affect wetlands and upland vegetation. These projects relate to facility development, recreation access, site restoration, and program development, as described in the “Cumulative Impacts” section under alternative 1 above.

When the likely effects of alternative 2 actions are added to the effects of these other past, present, and reasonably foreseeable future actions, there would be a long-term, moderate, adverse, and localized cumulative impact on vegetation and wetlands. Alternative 2 would contribute an appreciable, adverse increment to this cumulative impact.

**Conclusion.** Alternative 2 would result in short- to long-term, moderate, adverse, and localized impacts on upland vegetation and wetlands. Some wetlands would be lost, but the total loss would be less than 0.1 acre. The adverse effects would primarily result from displaced and altered vegetation along the alignment of the proposed boardwalks, disturbances to wetlands H and I (to the west of Brooks Camp) and wetlands E and F (between the bridge and the bus parking area), vegetation impacts from the proposed access road to the new barge landing area, loss of some wetlands in D and J due to construction of a culvert along the new road, and possible impacts from site construction activities (e.g., sedimentation and propagation of nonnative invasive plant species). However, wetlands and vegetation would benefit from the reduced potential for vegetation trampling and social trails on both sides of the river and the restored wetland hydrology of wetland G along the restored barge landing access road area.

## Alternative 3

**Analysis.** The elevated boardwalk on the north side of the river would reduce vegetation trampling and social trail development from pedestrian and vehicle use in the Corner and along the north bank of Brooks River. Vegetation in the Corner area and along the north bank would be rehabilitated and restored. However, some social trail development and vegetation trampling would continue in these areas due to other continuing uses such as angling.

Some upland vegetation in the Corner area, as well as some undisturbed vegetation near the south bank of the river, would be displaced by the piling support systems of the elevated boardwalks. The 530 linear ft of elevated boardwalks in this alternative would involve single- and double-pile supports spaced at 12 ft to 24 ft apart along the full length of the boardwalks. However, because much of the proposed boardwalk alignment under alternative 3 follows existing disturbance corridors (e.g., along existing road/trail), the impact on vegetation would be relatively minimal.

Under alternative 3, a minor realignment of barge landing access road near the mouth of the river would displace a limited amount of native vegetation. The proposed end of the access road would be about 200 ft south of the existing barge landing access point (figure 5). Because much of the vegetation in this realignment area has already been displaced by past activities, the displacement of vegetation from this action would be minimal.

The construction of a ramp at the barge landing site would be in a lacustrine wetland, classified as a limnetic, unconsolidated bottom, permanently flooded wetland (L1UBH) (URS 2009b). Although the ramp would not affect wetlands vegetation, it would affect hydric soils and hydrology—some soils would be altered with the placement of the ramp below the high water mark and on the lake bottom, and shoreline geomorphology and possibly shoreline erosion may occur (see also the discussion of hydrology impacts). However, these adverse effects would be very small and localized, given the size of the ramp and the abundance of this wetland in Naknek Lake.

Throughout the project area, an estimated total of 0.54 acre of vegetation would be directly displaced by the actions in this alternative (0.04 acre for bridge and boardwalk development and 0.5 acre for barge landing site/access road development). Conversely, this alternative would include the restoration of approximately 0.25 acre of vegetation (0.07 acre for restored trails and 0.18 acre for the restored barge landing site and access near the spit).

The construction of the bridge, elevated boardwalk, barge landing, and short access road segment would have some short-term effects on native vegetation near the construction activities. Some examples of these construction-related impacts include incidental ground disturbances of construction site periphery; sedimentation resulting from adjacent disturbed soils; and habitat disturbance from construction activities, noise, and human presence. However, to minimize or avoid these effects on vegetation, mitigation measures, abatement, and construction best management practices would be used. These measures would include a revegetation plan, erosion/sedimentation controls, maintained construction limits, and appropriate stockpile locations and containment.

In addition, the construction of the bridge and boardwalks could have some long-term adverse impacts on vegetation in the area. The ground disturbances associated with the construction activities would create areas that are suitable for the establishment and propagation of nonnative invasive plant species. Some areas of restoration would be reclaimed with active soil preparation and native replanting, while other areas would be left for passive, natural restoration over time. These passively restored areas would be most prone to the spread of nonnative invasive plants. To minimize this effect, various weed control and revegetation best management practices would be employed (e.g., use of weed-free materials, construction equipment washing, and postconstruction monitoring and weed control).

Lastly, this alternative also includes two utility lines (electric and septic pump-out) that would be mounted to the bridge and elevated boardwalks. The only effect these utilities could have on vegetation in the project area would be where the lines transition from above the ground (attached to boardwalk structure) to being buried underground. At the north end of the utility lines, a small ground disturbance from these lines could occur near the fish freezing station at the south end of Brooks Camp. On the south end, a small ground disturbance could occur from the septic pump-out line at the end of the vehicle ramp relatively near the south riverbank. The electric line would be buried and routed along the existing access roadbed from the end of the boardwalk ramp to the bus parking area (about 1,000 ft).

Overall, alternative 3 would result in a short- to long-term, minor, adverse, and localized impact to wetlands and upland vegetation due to the development of the bridge and boardwalk, and the continuing ground level human activities on both sides of Brooks River. Alternative 3 would only have a slight adverse impact on the lacustrine wetland in Naknek Lake, and also have only slight effects on the abundance and distribution of upland vegetation species and communities. The adverse effects would relate to direct displacement of or encroachment on vegetation acreage at the fringes of the proposed developed area (e.g., boardwalk) and temporary effects of construction activities. Compared to alternative 1, alternative 3 would likely result in in similar adverse effects to wetlands and upland vegetation because the proposed board-walks, ramps, and accesses are primarily aligned in already disturbed areas.

**Cumulative Impacts.** Various other past, present, and reasonably foreseeable future projects in and near the project area have and would continue to affect wetlands and upland vegetation. These projects relate to facility development, recreation access, site restoration, and program development, as described in the "Cumulative Impacts" section under alternative 1 above.

When the likely effects of alternative 3 actions are added to the effects of these other past, present, and reasonably foreseeable future actions, there would be a long-term, moderate, adverse, and localized cumulative impact on vegetation and wetlands. Alternative 3 would contribute a small, adverse increment to this cumulative impact.

**Conclusion.** Alternative 3 would result in a short- to long-term, minor, adverse, and localized impact on wetlands and vegetation. The adverse effects would primarily result from displaced and altered vegetation along the alignment of the proposed boardwalk, possible impacts from site construction activities (e.g., sedimen-tation, and propagation of nonnative invasive plant species), and the effects of the barge landing ramp on the Lake Naknek lacustrine wetland. However, the proposed boardwalks, ramps, and accesses are primarily aligned in already disturbed areas, so the adverse effects would be minimal. The wetlands and upland vegetation would also benefit from the reduced potential for vegetation trampling and social trails on the north side of the river.

## Alternative 4

**Analysis.** The elevated boardwalk on the north side of the river would reduce vegetation trampling and some social trail development from pedestrian and vehicle use in the Corner and along the north bank of Brooks River. Vegetation in the Corner area and along the north bank would be rehabilitated and restored. However, some social trail development and vegetation trampling would continue in these areas due to other continuing uses such as angling.

Undisturbed vegetation would be displaced by the support piles of the elevated boardwalks to the north and south of river. The 1,190 linear ft of elevated boardwalk in this alternative would involve single- or double-pile supports spaced at 12 ft to 24 ft apart along the full length of the boardwalks. For most of the boardwalk length, the support piles would directly displace native vegetation.

The elevated boardwalk on the north side of river would follow the edge of and cross a portion of delineated wetlands H and I (see wetland delineation report in appendix D for descriptions of these and other nearby wetlands). This would result in reduced wetland habitat value because of nearby human activity. In areas where the boardwalk crosses wetlands H and I, the boardwalk pilings (spaced at 12 ft to 24 ft) would displace some limited wetland area and functionality. Oils and chemicals from vehicular use of the boardwalk could also drain into the adjacent wetlands.

The elevated boardwalk on the south side of river would follow the edge of and cross a substantial portion of delineated wetlands E and F. As with the effects of the boardwalk on wetlands H and I, this would result in reduced wetland habitat value and displace some limited wetland area and functionality. The 8-foot-wide boardwalks could also introduce oils and chemicals from vehicular use into the adjacent wetlands.

However, because the elevated boardwalk on the south side of the river would remove a large volume of ground level pedestrian and vehicle activity between the bridge and the bus parking area, it would reduce vegetation trampling and social trail development south of the river. The local plant communities in this area would benefit from this reduction in ground level human activity. However, as on the north side of the river, some social trail development and vegetation trampling would continue due to other continuing ground level uses such as angling.

The wetland hydrology and plant community of delineated wetland G near the existing barge landing access road would be improved when the road is removed and the landscape restored (about 600 ft in length).

In addition to restoring the barge landing access road area, alternative 4 would include the restoration of approximately 600 ft of the access road that currently connects the bridge to the bus parking area (see map 6). This portion of the access road would no longer be needed because the pedestrians and NPS and concessioner vehicles would use the proposed elevated boardwalk that connects the bridge with the bus parking area. This road restoration would improve conditions for upland vegetation and wetlands along the restored road corridor, as well as restore the hydrology and habitat conditions of the adjacent delineated wetlands F and G (which were previously bisected by the road).

The proposed access road that would serve the new barge landing (roughly 2,000 ft south along the existing site on Naknek Lake shoreline) (figure 3) would displace some native vegetation and run between a complex of small emergent wetlands (delineated wetlands A, B, C, D, and J). The roadway length would be approximately 1,500 ft. Because the access road would bisect this wetland complex, wetland continuity could be negatively affected. Although the proposed access road would be routed to avoid crossing through the jurisdictional wetlands, a culvert would be needed to cross a small drainage connecting wetlands D and J. This may require a small amount of fill to be placed in the wetland. Assuming about a 2-foot diameter culvert, around 300 $ft^2$ of the two wetlands would be lost due to construction of the culvert and placement of fill.

The construction of a ramp at the barge landing site would be in a lacustrine wetland, classified as a limnetic, unconsolidated bottom, permanently flooded wetland (L1UBH) (URS 2009b). Although the ramp would not affect wetlands vegetation, it would affect hydric soils and hydrology—some soils would be altered with the placement of the ramp below the high water mark and on the lake bottom, and shoreline geomorphology and possibly shoreline erosion may occur (see also the discussion of hydrology impacts). However, these adverse effects would be very small and localized, given the size of the ramp and the abundance of this wetland in Naknek Lake.

Throughout the project area, an estimated total of 1.5 acres of vegetation (wetland and upland) would be directly displaced by the actions in this alternative (roughly 0.2 acre for bridge and boardwalk development and 1.3 acres for barge landing access road and site development). Conversely, this alternative would include the restoration of approximately 0.59 acre of vegetation (0.15 acre for restored trails and 0.44 acre for the restored access roads and barge landing).

The construction of the bridge, elevated boardwalk, barge landing, and landing access road would have multiple direct and indirect effects on vegetation and the wetlands near the construction activities. As noted above, delineated wetlands D, E, F, G, H, I, and J would be directly affected. Some examples of construction-related impacts include incidental ground disturbances to construction site periphery; sedimentation resulting from adjacent disturbed soils; and wetland habitat disturbance from construction activities, noise, and human presence. However, to minimize or avoid these effects on vegetation and wetlands, mitigation measures, abatement, and construction best management practices would be used. These measures would include a revegetation plan, erosion/sedimentation controls, maintained construction limits, and appropriate stockpile locations and containment.

The construction of the bridge, boardwalk, barge landing, and landing access road could have some long-term impacts on vegetation in the area. The ground disturbances associated with construction activities would create areas that are suitable for the establishment and propagation of nonnative invasive plant species. Some areas of restoration would be reclaimed with active soil preparation and native replanting, while other areas would be left for passive, natural restoration over time. These passively restored areas would be most prone to the spread of nonnative, invasive plants. To minimize this effect, various weed control and revegetation best management practices would be employed (e.g., use of weed-free materials, construction equipment washing, and postconstruction monitoring and weed control).

Lastly, this alternative also includes two utility lines (electric and septic pump-out) that would be mounted to the bridge and elevated boardwalks. The only effect these utilities could have on vegetation in the project area would be in the areas where the lines transition from above the ground (attached to boardwalk structure) to being buried underground. At the north end of the utility lines, a small ground disturbance from these lines could occur near the fish freezing station at the south end of Brooks Camp. On the south end, a small ground disturbance could occur from the septic clean-out line at the end of the ramp relatively near the bus parking area. The electric line would be buried along the existing roadbed from the end of the boardwalk ramp to the bus parking area (approximately 100 ft).

Overall, alternative 4 would result in a short- to long-term, moderate, adverse, and localized impact to wetlands (but resulting in a total loss of less than 0.1 acre of wetlands) and upland vegetation due to the development of the bridge, boardwalk, and barge landing access road, and the continuing ground level human activities on both sides of Brooks River. There would be some direct loss of wetlands along the proposed boardwalks and access routes for wetlands D,E, F, H, I, and J. The effects on upland vegetation would cause measurable changes to the abundance and distribution of individual plant species, and could continue to affect the viability of portions of the local vegetation communities. These adverse effects relate to direct displacement of vegetation and the reduced quality of upland vegetation communities. Compared to alternative 1, alternative 4 would likely result in an increase in adverse effects to wetlands and upland vegetation due to the expanded areas of boardwalk and road development. However, compared to alternative 1, reductions in vegetation trampling from park visitors, restored vegetation along the existing access road corridors, and improved hydrology at wetland G would be expected.

**Cumulative Impacts.** Various other past, present, and reasonably foreseeable future projects in and near the project area have and would continue to affect wetlands and upland vegetation. These projects relate to facility development, recreation access, site restoration, and program development, as described in the "Cumulative Impacts" section under alternative 1 above.

When the likely effects of alternative 4 actions are added to the effects of these other past, present, and reasonably foreseeable future actions, there would be a long-term, moderate, adverse, and localized cumulative impact on vegetation and wetlands. Alternative 4 would contribute an appreciable, adverse increment to this cumulative impact.

**Conclusion***.* Alternative 4 would result in a short- to long-term, moderate, adverse, and localized impact on wetlands and upland vegetation. Some wetlands would be lost, but the total loss would be less than 0.1 acre. The adverse effects would primarily result from displaced and altered vegetation along the alignment of the proposed boardwalks, disturbances to wetlands H and I (west of Brooks Camp) and to wetlands E and F (between the bridge and the bus parking area), vegetation impacts from the new access road to the new barge landing area, loss of some wetlands in D and J due to construction of a culvert along the new road, and possible impacts from site construction activities (e.g., sedimentation and propagation of nonnative invasive plant species). However, wetlands and vegetation would also benefit from the reduced potential for vegetation trampling and social trails on both sides of the river, restored vegetation between along the access road between the bridge and bus parking area, and the restored wetland hydrology of wetland G along the restored barge landing access road area.

## Alternative 5

**Analysis***.* The elevated boardwalk on the north side of the river would reduce vegetation trampling and some social trail development from pedestrian and vehicle use in the Corner and along the north bank of Brooks River. Vegetation in the Corner area and along the north bank would be rehabilitated and restored. However, some social trail development and vegetation trampling would continue in these areas due to other continuing uses such as angling.

Undisturbed vegetation would be displaced by the support piles of the elevated boardwalks to the north and south of river. The 770 linear ft of elevated boardwalk in this alternative would involve single- or double-pile supports spaced at 12 ft to 24 ft apart along the full length of the boardwalks. For most of the boardwalk length, the support piles would directly displace native vegetation.

The elevated boardwalk on the north side of river would follow the edge of and cross a portion of delineated wetlands H and I (see wetland delineation report in appendix D for descriptions of these and other nearby wetlands). This would result in reduced wetland habitat value because of human activity near the wetlands. In areas where the boardwalk crosses wetlands H and I, the boardwalk pilings (spaced at 12 ft to 24 ft) would displace some limited wetland area and functionality. Oils and chemicals from vehicular use of the boardwalk could also drain into the adjacent wetlands.

The wetland hydrology and plant community of delineated wetland G near the existing barge landing access road (approximately 600 ft in length) would be improved when the road is removed and the landscape restored.

Under alternative 5 the proposed access road that would serve the new barge landing (roughly 2,000 ft south of the existing site on Naknek Lake shoreline, figure 3) would displace a some native vegetation and run between a complex of small emergent wetlands (delineated wetlands A, B, C, D, and J). The roadway length would be approximately 1,500 ft. Because the access road would bisect this wetlands complex, wetland continuity could be negatively affected. Although the proposed access road would be routed to avoid crossing the jurisdictional wetlands, a culvert would be needed to cross a small drainage connecting wetlands D and J. This may require a small amount of fill to be placed in the wetland. Assuming about a 2-foot diameter culvert, about 300 square feet of the two wetlands would be lost due to the construction of the culvert and placement of fill.

The construction of a ramp at the barge landing site would be in a lacustrine wetland, classified as a limnetic, unconsolidated bottom, permanently flooded wetland (L1UBH) (URS 2009b). Although the ramp would not affect wetlands vegetation, it would affect hydric soils and hydrology—some soils would be altered with the placement of the ramp below the high water mark and on the lake bottom, and shoreline geomorphology and possibly shoreline erosion may occur (see also the discussion of hydrology impacts). However, these adverse effects would be very small and localized, given the size of the ramp and the abundance of this wetland in Naknek Lake.

Throughout the project area, an estimated total of 1.4 acres of vegetation (wetland and upland) would be directly displaced by the actions in this alternative (roughly 0.14 acre for bridge and boardwalk development and 1.3 acres for barge landing access road and site development). Conversely, this alternative would include the restoration of approximately 0.45 acre of vegetation (0.15 acre for restored trails and 0.30 acre for the restored barge landing access road and site).

The construction of the bridge, elevated boardwalk, barge landing, and landing access road would have multiple, direct and indirect effects on vegetation and the wetlands near the construction activities. As noted above, delineated wetlands D, G, H, I, and J would be directly affected. Some examples of construction-related impacts include incidental ground disturbance to construction site periphery; sedimentation resulting from adjacent disturbed soils; and wetland habitat disturbance from construction activities, noise, and human presence. However, to minimize or avoid these effects on vegetation and wetlands, mitigation measures, abatement, and construction best management practices would be used. These measures would include a revegetation plan, erosion/ sedimentation controls, maintained construction limits, and appropriate stockpile locations and containment.

In addition, the construction of the bridge, boardwalk, barge landing, and landing access road could have some long-term impacts on vegetation in the area. The ground disturbances associated with the construction activities would create areas that are suitable for the establishment and propagation of nonnative, invasive plant species. Some areas of restoration would be reclaimed with active soil preparation and native replanting, while other areas would be left for passive, natural restoration over time. These passively restored areas would be most prone to the spread of nonnative, invasive plants. To minimize this effect, various weed control and revegetation best management practices would be employed (e.g., use of weed-free materials, construction equipment washing, and postconstruction monitoring and weed control).

Lastly, this alternative also includes two utility lines (electric and septic pump-out) that would be mounted to the bridge and elevated boardwalks. The only effect these utilities could have on vegetation in the project area would be in the areas where the lines transition from above the ground (attached to boardwalk structure) to being buried underground. At the north end of the utility lines, a small ground disturbance from these lines could occur near the fish freezing station at the south end of Brooks Camp. On the south end, a small ground disturbance could occur from the septic clean-out line at the end of the vehicle ramp near the south riverbank. The electric line would be buried and routed along the existing access roadbed from the end of the boardwalk ramp to the bus parking area (approximately 1,000 ft in distance).

Overall, alternative 5 would result in a short- to long-term, moderate, adverse, and localized impact to wetlands and upland vegetation due to development of the bridge, boardwalk, and barge landing access road, and the continuing ground level human activities on both sides of Brooks River. There would be some direct loss of wetlands along the proposed boardwalks and access routes for wetlands D, H, I, and J. The effects on upland vegetation would cause measurable changes to the abundance and distribution of individual plant species, and could continue to affect the viability of portions of the local vegetation communities. These adverse effects relate to direct displacement of vegetation and the reduced quality of upland vegetation communities. Compared to alternative 1, alternative 5 would likely result in an increase in adverse effects to wetlands and upland vegetation due to the expanded areas of boardwalk and road development. However, compared to alternative 1, reductions in vegetation trampling from park visitors on the north side of the river and improved hydrology and vegetation cover near wetland G would be expected from the restoration of the adjacent barge landing access road.

**Cumulative Impacts.** Various other past, present, and reasonably foreseeable future projects in and near the project area have and would continue to affect wetlands and upland vegetation. These projects relate to facility development, recreation access, site restoration, and program development, as described in the "Cumulative Impacts" section under alternative 1 above.

When the likely effects of alternative 5 actions are added to the effects of these other past, present, and reasonably foreseeable future actions, there would be a long-term, moderate, adverse, and localized cumulative impact on vegetation and wetlands. Alternative 5 would contribute an appreciable, adverse increment to this cumulative impact.

**Conclusion.** Alternative 5 would result in short- to long-term, moderate, adverse, and localized impacts on wetlands and vegetation. The adverse effects would primarily result from displaced and altered vegetation along the alignment of the proposed boardwalks, disturbances to wetlands H and I (west of Brooks Camp, vegetation impacts from the proposed access road to the new barge landing area, loss of some wetlands in D and J due to construction of a culvert along the new road, and possible impacts from site construction activities (e.g., sedimentation and propagation of nonnative invasive plant species). However, wetlands and vegetation would benefit from the reduced potential for vegetation trampling and social trails on the north side of the river and the restored wetland hydrology of wetland G along the restored barge landing access road area.

## HYDROLOGY AND FLOODPLAINS

### Alternative 1 (No Action)

**Analysis**. Under alternative 1, river geomorphology, floodplains, groundwater flow, and channel flow hydraulics of Brooks River would continue to function as they have in the past. Naturally occurring changes to these attributes would continue each year because of dynamic nature of a meandering river. Because the floating bridge would remain in the upper water column of the river during visitation months, it would continue to affect or obstruct river flow hydraulics and geomorphology, particularly during periods of high runoff or flooding. Likewise, riverbank erosion would continue on both the north and south banks of Brooks River near the floating bridge anchor points, necessitating continued bank stabilization efforts. Soil erosion near floating bridge anchor points and from periodic hauling of septic waste across the river would continue to result in increases in river turbidity and downstream sedimentation. However, the turbidity and sedimentation associated with the erosion at the bridge anchor points and from the hauling operations are negligible relative to the sedimentation effects of natural processes such as storm events and geomorphic shifts in the river.

The barge landing access road along south bank of the river would continue to alter surface and subsurface hydrology between adjacent delineated wetland G and Brooks River (i.e., continuing to disrupt hydrological connectivity). Similarly, the access road that connects the bridge area with the bus parking area would continue to affect surface and subsurface hydrology between delineated wetlands F and G. The raised roadbeds of fill material and the compaction of native soils below these road surfaces are impediments to surface water and groundwater movement between these wetlands, respectively.

The periodic dredging of the barge landing site would continue to result in some impacts to the Naknek Lake floodplain. Dredging would affect sediments and turbidity in the bulkhead area. However, only a small amount of lakeshore sediments (approximately 20–60 cubic yards) would be annually removed from the site. Due to the size of the lake, wave action, and weather patterns, sediments within the bulkhead area reaccumulate in one or two years.

The construction of a hardened ramp at the barge landing site would not affect the hydrology of Naknek Lake. The ramp would alter the shoreline geomorphology, which in turn could result in some shoreline erosion in the wave zone of the lake. However, given the size of the ramp (24 ft to 30 ft wide) a relatively small area of shoreline potentially would be affected by the ramp.

Overall, the continued annual use of the floating bridge and presence of the barge landing access road under alternative 1 would have a long-term, moderate, adverse, and localized effect on hydrology and floodplains. This continued obstruction to upper water column flow and associated hydraulic effects would trigger multiple changes to hydrology, channel or bank erosion, and river geomorphology. The continued presence of the barge landing access road would also affect floodplain processes to the south of the river. Collectively, these impact agents could have detectable effects on the overall hydrological system of the project area.

**Cumulative Impacts.** The past management actions that expanded recreation access in the Brooks Camp area and beyond prompted the annual use of the temporary floating bridge across Brooks River. This past action introduced annual adverse effects on river flow hydraulics, which contributes to changes in river geomorphology and bank erosion, both in the mid-channel areas as well as along the banks, both upstream and downstream from the bridge anchor points on each shoreline. In addition, the placement and removal of the floating bridge each spring and fall has introduced riverbed and bank disturbances from the equipment used to move the bridge.

Past management actions have involved the development of access roads and trails along both banks of Brooks River. On the north bank, the development and use of the trail between Brooks Camp and the floating bridge has contributed to the loss of vegetation along the north bank over time. This lack of vegetation stabilization along the river shores has contributed to bank erosion in areas downstream of the bridge. However, it should be noted that the wave action and floodwaters near the river mouth (due to high water levels in Naknek Lake and/or east winds) is the primary factor causing this bank erosion. On the south bank, the development of the barge landing access road has altered the surface water and groundwater hydrology and floodplain functions of delineated wetland G (just south of the river).

Other present and reasonably foreseeable future projects in the project area would have no known effect on the hydrology and floodplain functions of the Brooks River corridor.

When the likely effects of alternative 1 are added to the effects of these other past, present, and reasonably foreseeable future actions, there would be a long-term, moderate, adverse, and localized cumulative impact on the hydrology and floodplains. Alternative 1 would contribute a large, adverse increment to this cumulative impact.

**Conclusion.** Alternative 1 would continue to have a long-term, moderate, adverse, and localized effect on hydrology and floodplains. These adverse effects would primarily result from the continued use of the floating bridge across Brooks River. The bridge would continue to alter river flow hydraulics and geomorphology (because of blocking upper levels of water column), as well as contribute to bank erosion in areas near the bridge anchor points.

## Alternative 2

**Analysis.** Alternative 2 would eliminate the seasonal floating bridge and associated impacts to surface flow hydraulics (and their downstream effects) during the spring, summer, and fall. Annual bank erosion near the bridge anchor points and impacts on river hydrology and water quality from the annual floating bridge installation and removal would no longer occur.

In this alternative the fill that has been added over the past several decades to build up and support the trail on the north side of Brooks River (upstream of the floating bridge anchor point) would be removed. Minimal, temporary effects to river water turbidity and sedimentation during and shortly after these construction activities would occur. However, overall, this action would eliminate an artificial earthen obstruction to river flows and the resulting geomorphology.

Under alternative 2 the foundation for the proposed 360-foot steel truss bridge would involve two pile systems in the Brooks River channel (spaced 120 ft apart). Each pile system would include two piles anchored in the riverbed. These piles would result in altered flow dynamics around the piles, which could lead to hydraulic scouring in the riverbed around the piles. When scouring occurs, sediment deposition would likely occur, resulting in sandbar development. In addition, the pile obstructions in the channel could lead to the accumulation of debris and/or ice dam buildup. Items such as tree limbs, brush, and ice chunks could build up on the upstream side of the pile systems. The debris buildup itself would further alter the dynamics of the river's flow. The altered river hydraulics caused by the debris buildup behind the piles could compound the riverbed scouring, sediment deposition, and sandbar development immediately downstream of the pile systems. If this happens, more alterations to the river's downstream flow hydraulics would occur. Removal of the debris buildup on bridge piles would help mitigate some of these effects during the times of year when NPS staff are present. In addition, because this alternative only includes two pile systems in the channel, these effects would be limited.

The in-river construction of the bridge pilings could affect the river channel's flow hydraulics. To minimize these effects, several channel construction mitigation measures would be applied, such as diversion of river flows around work areas, cofferdams, and sediment traps. However, depending on the amount of river ice and flows during piling installation, the construction equipment and mobilization in the channel could have an adverse effect by disturbing the riverbed and stirring up sediment that would be deposited downstream.

Alternative 2 includes relocation of the barge landing to an area farther south along the shores of Naknek Lake. This relocation would allow the elimination and restoration of the barge landing access road along the south bank of the Brooks River, near the mouth. The restoration of the access road site would help restore the floodplain values of wetland G, and the hydrological connectivity between the wetland and Brooks River.

The construction of a hardened ramp at the barge landing site would not affect hydrology of Naknek Lake. The ramp would alter the shoreline geomorphology, which in turn could result in some shoreline erosion in the wave zone of the lake. However, given the size of the ramp (24 ft to 30 ft wide) a relatively small area of shoreline potentially would be affected by the ramp.

Overall, the proposed bridge structure, which involves two permanent pile systems in the Brooks River channel, would have short- and long-term, minor, adverse, and localized effect on hydrology and floodplains. In addition to construction disturbances in the riverbed, these impacts would result from the hydraulic effects of the piles and the debris caught on the piles (e.g., scouring, sedimentation), which could result in minimal or isolated changes to hydrology, channel or bank erosion, and river geomorphology. These changes would not have any measurable effect on the overall hydrologic system of the area. And, compared to alternative 1, alternative 2 would likely reduce adverse impacts to hydrology and floodplains due to the elimination of the periodic hauling of septic waste across the river and the periodic dredging of the barge landing site, removal of the temporary floating bridge and barge landing access road (and their associated negative effects, including maintenance of the floating bridge abutments and driving vehicles in the riverbed) and the limited effects of only two flow obstructions in the riverbed.

**Cumulative Impacts.** Various past projects and actions in and near the project area have affected hydrology and floodplains along the Brooks River corridor. These past effects primarily relate to the development of access roads, bank alterations, and the floating bridge installation, as described in the “Cumulative Impacts” section under alternative 1 above. However, under this alternative, the annual installation and use of the floating bridge would no longer be necessary.

Other present and reasonably foreseeable future projects in the project area would have no known effect on the hydrology and floodplain functions of the Brooks River corridor. Thus, no cumulative impacts would result.

**Conclusion.** Alternative 2 would have short- to long-term, minor, adverse, and localized impacts on hydrology and floodplains, primarily from the addition of two permanent flow obstructions to the channel (two bridge pile systems spaced at 120 ft) and the associated construction disturbances in the channel. The support piles, and river debris that catches on them, would alter flow hydraulics, which could also result in riverbed scouring and sandbar development. However, the hydrology and floodplains would benefit from the removal of the floating bridge (that alters river flow hydraulics and flooding, and contributes to bank erosion near its anchors) and the restoration of surface and subsurface flows between wetland G and the river (along the existing barge landing access road).

## Alternative 3

**Analysis.** Alternative 3 would eliminate the seasonal floating bridge and associated impacts to surface flow hydraulics (and their downstream effects) during the spring, summer, and fall. Annual bank erosion near the bridge anchor points and impacts on river hydrology and water quality from the annual floating bridge installation and removal would no longer occur.

The fill that has been added over the past several decades to build up and support the trail on the north side of Brooks River (upstream of the floating bridge anchor point) would be removed. Minimal, temporary effects to river water turbidity and sedimentation during and shortly after these construction activities would occur. However, overall, this action would eliminate an artificial earthen obstruction to river flows and the resulting geomorphology.

Under alternative 3, the foundation for the 415-foot wood truss bridge would involve six sets of two piles in the Brooks River channel (spaced at 50 ft apart). These piles would result in altered flow dynamics, which could lead to hydraulic scouring in the riverbed around the piles. When scouring occurs, sediment deposition would likely occur, resulting in sandbar development. In addition, the pile obstructions in the channel could lead to the accumulation of debris (tree limbs, brush) and/or ice chunks on the upstream side of the piles. The debris buildup would also alter the dynamics of the flows and could compound the riverbed scouring, sediment deposition, and sandbar development immediately downstream of the pile systems. If this happens, more changes to the river’s downstream flow hydraulics would occur. Removal of the debris buildup on bridge piles would help mitigate some of these effects during times of year when NPS staff are present.

The in-river construction of the bridge piles could affect the river channel’s flow hydraulics. To minimize these effects, several channel construction mitigation measures would be applied, such as diversion of river flows around work areas, cofferdams, and sediment traps. However, depending on the amount of river ice and flows during piling installation, the construction equipment and mobilization in the channel could have an adverse effect by disturbing the riverbed and stirring up sediment that would be deposited downstream.

The construction of a hardened ramp at the new barge landing site would not affect hydrology of Naknek Lake. The ramp would alter the shoreline geomorphology, which in turn could result in some shoreline erosion in the wave zone of the lake. However, given the size of the ramp (24 ft to 30 ft wide) a relatively small area of shoreline potentially would be affected by the ramp.

Overall, the proposed bridge structure, which involves six permanent pile systems in the Brooks River channel, would have short- and long-term, minor, adverse, and localized effect on hydrology and floodplains. In addition to construction disturbances in the riverbed, these impacts would result from the hydraulic effects of the piles and the debris caught on the piles (e.g., scouring, sedimentation), which could result in minimal or isolated changes to hydrology, channel or bank erosion, river geomorphology, or floodplain processes. These changes would not have any measurable effect on the overall hydrologic system of the area. Compared to alternative 1, alternative 3 would increase some impacts to hydrology and floodplains due to the installation of six permanent flow obstructions (i.e., pile systems). However, compared to alternative 1, alternative 3 would likely reduce some adverse impacts to hydrology and floodplains due to the elimination of the periodic hauling of septic waste across the river and the periodic dredging of the barge landing site. This alternative would also benefit the Brooks River hydrology and floodplains due to the elimination of the temporary floating bridge and its associated negative effects, including maintenance of the floating bridge abutments and driving vehicles in the riverbed.

**Cumulative Impacts.** Various past projects and actions in and near the project area have affected hydrology and floodplains along the Brooks River corridor. These past effects primarily relate to the development of access roads, bank alterations, and the floating bridge installation, as described in the "Cumulative Impacts" section under alternative 1 above. However, under this alternative, the annual installation and use of the floating bridge would no longer be necessary.

Other present and reasonably foreseeable future projects in the project area would have no known effect on the hydrology and floodplain functions of the Brooks River corridor. Thus, no cumulative impacts would result.

**Conclusion.** Alternative 3 would have short- to long-term, minor, adverse, and localized impacts on hydrology and floodplains, primarily from the addition of six permanent flow obstructions to the channel (i.e., six sets of bridge pile systems spaced at 50 ft) and the associated construction disturbances in the channel. The support piles, and river debris that catches on them, would alter flow hydraulics, which could also result in riverbed scouring and sandbar development. However, the hydrology would benefit from the removal of the floating bridge (that alters river flow hydraulics and flooding, and contributes to bank erosion near its anchors).

### Alternative 4

**Analysis.** Alternative 4 would eliminate the seasonal floating bridge and associated impacts to surface flow hydraulics (and their downstream effects) during the spring, summer, and fall. Annual bank erosion near the bridge anchor points and impacts on river hydrology and water quality from the annual floating bridge installation and removal would no longer occur.

The fill that has been added over the past several decades to build up and support the trail on the north side of Brooks River (upstream of the floating bridge anchor point) would be removed. Minimal, temporary effects to river water turbidity and sedimentation during and shortly after these construction activities would occur. However, overall, this action would eliminate an artificial earthen obstruction to river flows and the resulting geomorphology.

Under alternative 4, the foundation for the 350-foot wooden and steel short span bridge would involve up to 14 sets of two piles in the Brooks River channel (spaced at a minimum of 24 ft apart). These piles would result in altered flow dynamics, which could lead to hydraulic scouring in the riverbed around the piles. When scouring occurs, sediment deposition would likely occur, resulting in sandbar development. In addition, the pile obstructions in the channel could lead to the accumulation of debris (tree limbs, brush) and/or ice chunks on the upstream side of the piles. The debris buildup would also alter the dynamics of the flows and could compound the riverbed scouring, sediment deposition, and sandbar development immediately downstream of the pile systems. If this happens, more changes to the river's downstream flow hydraulics would occur. Given the many pile systems that would be in the channel under this alternative, there is a potential for a continuous, collective impact to flow, scouring, and sediment deposition across the width of the channel. Removal of the debris buildup on bridge piles would help mitigate some of these effects during times of year when NPS staff are present. However, the altered flow hydraulics would likely occur regardless of seasonal debris removal because of the large number and spacing of piles in the river.

The in-river construction of the bridge piles could affect the river channel's flow hydraulics. To minimize these effects, several channel construction mitigation measures would be applied, such as diversion of river flows around work areas, cofferdams, and sediment traps. However, depending on the amount of river ice and flows that exist during piling installation, the construction equipment and mobilization in the channel could have an adverse effect by disturbing the riverbed and stirring up sediment that would be deposited downstream.

Alternative 4 includes a relocation of the barge landing to an area farther south along the shores of Naknek Lake. This relocation would allow for the elimination and restoration of the barge landing access road along the south bank of Brooks River, near the mouth. The restoration of the access road site would help restore the floodplain values of wetland G, and the hydrological connectivity between the wetland and Brooks River.

The construction of a hardened ramp at the new barge landing site would not affect hydrology of Naknek Lake. The ramp would alter the shoreline geomorphology, which in turn could result in some shoreline erosion in the wave zone of the lake. However, given the size of the ramp (24 ft to 30 ft wide) a relatively small area of shoreline potentially would be affected by the ramp.

This alternative also calls for the restoration of a portion of the access road that connects the bridge area to the bus parking area. The removal of this north to south road, and the soil compaction that results from vehicular use, would allow local hydrological conditions to become restored (both surface water and groundwater flows).

Overall, the proposed bridge structure, which involves up to 14 permanent pile systems in the Brooks River channel, would have short- and long-term, moderate, adverse, and localized effect on hydrology and floodplains. In addition to construction disturbances in the riverbed, these impacts would result from the hydraulic effects of the piles and the debris caught on the piles (e.g., scouring, sedimentation), which could result in multiple changes to hydrology, channel or bank erosion, river geo-morphology, and/or floodplain processes. Collectively, these changes could have detectable effects on the overall hydro-logical system of the project area. Compared to alternative 1, alternative 4 would increase overall adverse impact to hydrology and floodplains primarily due to the installation of several permanent flow obstructions in the riverbed. This alternative would also benefit the Brooks River hydrology and floodplains due to the elimination of the periodic hauling of septic waste across the river and the periodic dredging of the barge landing site, and the removal of the of the temporary floating bridge and barge landing access road, and their associated negative effects, including maintenance of the floating bridge abutments and driving vehicles in the riverbed.

**Cumulative Impacts.** Various past projects and actions in and near the project area have affected hydrology and floodplains along the Brooks River corridor. These past effects primarily relate to the development of access roads, bank alterations, and the floating bridge installation, as described in the "Cumulative Impacts" section under alternative 1 above. However, under this alternative, the annual installation and use of the floating bridge would no longer be necessary.

Other present and reasonably foreseeable future projects in the project area would have no known effect on the hydrology and floodplain functions of the Brooks River corridor. Thus, no cumulative impacts would result.

**Conclusion.** Alternative 4 would have short- to long-term, moderate, adverse, and localized impacts on hydrology and floodplains, primarily from the addition of up to 14 permanent flow obstructions to the channel (14 bridge pile systems spaced at 24 ft) and the associated construction disturbances in the channel. The support piles, and river debris that catches on them, would alter flow hydraulics, which could also result in scouring and sandbar development. However, the hydrology would benefit from the removal of the floating bridge (that alters river flow hydraulics and flooding, and contributes to bank erosion near its anchors) and the restoration of surface and subsurface flows between wetland G and the river (along the existing barge landing access road).

## Alternative 5

**Analysis.** Alternative 5 would eliminate the seasonal floating bridge and associated impacts to surface flow hydraulics (and their downstream effects) during the spring, summer, and fall. Annual bank erosion near the bridge anchor points and impacts on river hydrology and water quality from the annual floating bridge installation and removal would no longer occur.

The fill that has been added over the past several decades to build up and support the trail on the north side of Brooks River (upstream of the floating bridge anchor point) would be removed. Minimal, temporary effects to river water turbidity and sedimentation during and shortly after these construction activities would occur. However, overall, this action would eliminate an artificial earthen obstruction to river flows and the resulting geomorphology.

Under alternative 5 the proposed bridge design would be the same as the bridge in alternative 4. The foundation for the 350-foot wooden and steel short span bridge would involve up to 14 sets of two piles in the Brooks River channel (spaced at a minimum of 24 ft apart). These piles would result in altered flow dynamics, which could lead to hydraulic scouring in the riverbed around the piles. When scouring occurs, sediment deposition would likely occur, resulting in sandbar development. In addition, the pile obstructions in the channel could lead to the accumulation of debris (tree limbs, brush) and/or ice chunks on the upstream side of the piles. The debris buildup would also alter the dynamics of the flows and could compound the riverbed scouring, sediment deposition, and sandbar development immediately downstream of the pile systems. If this happens, more changes to the river's downstream flow hydraulics would occur. Given the many pile systems that would be located in the channel under this alternative, there is a potential for a continuous, collective impact to flow, scouring, and sediment deposition across the width of the channel. Removal of the debris buildup on bridge piles would help mitigate some of these effects during times of year when NPS staff are present. However, the altered flow hydraulics would likely occur regardless of seasonal debris removal because of the large number and spacing of piles in the river.

The in-river construction of the bridge piles could affect the river channel's flow hydraulics. To minimize these effects, several channel construction mitigation measures would be applied, such as diversion of river flows around work areas, cofferdams, and sediment traps. However, depending on the amount of river ice and flows that exist during piling installation, the construction equipment and mobilization in the channel could have an adverse effect by disturbing the riverbed and stirring up sediment that would be deposited downstream.

Alternative 5 includes a relocation of the barge landing to an area farther south along the shores of Naknek Lake. This relocation would allow for the elimination and restoration of the barge landing access road along the south bank of Brooks River, near the mouth. The restoration of the access road site would help restore the floodplain values of wetland G, and the hydrological connectivity between the wetland and Brooks River.

The construction of a hardened ramp at the new barge landing site would not affect hydrology of Naknek Lake. The ramp would alter the shoreline geomorphology, which in turn could result in some shoreline erosion in the wave zone of the lake. However, given the size of the ramp (24 ft to 30 ft wide) a relatively small area of shoreline potentially would be affected by the ramp.

Overall, the proposed bridge structure, which involves up to 14 permanent pile systems in the Brooks River channel, would have short- and long-term, moderate, adverse, and localized effect on hydrology and floodplains. In addition to construction disturbances in the riverbed, these impacts would result from the hydraulic effects of the piles and the debris caught on the piles (e.g., scouring, sedimentation), which could result in multiple changes to hydrology, channel or bank erosion, river geomorphology, and/or floodplain processes. Collectively, these changes could have detectable effects on the overall hydrological system of the project area. Compared to alternative 1, alternative 5 would increase overall adverse impact to hydrology and floodplains primarily due to the installation of the several flow obstructions in the riverbed. This alternative would also benefit the Brooks River hydrology and floodplains due to elimination of the periodic septic waste hauling across the river, periodic dredging of the barge landing site, and removal of the temporary floating bridge and barge landing access road, and their associated negative effects, including maintenance of the floating bridge abutments and driving vehicles in the riverbed.

**Cumulative Impacts.** Various past projects and actions in and near the project area have affected hydrology and floodplains along the Brooks River corridor. These past effects primarily relate to the development of access roads, bank alterations, and the floating bridge installation, as described in the "Cumulative Impacts" section under alternative 1 above. However, under this alternative, the annual installation and use of the floating bridge would no longer be necessary.

Other present and reasonably foreseeable future projects in the project area would have no known effect on the hydrology and floodplain functions of the Brooks River corridor. Thus, no cumulative impacts would result.

**Conclusion.** Alternative 5 would have short- to long-term, moderate, adverse, and localized impacts on hydrology and floodplains, primarily from the addition of up to 14 permanent flow obstructions to the channel (14 bridge pile systems spaced at 24 ft) and the associated construction disturbances in the channel. The support piles, and river debris that catches on them, would alter flow hydraulics, which could also result in scouring and sandbar development. However, the hydrology would benefit from the removal of the floating bridge (that alters river flow hydraulics and flooding, and contributes to bank erosion near its anchors) and the restoration of surface and subsurface flows between wetland G and the river (along the existing barge landing access road).

## SOUNDSCAPE

### Alternative 1

**Analysis.** Noise can adversely affect the natural soundscape in two ways. First, if noise is loud enough, it can drown out or "mask" the natural sounds that are occurring in the area to a point where the natural sounds are not discernible. Second, the noise might alter the behavior of various mammals, birds, and amphibians. This, in turn, may preclude these animals from contributing their respective natural sounds to the surrounding soundscape.

Under alternative 1, the natural soundscape of the project area would continue to be affected by noise associated with the barge landing area (including vehicle loading and unloading) at its current location near the mouth of Brooks River. During the months when Brooks Camp area receives park operations use and visitation, the existing barge landing would be expected to continue accommodating roughly three to 13 barge landings per month, with the most barge activity occurring in August and September (T. Kay, pers. comm., April 8, 2011). Each time a barge docks at the landing, the natural soundscape of area is subjected to several hours of noise disturbances associated with the unloading and loading of supplies and material. Noise from human activity and motorized vehicles would occur at the barge landing, along the south bank access road, along other adjacent access roads and trails, over the floating bridge, and on the trail to Brooks Camp.

Collectively, noise would continue to mask ambient natural sounds.

In addition, the day-to-day noise from park visitation and park operations near Brooks Camp, along the floating bridge, at viewing platforms, and along access roads would continue (e.g., motorized vehicle noise, visitor noise, other park operations noise, etc.). The light utility vehicles that are used to haul supplies across the floating bridge, in particular, generate considerable amounts of noise. The majority of the noise would originate at ground level, which would allow some of the noise to be reduced or dampened by ground vegetation and other natural obstructions. (Refer to the "Soundscape" section of "Chapter 3: Affected Environment" for additional descriptions of noise.)

Overall, the continued annual use of the floating bridge, viewing platforms, roads, and barge landing in the project area under alternative 1 would have a long-term, minor, adverse, and localized effect on the natural soundscape. The noise from this human activity would be greater than natural ambient sound levels for a small portion of the average day during the visitation season. Substantial periods of time between noise events would continue. The noise would rarely mask natural ambient sounds in the area.

**Cumulative Impacts.** Past management actions in and around the project area have had considerable effects on the natural soundscape in the area. Most of these past actions are associated with the incremental development of Brooks Camp as a high use area for park visitors and the effects of providing for overnight stays, bear viewing, and a transportation hub for trips to Valley of Ten Thousand Smokes. The majority of the effects of these past actions have been adverse, by bringing increased noise generation to the area that masks natural ambient sounds. The short-term, adverse effects of these past actions on soundscape related to the noise from construction and development activities. The long-term, adverse effects of past actions relate to the noise-generating human activities that have been introduced and allowed in the area, such as the use of motorboats and floatplanes, voices of park visitors and staff, motorized vehicles, park operation activities, staff and concessioner housing, and generators.

In addition, present and reasonably foreseeable future actions would also affect the natural soundscape in the project area. Such actions could include additional facility improvements around the project area (e.g., the maintenance and housing development at Valley Road Administrative Area), removal (and site restoration) of Lake Brooks maintenance and housing facilities, and overall relocation of Brooks Camp and its associated uses to the south of Brooks River (near Beaver Pond Terrace). The short-term effects of these actions would relate to the noise disturbances from construction and project mobilization activities. The adverse, long-term effects of some of these actions would involve the introduction noise-generating activities and uses into new parts of the project area (e.g., the future relocation of Brooks Camp to the Beaver Pond Terrace area, and the development of Valley Road Administrative Area). The beneficial, long-term effects would result from the removal of noise generation from high use areas such as Brooks Camp or the Lake Brooks maintenance area, including the removal of the generator in Brooks Camp. Overall, the beneficial and adverse effects of these present and future actions would offset each other somewhat, because areas of new noise disturbance and areas of soundscape restoration could be relatively similar. However, present and future developments and uses would collectively result in noise intrusion into a larger geographic area (because not all Brooks Camp facilities/uses would be relocated to the Beaver Pond Terrace area).

When the likely effects of alternative 1 are added to the effects of these other past, present, and reasonably foreseeable future actions, there would be a long-term, moderate, adverse, and localized cumulative impact on the natural soundscape. Alternative 1 would contribute a small, adverse increment to this cumulative impact.

**Conclusion.** The effect of alternative 1 on the natural soundscape in the project area would continue to be long-term, minor, adverse, and localized. These adverse effects would primarily result from the continued noise generation from human activities associated with Brooks Camp (e.g., visitors and staff, motorized vehicles, and generator noise from NPS/concessioner operations). The noise disturbances would primarily originate at ground level, occur in the summer, and would extend out from Brooks Camp, the campground, the Lake Brooks area, and along the roads and trails that connect these sites.

## Alternative 2

**Analysis.** Human and motorized vehicle noise generated along elevated boardwalk and bridge would carry farther than noise on the roads/paths in alternative 1 because the noise would originate 10 ft above ground (Flemming et al. 1995; K. Fristrup, pers. comm., March 29, 2012). The exceptions to this effect would occur where the boardwalks are routed through heavily wooded areas. Alternative 2 would have approximately 1,610 linear ft of elevated structures from which human pedestrian noise could be projected and 995 linear ft (part of the 1,610 ft) of elevated structures from which motorized vehicle noise could be projected. These noise disturbances to the natural soundscape, primarily from human voices and motorized vehicles, would occur intermittently throughout the project area on each day of the visitation months (generally from 7:00 a.m. through 10:00 p.m.). The highest occurrence of noise projecting from the elevated boardwalks and bridge would likely occur in July and September (the periods of highest visitation and activity in the lower Brooks River).

Motorized vehicles climbing elevated boardwalk ramps (near the south edge of Brooks Camp on the north bank and near the bridge on the south bank) would likely cause a louder noise than when operating on the boardwalk. Higher decibels of motorized engine noise could be expected from this up-ramp acceleration, with the noise propagation being compounded by the elevated nature of the ramps (Flemming et al. 1995; K. Fristrup, pers. comm., March 30, 2012). The natural soundscape would also be exposed to increased noise from motorized vehicle tires running on the wood deck of the bridge and boardwalks instead of gravel or soil (for 995 ft) (K. Fristrup, pers. comm., March 30, 2012). These adverse effects on the soundscape from NPS and concessioner vehicle use would be expected to occur intermittently throughout each day of the Brooks Camp visitation season.

Under alternative 2 the barge landing would be relocated approximately 2,000 ft to the south along the Naknek Lake shoreline. The new barge landing location and removal of the barge landing access road parallel to the south bank would eliminate several NPS operations and motorized vehicle noise from the vicinity of the river corridor, the river mouth, and the Brooks Camp area.

Conversely, the 2,000-foot relocation of the barge landing would introduce the associated NPS operations noise to a new area to the south along Naknek Lake. Although this operations noise would no longer affect the area around the mouth of Brooks River, they would affect natural soundscape around the new location. Similarly, the relocation of the barge landing access road would introduce motorized vehicle noise and other NPS operations noise to several previously undisturbed woodland and wetland areas south of the river (for a length of approximately 1,500 ft). However, the dense tree and shrub cover in the area of the new road and barge landing would help diminish noise generated from activities in the area.

The construction of the bridge, elevated boardwalks, barge landing, and landing access road, and the restoration work on the existing barge landing access road would have multiple negative impacts on the natural soundscape of the project area from noise related to heavy construction equipment operation, the use of handheld construction tools, construction transport vehicles, and construction worker voices. The intermittent, yet frequent, noise disturbances from construction activities would vary notably in volume and occurrence frequency, depending on the type and location of the construction activity on each given day. The entire project area would be affected at one time or another throughout the construction periods. To help minimize these effects, particularly during July and September, several noise mitigation measures would be applied, such as work time limits, construction noise restrictions, limiting to small power tool use at critical times, and maintaining mufflers on construction equipment and generators.

Overall, the construction and future use of the proposed bridge, elevated boardwalk, barge landing, and access road would have a long-term, moderate, adverse, and localized effect on the natural soundscape. The noise from this human activity would often be greater than natural ambient sound levels for notable parts of the average day during the visitation season, and this noise would often mask natural ambient sounds. Because relatively long periods of time between noise events would still occur, there would still be many opportunities to hear natural ambient sounds in the area. When compared to alternative 1, the increased noise exposure on the proposed bridge and boardwalks and the construction activities associated with alternative 2 would increase adverse impacts to the soundscape in the area. However, this alternative would benefit the soundscape along the Brooks River corridor due to the relocation of the barge landing and its access road further to the south.

**Cumulative Impacts.** Various other past, present, and reasonably foreseeable future projects and actions in and near the project area have and would continue to affect the natural soundscape of the area. These projects relate to facility development, park operations, recreation use, and transport vehicle use, as described in the "Cumulative Impacts" section under alternative 1 above. When the likely beneficial and adverse effects of alternative 2 actions are added to the effects of these other past, present, and reasonably foreseeable future actions, there would be a long-term, moderate, adverse, and localized cumulative impact on the natural soundscape. Alternative 2 would contribute a small, adverse increment to this cumulative impact.

**Conclusion.** Alternative 2 would have short- and long-term, moderate, adverse, and localized impacts on the natural soundscape. Adverse impacts would primarily result from construction-related noise, increasing the audio exposure of human activities on the boardwalks/bridge, and introducing park operations noise to a new access corridor and barge landing area to the south. The removal/relocation of two notable noise sources along open, exposed areas of the Brooks River corridor (barge landing and access road) would benefit the soundscape along Brooks River, but introduce noise sources to a relatively undisturbed area to the south.

## Alternative 3

**Analysis.** Human and motorized vehicle noise generated along the elevated boardwalk and bridge would carry further than the noise on the roads/paths in alternative 1 because the noise would originate 10 ft above ground (Flemming et al. 1995; K. Fristrup, pers. comm., March 29, 2012). The exceptions to this effect would occur where the boardwalks are routed through heavily wooded areas. Alternative 3 would have approximately 945 linear ft of elevated structures from which human pedestrian noise and motorized vehicle noise could be projected. The elevated boardwalks and bridge would be shared by both pedestrian visitors and NPS and concessioner vehicles. These noise disturbances to the natural soundscape, primarily from human voices and motorized vehicles, would occur intermittently throughout the project area on each day of the visitation months (generally from 7:00 a.m. through 10:00 p.m.). The highest occurrence of noise projecting from the elevated boardwalks and bridge would likely occur in July and September (the periods of highest visitation and activity in the lower Brooks River).

Motorized vehicles climbing elevated boardwalk ramps would likely make a louder noise than when operating on the boardwalk. Higher decibels of motorized engine noise could be expected from up-ramp acceleration, with the noise propagation being compounded by the elevated nature of the ramps (Flemming et al. 1995; K. Fristrup, pers. comm., March 30, 2012). This alternative includes a vehicle ramp on north side of river that is offset roughly 200 ft from the river, providing some noise buffer. The vehicle ramp on south side is adjacent to river. The natural soundscape would also be exposed to increased noise from motorized vehicle tires running on the wood deck of the bridge and boardwalks instead of gravel or soil (for 945 ft) (K. Fristrup, pers. comm., March 30, 2012). These adverse effects on the soundscape from NPS and concessioner vehicle use would be expected to occur intermittently throughout each day of the Brooks Camp visitation season.

Under alternative 3, the barge landing would be relocated approximately 200 ft to the south along the Naknek Lake shoreline, which would provide a slight relocation of NPS operations noise away from the river mouth and Brooks Camp areas.

The construction of the bridge, elevated boardwalks, and barge landing would have multiple negative impacts on the natural soundscape of the project area from noise related to heavy construction equipment operation, the use of handheld construction tools, construction transport vehicles, and construction worker voices. The intermittent, yet frequent, noise disturbances from construction activities would vary notably in volume and occurrence frequency, depending on the type and location of the construction activity on each given day. The entire project area would be affected at one time or another throughout the construction periods. To help minimize these effects, particularly during July and September, several noise mitigation measures would be applied, such as work time limits, construction noise restrictions, limiting to small power tool use at critical times, and maintaining mufflers on construction equipment and generators.

Overall, the construction and future use of the proposed bridge and elevated boardwalk would have a long-term, moderate, adverse, and localized effect on the natural soundscape. The noise from this human activity would often be greater than natural ambient sound levels for notable parts of the average day during the visitation season, and this noise would often mask natural ambient sounds. Because relatively long periods of time between noise events would occur, there would still be many opportunities to hear natural ambient sounds in the area. When compared to alternative 1, the increased noise exposure on the proposed bridge and boardwalks and the construction activities associated with alternative 3 would increase adverse impacts to the soundscape in the area. However, this alternative would benefit the soundscape along the Brooks River corridor due to the slight relocation of the barge landing to the south.

**Cumulative Impacts.** Various other past, present, and reasonably foreseeable future projects and actions in and near the project area have and would continue to affect the natural soundscape of the area. These projects relate to facility development, park operations, recreation use, and transport vehicle use, as described in the "Cumulative Impacts" section under alternative 1 above.

When the likely effects of alternative 3 are added to the effects of these other past, present, and reasonably foreseeable future actions, there would be a long-term, moderate, adverse, and localized cumulative impact on the natural soundscape. Alternative 3 would contribute a small, adverse increment to this cumulative impact.

**Conclusion.** Alternative 3 would have short- and long-term, moderate, adverse, and localized impacts on the natural soundscape. Adverse impacts would primarily result from construction-related noise and increasing the audio exposure of human activities on the boardwalks/bridge.

The slight relocation of the barge landing away from the Brooks River mouth could benefit the soundscape.

## Alternative 4

**Analysis.** Human and motorized vehicle noise generated along the elevated boardwalk and bridge would carry further than the noise on the roads/paths in alternative 1 because the noise would originate 10 ft above ground (Flemming et al 1995, K. Fristrup, senior scientist, NPS Natural Sounds and Night Skies Program, pers. comm., 3/29/2012). The exceptions to this effect would occur where the boardwalks are routed through heavily wooded areas. Alternative 4 would have approximately 1,540 linear ft of elevated structures from which human pedestrian noise and motorized vehicle noise could be projected. The elevated boardwalks and bridge would be shared by both pedestrian visitors and NPS vehicles. These noise disturbances to the natural soundscape, primarily from human voices and motorized vehicles, would occur intermittently throughout the project area on each day of the visitation months (generally from 7:00 a.m. through 10:00 p.m.). The highest occurrence of noise projecting from the elevated boardwalks and bridge would likely occur in July and September (the periods of highest visitation and activity in the lower Brooks River).

Motorized vehicles climbing elevated boardwalk ramps would likely make a louder noise than when operating on the boardwalk. Higher decibels of motorized engine noise could be expected from up-ramp acceleration, with the noise propagation being compounded by the elevated nature of the ramps (Flemming et al. 1995; K. Fristrup, pers. comm., March 30, 2012). However, alternative 4 includes vehicle ramps on both the north and south sides of river that are offset roughly 300 to 400 ft from the river and located in wooded areas, which would provide some noise buffering for vehicle noise. Equally important, the alignment of the boardwalk ramps in alternative 4 would use the local topography to make the boardwalk ramps relatively flat. The natural soundscape would also be exposed to increased noise from motorized vehicle tires running on the wood deck of the bridge and boardwalks instead of on gravel or soil (for 1,540 ft) (K. Fristrup, pers. comm., March 30, 2012). These adverse effects on the soundscape from NPS and concessioner vehicle use would be expected to occur intermittently throughout each day of the Brooks Camp visitation season.

Under alternative 4 the barge landing would be relocated approximately 2,000 ft to the south along the Naknek Lake shoreline. The new barge landing location and removal of the barge landing access road parallel to the south bank would eliminate several NPS operations and motorized vehicle noise from the vicinity of the river corridor, the river mouth, and the Brooks Camp area.

Conversely, the 2,000-foot relocation of the barge landing would introduce the associated NPS operations noise to a new area to the south along Naknek Lake. Although the operations noise would no longer affect the area around the mouth of Brooks River, it would affect natural soundscape around the new location. Similarly, the relocation of the barge landing access road would introduce motorized vehicle noise and other NPS operations noise to several previously undisturbed woodland and wetland areas south of the river (for a length of approximately 1,500 ft). However, the dense tree and shrub cover in the area of the new road and barge landing would help diminish noise generated from activities in the area.

The construction of the bridge, elevated boardwalks, barge landing, and landing access road, and the restoration work on the barge landing access road would have multiple negative impacts on the natural soundscape of the project area from noise related to heavy construction equipment operation, the use of handheld construction tools, construction transport vehicles, and construction worker voices. The intermittent, yet frequent, noise disturbances from construction activities would vary notably in volume and occurrence frequency, depending on the type and location of the construction activity on each given day. The entire project area would be affected at one time or another throughout the construction periods. To help minimize these effects, particularly during July and September, several noise mitigation measures would be applied, such as work time limits, construction noise restrictions, limiting to small power tool use at critical times, and maintaining mufflers on construction equipment and generators.

Overall, the construction and future use of the proposed bridge, elevated boardwalk, barge landing, and access road would have a long-term, moderate, adverse, and localized effect on the natural soundscape. The noise from this human activity would often be greater than natural ambient sound levels for notable parts of the average day during the visitation season, and this noise would often mask natural ambient sounds. Because relatively long periods of time between noise events would still occur, there would still be many opportunities to hear natural ambient sounds in the area. When compared to alternative 1, the increased noise exposure on the proposed bridge and boardwalks and the construction activities associated with alternative 4 would increase adverse impacts to the soundscape in the area. However, this alternative would benefit the soundscape along the Brooks River corridor due to the relocation of the barge landing and its access road further to the south.

**Cumulative Impacts.** Various other past, present, and reasonably foreseeable future projects and actions in and near the project area have and would continue to affect the natural soundscape of the area. These projects relate to facility development, park operations, recreation use, and transport vehicle use, as described in the "Cumulative Impacts" section under alternative 1 above.

When the likely beneficial and adverse effects of alternative 4 actions are added to the effects of these other past, present, and reasonably foreseeable future actions, there would be a long-term, moderate, adverse, and localized cumulative impact on the natural soundscape. Alternative 4 would contribute a small, adverse increment to this cumulative impact.

**Conclusion***.* Alternative 4 would have short- and long-term, moderate, adverse, and localized impacts on the natural soundscape. Adverse impacts would primarily result from construction-related noise, increasing the audio exposure of human activities on the boardwalks/bridge, and introducing park operations noise to a new access corridor and barge landing area to the south. The removal/relocation of two notable noise sources along open, exposed areas of the Brooks River corridor (barge landing and access road) would benefit the soundscape along Brooks River, but would introduce noise sources to a relatively undisturbed area to the south.

### Alternative 5

**Analysis.** Human and motorized vehicle noise generated along elevated boardwalk and bridge would carry farther than the noise on the roads/paths in alternative 1 because the noise would originate 10 ft aboveground (Flemming et al. 1995; K. Fristrup, pers. comm., March 29, 2012). The exceptions to this effect would occur where the boardwalks are routed through heavily wooded areas. Alternative 4 would have approximately 1,120 linear ft of elevated structures from which human pedestrian noise and motorized vehicle noise could be projected. The elevated boardwalks and bridge would be shared by both pedestrian visitors and NPS vehicles. These noise disturbances to the natural soundscape, primarily from human voices and motorized vehicles, would occur intermittently throughout the project area on each day of the visitation months (generally from 7:00 a.m. through 10:00 p.m.). The highest occurrence of noise projecting from the elevated boardwalks and bridge would likely occur in July and September (the periods of highest visitation and activity in the lower Brooks River).

Motorized vehicles climbing elevated boardwalk ramps would likely make a louder noise than when operating on the boardwalk (Flemming et al. 1995; K. Fristrup, pers. comm., March 30, 2012). Higher decibels of motorized engine noise could be expected from up-ramp acceleration, with the noise propagation being compounded by the elevated nature of the ramps. Alternative 5 includes a vehicle ramp on the north side of river offset roughly 300 ft from the river and within the Brooks Camp area (and takes advantage of local topography to allow a relatively flat ramp). However, the vehicle ramp on south side is adjacent to river and steeper. The natural soundscape would also be exposed to increased noise from motorized vehicle tires running on the wood deck of the bridge and boardwalks instead of gravel or soil (for 1,120 ft) (K. Fristrup, pers. comm., March 30, 2012). These adverse effects on the soundscape from NPS and concessioner vehicle use would be expected to occur intermittently throughout each day of the Brooks Camp visitation season.

Under alternative 5, the barge landing would be relocated approximately 2,000 ft to the south along the Naknek Lake shoreline. The new barge landing location and removal of the barge landing access road parallel to the south bank would eliminate several NPS operations and motorized vehicle noise from the vicinity of the river corridor, the river mouth, and the Brooks Camp area.

Conversely, the 2,000-foot relocation of the barge landing would introduce the associated NPS operations noise to a new area to the south along Naknek Lake. Although the operations noise would no longer affect the area around the mouth of Brooks River, it would affect the natural soundscape around the new location. Similarly, the relocation of the barge landing access road would introduce motorized vehicle noise and other NPS operations noise to several previously undisturbed woodland and wetland areas south of the river (for a length of approximately 1,500 ft). However, the dense tree and shrub cover in the area of the new road and barge landing would help diminish noise generated from activities in the area.

The construction of the bridge, elevated boardwalks, barge landing, and landing access road, and the restoration work on the existing barge landing access road would have multiple negative impacts on the natural soundscape of the project area from noise related to heavy construction equipment operation, the use of handheld construction tools, construction transport vehicles, and construction worker voices. The intermittent, yet frequent, noise disturbances from construction activities would vary notably in volume and occurrence frequency, depending on the type and location of the construction activity on each given day. The entire project area would be affected at one time or another throughout the construction periods. To help minimize these effects, particularly during July and September, several noise mitigation measures would be applied, such as work time limits, construction noise restrictions, limiting to small power tool use at critical times, and maintaining mufflers on construction equipment and generators.

Overall, the construction and future use of the proposed bridge, elevated boardwalk, barge landing, and access road would have a long-term, moderate, adverse, and localized effect on the natural soundscape. The noise from this human activity would often be greater than natural ambient sound levels for notable parts of the average day during the visitation season, and this noise would often mask natural ambient sounds. Because relatively long periods of time between noise events would still occur, there would still be many opportunities to hear natural ambient sounds in the area. When compared to alternative 1, the increased noise exposure on the proposed bridge and boardwalks and the construction activities associated with alternative 5 would increase adverse impacts to the soundscape in the area. However, this alternative would benefit the soundscape along the Brooks River corridor due to the relocation of the barge landing and its access road further to the south.

**Cumulative Impacts.** Various other past, present, and reasonably foreseeable future projects and actions in and near the project area have and would continue to affect the natural soundscape of the area. These projects relate to facility development, park operations, recreation use, and transport vehicle use, as described in the "Cumulative Impacts" section under alternative 1 above.

When the likely beneficial and adverse effects of alternative 5 actions are added to the effects of these other past, present, and reasonably foreseeable future actions, there would be a long-term, moderate, adverse, and localized cumulative impact on the natural soundscape. Alternative 5 would contribute a small, adverse increment to this cumulative impact.

**Conclusion.** Alternative 5 would have short- and long-term, moderate, adverse, and localized impacts on the natural soundscape. Adverse impacts would primarily result from construction-related noise, increasing the audio exposure of human activities on the boardwalks/bridge, and introducing park operations noise to a new access corridor and barge landing area to the south. The removal/relocation of two notable noise sources along open, exposed areas of the Brooks River corridor (barge landing and access road) would benefit the soundscape along Brooks River, but would introduce noise sources to a relatively undisturbed area to the south.

# CULTURAL RESOURCES

## ARCHEOLOGICAL RESOURCES

### Alternative 1

**Analysis.** Under the no-action alternative, there would be no substantial changes in park operations or visitor use. Seasonal installation and use of the floating bridge across the river would continue at the current location. Consequently, other than routine maintenance activities, there would be little potential for impacts on archeological resources except in the case of major infrastructure failure. Archeological resources, however, would continue to be at potential risk of disturbance by natural erosional processes and by erosion associated with concentrated visitor use and NPS and concessioner operations. Archeologists would continue to monitor the condition of known archeological sites within the Brooks River Archeological District National Historic Landmark and would undertake appropriate protection and stabilization measures to reduce or avoid site impacts.

Potential disturbance resulting from erosion or other actions associated with visitor use and park/concessioner operations would have localized, long-term, minor adverse impacts on archeological resources. The overall archeological integrity of sites contributing to the significance of the national historic landmark district would not be appreciably diminished. Continuation of archeological resource protection and management actions would benefit the long-term preservation of the district's archeological resources.

**Cumulative Impacts.** Archeological sites in the Brooks River Archeological District have been disturbed to varying degrees, primarily by natural and human-caused erosion and by localized ground disturbance associated with previous NPS and concessioner development activities. Brooks Camp buildings and structures are typically placed on piers that do not penetrate below the upper portion of the ash layer deposited by the 1912 Katmai volcanic eruption. Although significant archeological resources are typically not identified above the 1912 ash layer, some archeological resources lying below the layer have been adversely impacted by previous projects that have penetrated through the ash layer. Despite these adverse impacts, it is believed that more than 90 percent of the district's archeological resources remain intact with overall integrity ranging from good to excellent (NPS 1992).

Other recent or foreseeable construction projects in the vicinity include improvements to the Brooks Camp picnic area (e.g., installation of a picnic shelter, restroom, and storage building); construction of a maintenance shop and water/septic system in the Valley Road Administrative Area; and construction of access roads and utilities at the Valley Road Administrative Area for phased relocation of Brooks Camp housing. Projects in the Valley Road Administrative Area would be carried out in support of the 1996 development concept plan, which calls for the phased relocation of Brooks Camp facilities and operations to a location south of the river. Although these projects could adversely affect archeological resources because of ground disturbance, the adverse impacts in the Brooks Camp area would be expected to be minor because, in most cases, project activities would not be anticipated to entail disturbance below the 1912 ash layer. Buried utility lines may be removed if removal would not damage archeological resources. The area proposed for the Valley Road Administrative Area has been evaluated as having a low potential for archeological resources. As appropriate, archeological surveys and monitoring would precede and accompany construction for all project areas to ensure that resources are avoided or that adverse effects are adequately mitigated. Removal of facilities and operations from the Brooks Camp area has also been previously evaluated as having long-term, beneficial impacts on sensitive archeological resources by removing the threats of disturbance associated with development and park/visitor use from the area (URS Inc. 2009a).

The effects of alternative 1, when added to the effects identified above from other past present and reasonably foreseeable actions, would result in a long-term, localized, moderate adverse cumulative impact on archeological resources. Alternative 1 would contribute a small adverse increment to this cumulative impact.

**Conclusion.** Alternative 1 would have long-term, localized, minor adverse impacts on archeological resources contributing to the significance of the Brooks River Archeological District. Adverse impacts would occur primarily from potential disturbance resulting from erosion or other actions associated with visitor use and park/concessioner operations.

## Alternative 2

**Analysis.** Archeological testing conducted in July 2010 confirmed the presence of intact archeological resources near Brooks Camp where the proposed boardwalk and vehicle access points to the bridge are planned to originate. The resources are likely associated with a previously recorded prehistoric site that contains human burials and associated house features. The site has sustained (and continues to be threatened by) development impacts (NPS 1992). Another site, also partially disturbed by previous development, is located to the north in the general project area of Brooks Camp. Measures to limit possible adverse effects on archeological resources include avoiding construction activities north of the fish freezing station. Archeological remains of the original Northern Consolidated Airlines camp and a native Sugpiat fish camp that predates the concessioner camp exist between the fish freezing station and the Corner. The boardwalk footings would be designed to avoid adversely impacting these archeological resources.

No archeological resources are anticipated to be affected by boardwalk and bridge construction on the south side of the river or near the Lake Brooks access road (NPS 2010a). Archeological investigations along the route of the proposed barge landing access road led to the discovery of significant prehistoric resources in addition to positively locating previously known historic archeological resources. To avoid adverse impacts to these sites by road construction, it is recommended that the proposed right-of-way be modified to avoid subsurface disturbance, particularly the final 164 ft (50 meters) to the proposed location of the barge landing (NPS 2010b).

It is anticipated that the site avoidance measures recommended above can be adequately addressed through project design modifications that restrict or direct ground-disturbing construction activities away from areas likely to contain archeological resources. Consequently, although ground-disturbing construction would occur, measures would be implemented to minimize or avoid disturbance of identified sites in the Brooks Camp area and at other project locations. Archeological monitoring would accompany construction in all areas where sensitive archeological resources have been previously identified or could be anticipated based on current project surveys. If archeological resources are discovered during construction, construction would cease in the area of the discovery until the resources are adequately documented and assessed by NPS staff in consultation with the Alaska SHPO, the Council of Katmai Descendants, and/or other concerned tribal members and individuals. NPS staff would further consult on ways to avoid significant sites and/or to carry out necessary mitigation and data recovery measures if avoidance cannot be achieved.

Actions proposed by alternative 2 would be expected to have long-term, localized, minor adverse impacts on archeological resources. The overall archeological integrity of sites contributing to the significance of the national historic landmark district would not be appreciably diminished by project undertakings. The long-term preservation of archeological resources in the Brooks Camp area would also benefit following project completion because pedestrian and vehicle access to the bridge crossing would be directed along the boardwalks and ramps, thereby reducing the potential for ongoing erosion and compaction impacts on buried archeological resources by use of existing roads and trails.

After applying ACHP criteria of adverse effect (36 CFR Part 800.5, *Assessment of Adverse Effects*), the National Park Service concludes that implementing alternative 2 would result in *no adverse effect* on archeological resources.

**Cumulative Impacts.** Other past, present, and reasonably foreseeable future projects and actions have had, or have the potential to adversely impact archeological resources in the project area. As described in the "Cumulative Impacts" section under alternative 1 above, these impacts are generally attributed to erosion and localized ground disturbance associated with NPS and concessioner development and operations.

The effects of alternative 2, when added to the effects identified above from other past, present, and reasonably foreseeable actions, would result in a long-term, localized, moderate adverse cumulative impact on archeological resources. Alternative 2 would contribute a small adverse increment to this cumulative impact.

**Conclusion.** Alternative 2 would have long-term, localized, minor adverse impacts on archeological resources contributing to the significance of the Brooks River Archeological District. Although ground-disturbing construction activities have the potential to adversely impact archeological resources, site avoidance and protection measures would be implemented to minimize or avoid site disturbances.

### Alternative 3

**Analysis.** Archeological testing conducted in July 2010 confirmed the presence of intact archeological resources near Brooks Camp where the proposed boardwalk and vehicle access points to the bridge are planned to originate. The resources are likely associated with a previously recorded prehistoric site that contains human burials and associated house features. The site has sustained (and continues to be threatened by) development impacts (NPS 1992). Another site, also partially disturbed by previous development, is located to the north in the general project area of Brooks Camp. Measures to limit possible adverse effects on archeological resources include avoiding construction activities north of the fish freezing station. Archeological remains of the original Northern Consolidated Airlines camp and a native Sugpiat fish camp that predates the concessioner camp exist between the fish freezing station and the Corner. The boardwalk footings would be designed to avoid adversely impacting these archeological resources. The limited extent of new boardwalks and access roads under this alternative would reduce the potential for inadvertent disturbance of archeological resources.

No archeological resources are anticipated to be affected by boardwalk and bridge construction on the south side of the river or near the Lake Brooks access road (NPS 2010a). Archeological investigations along the route of the proposed barge landing access road (for alternatives 2, 4, and 5) led to the discovery of significant prehistoric resources in addition to positively locating previously known historic archeological resources. However, under alternative 3 these resources would be avoided for proposed construction of the barge landing and access road closer to the mouth of Brooks River.

It is anticipated that the site avoidance measures recommended above can be adequately addressed through project design modifications that restrict or direct ground-disturbing construction activities away from areas likely to contain archeological resources. Consequently, although ground-disturbing construction would occur, measures would be implemented to minimize or avoid disturbance of identified sites in the Brooks Camp area and at other project locations. Archeological monitoring would accompany construction in all areas where sensitive archeological resources have been previously identified or could be anticipated based on current project surveys. If archeological resources are discovered during construction, construction would cease in the area of the discovery until the resources are adequately documented and assessed by NPS staff in consultation with the Alaska SHPO, the Council of Katmai Descendants, and/or other concerned tribal members and individuals. NPS staff would further consult on ways to avoid significant sites and/or to carry out necessary mitigation and data recovery measures if avoidance cannot be achieved.

Actions proposed by alternative 3 would be expected to have long-term, localized, minor adverse impacts on archeological resources. The overall archeological integrity of sites contributing to the significance of the national historic landmark district would not be appreciably diminished by project undertakings. The long-term preservation of archeological resources in the Brooks Camp area would also benefit following project completion because pedestrian and vehicle access to the bridge crossing would be directed along the boardwalks and ramps, thereby reducing the potential for ongoing erosion and compaction impacts on buried archeological resources by use of existing roads and trails.

After applying ACHP criteria of adverse effect (36 CFR Part 800.5, *Assessment of Adverse Effects*), the National Park Service concludes that implementing alternative 3 would result in *no adverse effect* on archeological resources.

**Cumulative Impacts.** Other past, present, and reasonably foreseeable future projects and actions have had, or have the potential to adversely impact archeological resources in the project area. As described in the "Cumulative Impacts" section under alternative 1 (above), these impacts are generally attributed to erosion and localized ground disturbance associated with NPS and concessioner development and operations.

The effects of alternative 3, when added to the effects identified above from other past, present, and reasonably foreseeable actions, would result in a long-term, localized, moderate adverse cumulative impact on archeological resources. Alternative 3 would contribute a small adverse increment to this cumulative impact.

**Conclusion.** Alternative 3 would have long-term, localized, minor adverse impacts on archeological resources contributing to the significance of the Brooks River Archeological District. Although ground-disturbing construction activities have the potential to adversely impact archeological resources, site avoidance and protection measures would be implemented to minimize or avoid site disturbances.

## Alternative 4

**Analysis.** Archeological testing conducted in July 2010 confirmed the presence of intact archeological resources near Brooks Camp where the proposed boardwalk and vehicle access points to the bridge are planned to originate. The resources are likely associated with a previously recorded prehistoric site that contains human burials and associated house features. The site has sustained (and continues to be threatened by) development impacts (NPS 1992). Another site, also partially disturbed by previous development, is located to the north in the general project area of Brooks Camp. Measures to limit possible adverse effects on archeological resources include avoiding construction activities north of the fish freezing station. Archeological remains of the original Northern Consolidated Airlines camp and a native Sugpiat fish camp that predates the concessioner camp exist between the fish freezing station and the Corner. The boardwalk footings would be designed to avoid adversely impacting these archeological resources.

No archeological resources are anticipated to be affected by boardwalk and bridge construction on the south side of the river or near the Lake Brooks access road (NPS 2010a). Archeological investigations along the route of the proposed barge landing access road led to the discovery of significant prehistoric resources in addition to positively locating previously known historic archeological resources. To avoid adverse impacts to these sites by road construction, it is recommended that the proposed right-of-way be modified to avoid subsurface disturbance, particularly the final 164 ft (50 meters) to the proposed location of the barge landing (NPS 2010b).

It is anticipated that the site avoidance measures recommended above can be adequately addressed through project design modifications that restrict or direct ground-disturbing construction activities away from areas likely to contain archeological resources. Consequently, although ground-disturbing construction would occur, measures would be implemented to minimize or avoid disturbance of identified sites in the Brooks Camp area and at other project locations. Archeological monitoring would accompany construction in all areas where sensitive archeological resources have been previously identified or could be anticipated based on current project surveys. If archeological resources are discovered during construction, construction would cease in the area of the discovery until the resources are adequately documented and assessed by NPS staff in consultation with the Alaska SHPO, the Council of Katmai Descendants, and/or other concerned tribal members and individuals. NPS staff would further consult on ways to avoid significant sites and/or to carry out necessary mitigation and data recovery measures if avoidance cannot be achieved.

Actions proposed by alternative 4 would be expected to have long-term, localized, minor adverse impacts on archeological resources. The overall archeological integrity of sites contributing to the significance of the national historic landmark district would not be appreciably diminished by project undertakings. The long-term preservation of archeological resources in the Brooks Camp area would also benefit following project completion because pedestrian and vehicle access to the bridge crossing would be directed along the boardwalks and ramps, thereby reducing the potential for ongoing erosion and compaction impacts on buried archeological resources by use of existing roads and trails.

After applying ACHP criteria of adverse effect (36 CFR Part 800.5, *Assessment of Adverse Effects*), the National Park Service concludes that implementing alternative 4 would result in *no adverse effect* on archeological resources.

**Cumulative Impacts.** Other past, present, and reasonably foreseeable future projects and actions have had, or have the potential to adversely impact archeological resources in the project area. As described in the "Cumulative Impacts" section under alternative 1 above, these impacts are generally attributed to erosion and localized ground disturbance associated with NPS and concessioner development and operations.

The effects of alternative 4, when added to the effects identified above from other past, present, and reasonably foreseeable actions, would result in a long-term, localized, moderate adverse cumulative impact on archeological resources. Alternative 4 would contribute a small adverse increment to this cumulative impact.

**Conclusion.** Alternative 4 would have long-term, localized, minor adverse impacts on archeological resources contributing to the significance of the Brooks River Archeological District. Although ground-disturbing construction activities have the potential to adversely impact archeological resources, site avoidance and protection measures would be implemented to minimize or avoid site disturbances.

## Alternative 5

**Analysis.** Archeological testing conducted in July 2010 confirmed the presence of intact archeological resources near Brooks Camp where the proposed boardwalk and vehicle access points to the bridge are planned to originate. The resources are likely associated with a previously recorded prehistoric site that contains human burials and associated house features. The site has sustained (and continues to be threatened by) development impacts (NPS 1992). Another site, also partially disturbed by previous development, is located to the north in the general project area of Brooks Camp. Measures to limit possible adverse effects on archeological resources include avoiding construction activities north of the fish freezing station. Archeological remains of the original Northern Consolidated Airlines camp and an Alaska Native fish camp that predates the concessioner camp exist between the fish freezing station and the Corner. The boardwalk footings would be designed to avoid adversely impacting these archeological resources.

No archeological resources are anticipated to be affected by boardwalk and bridge construction on the south side of the river or near the Lake Brooks access road (NPS 2010a). Archeological investigations along the route of the proposed barge landing access road led to the discovery of significant prehistoric resources in addition to positively locating previously known historic archeological resources. To avoid adverse impacts to these sites by road construction, it is recommended that the proposed right-of-way be modified to avoid subsurface disturbance, particularly the final 164 ft (50 meters) to the proposed location of the barge landing (NPS 2010b).

It is anticipated that the site avoidance measures recommended above can be adequately addressed through project design modifications that restrict or direct ground-disturbing construction activities away from areas likely to contain archeological resources. Consequently, although ground-disturbing construction would occur, measures would be implemented to minimize or avoid disturbance of identified sites in the Brooks Camp area and at other project locations. Archeological monitoring would accompany construction in all areas where sensitive archeological resources have been previously identified or could be anticipated based on current project surveys. If archeological resources are discovered during construction, construction would cease in the area of the discovery until the resources are adequately documented and assessed by NPS staff in consultation with the Alaska SHPO, the Council of Katmai Descendants, and/or other concerned tribal members and individuals. NPS staff would further consult on ways to avoid significant sites and/or to carry out necessary mitigation and data recovery measures if avoidance cannot be achieved.

Actions proposed by alternative 5 would be expected to have long-term, localized, minor adverse impacts on archeological resources. The overall archeological integrity of sites contributing to the significance of the national historic landmark district would not be appreciably diminished by project undertakings. The long-term preservation of archeological resources in the Brooks Camp area would also benefit following project completion because pedestrian and vehicle access to the bridge crossing would be directed along the boardwalks and ramps, thereby reducing the potential for ongoing erosion and compaction impacts on buried archeological resources by use of existing roads and trails.

After applying ACHP criteria of adverse effect (36 CFR Part 800.5, *Assessment of Adverse Effects*), the National Park Service concludes that implementing alternative 5 would result in *no adverse effect* on archeological resources.

**Cumulative Impacts.** Other past, present, and reasonably foreseeable future projects and actions have had, or have the potential to adversely impact archeological resources in the project area. As described in the "Cumulative Impacts" section under alternative 1 above, these impacts are generally attributed to erosion and localized ground disturbance associated with NPS and concessioner development and operations.

The effects of alternative 5, when added to the effects identified above from other past present and reasonably foreseeable actions, would result in a long-term, localized, moderate adverse cumulative impact on archeological resources. Alternative 5 would contribute a small adverse increment to this cumulative impact.

**Conclusion.** Alternative 5 would have long-term, localized, minor adverse impacts on archeological resources contributing to the significance of the Brooks River Archeological District. Although ground-disturbing construction activities have the potential to adversely impact archeological resources, site avoidance and protection measures would be implemented to minimize or avoid site disturbances.

## HISTORIC STRUCTURES AND CULTURAL LANDSCAPES

### Alternative 1

**Analysis.** Under the no-action alternative, there would be no new construction. Seasonal installation and use of the floating bridge across Brooks River would continue at the current location. Consequently, other than routine maintenance and other park/visitor use activities, there would be little potential for impacts on historic structures and cultural landscape features. NPS staff would continue to monitor the condition of historic structures, such as the national register-listed ranger station and boathouse at Brooks Camp, and would undertake necessary preservation maintenance, stabilization, or other appropriate treatments (e.g., rehabilitation) in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties*. As necessary, historic structure reports would be completed for selected lodge buildings to identify appropriate treatments and materials for preservation maintenance. Cultural landscape features identified as contributing to the significance of the Brooks Camp Historic District (e.g., buildings, patterns of circulation/spatial organization, views and vistas, small-scale features) would also be preserved and managed in accordance with the *Secretary's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes*.

Because park/visitor use and ongoing preservation management actions could entail necessary repairs, minor alterations, or replacement of deteriorated historic fabric or contributing landscape elements, these actions would have long-term, localized, minor adverse impacts on historic structures and cultural landscape features that contribute to the significance of the Brooks Camp Historic District. The overall historical integrity of the district would not be diminished. Stabilization and rehabilitation of historic structures and cultural landscape elements in accordance with the secretary's standards would also benefit the long-term preservation of these resources.

**Cumulative Impacts.** Over the years, several historic structures associated with the early 1950s–1960s period of NPS operations and tourism development at Brooks Camp have been removed, modified, and/or moved from their original sites. Only two of the original concessioner-built buildings, originally of wall-tent construction, remain in Brooks Camp; these were later modified by the addition of asphalt shingling and were moved off their original footings (NPS 1999). These past actions have adversely impacted historic structures and cultural landscape features because of the loss of contributing properties/fabric and the alteration of character-defining features, including changes to Brooks Camp's historic pattern of spatial organization. Ongoing preservation maintenance and rehabilitation of remaining historic buildings and structures have also resulted in long-term beneficial effects.

Other recent or foreseeable construction projects in the vicinity include improvements to the Brooks Camp picnic area (e.g., installation of a picnic shelter, restroom and storage building, and re-erection of the original elevated log cache). The 1996 development concept plan calls for the phased relocation of Brooks Camp facilities and operations to the Valley Road Administrative Area south of the river.

These projects could potentially result in long-term adverse impacts on historic structures and cultural landscape features as a result of the introduction of new constructed elements into the viewshed of the Brooks Camp cultural landscape and the eventual relocation of structures from the site. Final management decisions are pending regarding the ultimate disposition of national register eligible or listed structures such as the ranger station and boathouse; both structures were listed on the National Register of Historic Places following selection of the 1996 development concept plan preferred alternative that called for removal of all structures from Brooks Camp.

The effects of alternative 1, when added to the effects identified above from other past, present, and reasonably foreseeable actions, would result in a long-term, localized, moderate adverse cumulative impact on historic buildings, structures and cultural landscape features. Alternative 1 would contribute a small adverse increment to this cumulative impact.

**Conclusion.** Alternative 1 would have long-term, localized, minor adverse impacts on historic buildings, structures and cultural landscape features contributing to the significance of the Brooks Camp Historic District. Adverse impacts would occur primarily from park and visitor use and routine maintenance/preservation activities.

## Alternative 2

**Analysis.** No historic structures would be directly impacted by proposed construction activities under this alternative. However, the introduction of new constructed elements (e.g., the boardwalk and vehicle access ramp) into the core area of the Brooks Camp Historic District would be expected to adversely impact character-defining features of the cultural landscape, altering elements such as views and vistas, historic setting and feeling, historic patterns of circulation and spatial organization. The new bridge across Brooks River at the same location of the seasonal floating bridge would be constructed at an increased height (10 ft above the river) and would consequently be a more intrusive and permanent addition to the cultural landscape. Because of the relatively level topography along the river corridor, the large scale and location of the bridge and boardwalks/ramps limit the range of effective options (e.g., design modifications, use of compatible materials, screening) for minimizing adverse impacts on the viewshed and historic setting of the district.

Long-term localized, moderate adverse impacts on the Brooks Camp cultural landscape are therefore anticipated from the construction of the bridge, elevated boardwalks and ramps. After applying ACHP criteria of adverse effect (36 CFR Part 800.5, *Assessment of Adverse Effects*), the National Park Service concludes that implementing alternative 2 would result in an *adverse effect* on the Brooks Camp cultural landscape because of the bridge and boardwalk construction. Consequently, the National Park Service would execute a memorandum of agreement documenting measures to minimize or mitigate the adverse effects of construction in consultation with the Alaska SHPO, associated Alaska Native groups, and other concerned parties.

**Cumulative Impacts.** Other past, present, and reasonably foreseeable future projects and actions have had, or have the potential to adversely impact historic structures and cultural landscape elements in the project area. As described in the "Cumulative Impacts" section under alternative 1 (above), these impacts are generally attributed to the loss and alteration of historic properties, fabric, and contributing landscape features.

The effects of alternative 2, when added to the effects identified above from other past present and reasonably foreseeable actions, would result in a long-term, localized, moderate adverse cumulative impact on historic buildings, structures and cultural landscape features. Alternative 2 would contribute a substantial adverse increment to this cumulative impact.

**Conclusion.** Alternative 2 would have long-term, localized, moderate adverse impacts on historic structures and cultural landscape features contributing to the significance of the Brooks Camp Historic District. These adverse impacts are attributed to the introduction of new constructed elements (bridge, boardwalks, and ramps) that would diminish the integrity of the Brooks Camp cultural landscape.

## Alternative 3

**Analysis.** No historic structures would be directly impacted by proposed construction activities under this alternative. However, the introduction of new constructed elements (e.g., the boardwalk and vehicle access ramp) into the southern portion of the Brooks Camp Historic District would be expected to adversely impact character-defining features of the cultural landscape, altering elements such as views and vistas, historic setting and feeling, historic patterns of circulation and spatial organization. The new bridge across Brooks River at the same location of the seasonal floating bridge would be constructed at an increased height (10 ft above the river) and would consequently be a more intrusive and permanent addition to the cultural landscape. Because of the relatively level topography along the river corridor, the large scale and location of the bridge and boardwalks/ramps limit the range of effective options (e.g., design modifications, use of compatible materials, screening) for minimizing adverse impacts on the viewshed and historic setting of the district.

Long-term localized, moderate adverse impacts on the Brooks Camp cultural landscape are therefore anticipated from the construction of the bridge, elevated boardwalks, and ramps. After applying ACHP criteria of adverse effect (36 CFR Part 800.5, *Assessment of Adverse Effects*), the National Park Service concludes that implementing alternative 3 would result in an *adverse effect* on the Brooks Camp cultural landscape because of the bridge and boardwalk construction. Consequently, the National Park Service would execute a memorandum of agreement documenting measures to minimize or mitigate the adverse effects of construction in consultation with the Alaska SHPO, associated Alaska Native groups and other concerned parties.

**Cumulative Impacts.** Other past, present, and reasonably foreseeable future projects and actions have had, or have the potential to adversely impact historic structures and cultural landscape elements in the project area. As described in the “Cumulative Impacts” section under alternative 1 (above), these impacts are generally attributed to the loss and alteration of historic properties, fabric and contributing landscape features.

The effects of alternative 3, when added to the effects identified above from other past present and reasonably foreseeable actions, would result in a long-term, localized, moderate adverse cumulative impact on historic buildings, structures and cultural landscape features. Alternative 3 would contribute a substantial adverse increment to this cumulative impact.

**Conclusion.** Alternative 3 would have long-term, localized, moderate adverse impacts on historic structures and cultural landscape features contributing to the significance of the Brooks Camp Historic District. These adverse impacts are attributed to the introduction of new constructed elements (bridge, boardwalks, and ramps) that would diminish the integrity of the Brooks Camp cultural landscape.

## Alternative 4

**Analysis.** No historic structures would be directly impacted by proposed construction activities under this alternative. However, the introduction of new constructed elements (e.g., the boardwalk and vehicle access ramp) into the core area of the Brooks Camp Historic District would be expected to adversely impact character-defining features of the cultural landscape, altering elements such as views and vistas, historic setting and feeling, historic patterns of circulation and spatial organization. The new bridge across Brooks River at the same location of the seasonal floating bridge would be constructed at an increased height (10 ft above the river) and would consequently be a more intrusive and permanent addition to the cultural landscape. Because of the relatively level topography along the river corridor, the large scale and location of the bridge and boardwalks/ramps limit the range of effective options (e.g., design modifications, use of compatible materials, screening) for minimizing adverse impacts on the viewshed and historic setting of the district.

Long-term localized, moderate adverse impacts on the Brooks Camp cultural landscape are therefore anticipated from the construction of the bridge, elevated boardwalks and ramps. After applying ACHP criteria of adverse effect (36 CFR Part 800.5, *Assessment of Adverse Effects*), the National Park Service concludes that implementing alternative 4 would result in an *adverse effect* on the Brooks Camp cultural landscape because of the bridge and boardwalk construction. Consequently, the National Park Service would execute a memorandum of agreement documenting measures to minimize or mitigate the adverse effects of construction in consultation with the Alaska SHPO, associated Alaska Native groups, and other concerned parties.

**Cumulative Impacts.** Other past, present, and reasonably foreseeable future projects and actions have had, or have the potential to adversely impact historic structures and cultural landscape elements in the project area. As described in the "Cumulative Impacts" section under alternative 1 (above), these impacts are generally attributed to the loss and alteration of historic properties, fabric and contributing landscape features.

The effects of alternative 4, when added to the effects identified above from other past present and reasonably foreseeable actions, would result in a long-term, localized, moderate adverse cumulative impact on historic buildings, structures and cultural landscape features. Alternative 4 would contribute a substantial adverse increment to this cumulative impact.

**Conclusion.** Alternative 4 would have long-term, localized, moderate adverse impacts on historic structures and cultural landscape features contributing to the significance of the Brooks Camp Historic District. These adverse impacts are attributed to the introduction of new constructed elements (bridge, boardwalks, and ramps) that would diminish the integrity of the Brooks Camp cultural landscape.

## Alternative 5

**Analysis.** No historic structures would be directly impacted by proposed construction activities under this alternative. However, the introduction of new constructed elements (e.g., the boardwalk and vehicle access ramp) into the core area of the Brooks Camp Historic District would be expected to adversely impact character-defining features of the cultural landscape, altering elements such as views and vistas, historic setting and feeling, historic patterns of circulation and spatial organization. The new bridge across Brooks River at the same location of the seasonal floating bridge would be constructed at an increased height (10 ft above the river) and would consequently be a more intrusive and permanent addition to the cultural landscape. Because of the relatively level topography along the river corridor, the large scale and location of the bridge and boardwalks/ramps limit the range of effective options (e.g., design modifications, use of compatible materials, screening) for minimizing adverse impacts on the viewshed and historic setting of the district.

Long-term localized, moderate adverse impacts on the Brooks Camp cultural landscape are therefore anticipated from the construction of the bridge, elevated boardwalks and ramps. After applying ACHP criteria of adverse effect (36 CFR Part 800.5, *Assessment of Adverse Effects*), the National Park Service concludes that implementing alternative 5 would result in an *adverse effect* on the Brooks Camp cultural landscape because of the bridge and boardwalk construction. Consequently, the National Park Service would execute a memorandum of agreement documenting measures to minimize or mitigate the adverse effects of construction in consultation with the Alaska SHPO, associated Alaska Native groups, and other concerned parties.

**Cumulative Impacts.** Other past, present, and reasonably foreseeable future projects and actions have had, or have the potential to adversely impact historic structures and cultural landscape elements in the project area. As described in the "Cumulative Impacts" section under alternative 1 (above), these impacts are generally attributed to the loss and alteration of historic properties, fabric, and contributing landscape features.

The effects of alternative 5, when added to the effects identified above from other past present and reasonably foreseeable actions, would result in a long-term, localized, moderate, adverse, cumulative impact on historic buildings, structures and cultural landscape features. Alternative 5 would contribute a substantial adverse increment to this cumulative impact.

**Conclusion.** Alternative 5 would have long-term, localized, moderate adverse impacts on historic structures and cultural landscape features contributing to the significance of the Brooks Camp Historic District. These adverse impacts are attributed to the introduction of new constructed elements (bridge, boardwalks, and ramps) that would diminish the integrity of the Brooks Camp cultural landscape.

## ETHNOGRAPHIC RESOURCES

### Alternative 1

**Analysis.** Under the no-action alternative, there would be no new construction in the Brooks Camp area other than that necessary for routine maintenance activities. Seasonal installation and use of the floating bridge across Brooks River would continue at the present location, and no substantial changes in park operations or visitor use activities would occur. Because the archeological sites and burial locations of the Brooks River Archeological District National Historic Landmark are also recognized as ethnographic resources and important elements of the potential Brooks River ethnographic landscape, there would be little potential for impacts on buried ethnographic resources as a result of ground-disturbing construction. These resources, however, would continue to be at potential risk of disturbance resulting from the presence, use, and maintenance of concentrated development and infrastructure in Brooks Camp by NPS and concession operations. NPS archeologists and cultural resource specialists would continue to monitor the condition of known archeological/ethnographic sites in the archeological district and would take appropriate protection and stabilization measures to reduce or avoid site impacts.

The presence and activities of the National Park Service, concession operators, and visitors would continue to inhibit traditional uses and activities in the Brooks River area. However, the National Park Service would cooperate, plan, and consult with Sugpiat traditional users, the heirs of Palakia Melgenak, and others with cultural ties to the area in efforts to ensure access is appropriately retained to places and resources of cultural importance. The annual Brooks River redfish harvest would continue as a culturally important activity. Continuation of NPS resource protection measures and retention of access to traditionally important resources and places would have long-term, minor benefits on ethnographic resources and those with cultural ties to the area. Potential disturbance of ethnographic resources resulting from actions associated with visitor use and park/concessioner operations, along with the continuance of actions and conditions that discourage traditional use activities would have long-term, localized, minor adverse impacts on ethnographic resources.

**Cumulative Impacts.** Ethnographic resources in the Brooks River area have been impacted primarily by the establishment, development, and operation of Brooks Camp and to a lesser extent by natural and human caused erosion and localized ground disturbance.

Beginning in the 1950s, development associated with operations of the park concessioner and the National Park Service at Brooks Camp resulted in the disturbance of culturally important sites and resources, and disrupted the traditional use activities of the Sugpiat people. Impacts were compounded by increasing numbers of anglers and visitors to the area. Development actions affecting traditional use of the area included construction of the road linking Brooks Camp with Valley of Ten Thousand Smokes, NPS use of the spit road and loading ramp, installation of the floating bridge over the river, and construction of the bear viewing platform and boardwalk on the south side of the river. High numbers of bears and visitors, later closing dates for Brooks Camp, and regulatory provisions have also discouraged the traditional late season redfish harvest. These actions have adversely affected ethnographic resources and the ability of the Sugpiat to carry out traditional activities on Brooks River.

Other recent or foreseeable construction projects in the vicinity include improvements to the Brooks Camp picnic area (e.g. installation of a picnic shelter, restroom and storage building); construction of a maintenance shop and water/septic system in the Valley Road Administrative Area; and construction of access roads and utilities at Valley Road Administrative Area for phased relocation of Brooks Camp housing. Projects in the Valley Road Administrative Area would be carried out in support of the 1996 development concept plan, which calls for the phased relocation of Brooks Camp facilities and operations to a location south of the river. Although these projects could adversely affect ethnographic resources because of reduced access to the lower river, the intensity of adverse impacts would be expected to be minor because they are associated primarily with temporary use of the spit area for project activities. Buried utility lines may be removed if removal would not damage buried archeological resources or graves. The area proposed for Valley Road Administrative Area has been evaluated as having a low potential for ethnographic resources. As appropriate, surveys and monitoring would precede and accompany construction for all project areas to ensure that resources are avoided or that adverse effects are adequately mitigated. Removal of facilities and operations from the Brooks Camp area has also been previously evaluated as having long-term, beneficial impacts on sensitive ethnographic resources by removing the threats of disturbance associated with development and park/visitor use from the area (URS Inc. 2009a).

The effects of alternative 1 when added to the effects identified above from other past, present, and reasonably foreseeable actions, would result in a long-term, localized, moderate adverse cumulative impact on ethnographic resources. Alternative 1 would contribute a small adverse increment to this cumulative impact.

**Conclusion.** Alternative 1 would have long-term, localized, minor adverse impacts on ethnographic resources associated with Brooks River and the Brooks River Archeological District. Adverse impacts would occur primarily from reduced access to the lower Brooks River for native Sugpiat people to conduct traditional activities, and from erosion or other disturbance associated with visitor use and park/concessioner operations.

## Alternative 2

**Analysis.** Ethnographic resources in the project area include natural resources and landmark features significant to the traditionally associated Sugpiat people as well as archeological sites and burial locations of the Brooks River Archeological District National Historic Landmark. Sites comprising the archeological district are also potential elements of the Brooks River ethnographic landscape. Archeological testing conducted in 2008, 2009, and 2010 confirmed the presence of intact archeological/ethnographic resources near Brooks Camp where the proposed boardwalk and vehicle access points to the bridge are planned to originate, and at the north bank of Brooks River. The resources are part of a previously recorded prehistoric site that contains human burials and associated house features, as well as artifacts and a pit exposed in the north bank of the river associated with mid-20th century traditional use. The sites have sustained, and continue to be threatened by, development impacts (NPS 1992). Another site, also partially disturbed by previous development, is located to the north in the general project area of Brooks Camp. Measures to limit possible adverse effects on ethnographic resources include avoiding construction activities north of the fish freezing station, and ensuring that boardwalk footings avoid resources associated with a former Sugpiat fish camp between the fish freezing station and the Corner.

Boardwalk and bridge construction on the south side of the river or near the Lake Brooks access road are not anticipated to introduce new effects to ethnographic resources. Archeological investigations along the route of the proposed barge landing access road led to the discovery of significant prehistoric resources found in association with previously known historic archeological resources in the form of post-1912 cabin ruins. Ethnographic survey may attribute ethnographic significance to the historic cabin ruins. To avoid adverse impacts to these sites by road construction, it is recommended that the proposed right-of-way be modified to avoid subsurface disturbance, particularly the final 164 ft (50 meters) to the proposed location of the barge landing (NPS 2010b).

The barge road would pass along the southern boundary of the conservation easement and terminate along the southeast edge of the private parcel owned by the heirs of Palakia Melgenak. Under this alternative, the spit road and barge landing would be removed, thereby eliminating vehicles and heavy equipment handling cargo at the river mouth. Additionally, NPS boats currently parked along the spit would be parked and stored at the barge landing. This would free the river mouth of concessioner and NPS activities, which would improve access to the spit on the south side of Brooks River for those conducting traditional activities. Frequent bear use of the spit would continue to impede traditional activities there.

It is anticipated that the site avoidance measures recommended above would be adequately addressed through project design modifications that restrict or direct ground-disturbing construction activities away from areas likely to be associated with ethnographic resources. Consequently, although ground-disturbing construction would occur, measures would be implemented to minimize or avoid disturbance of identified sites in the Brooks Camp area and at other project locations. As necessary, monitoring would accompany construction in all areas where sensitive archeological/ethnographic resources have been previously identified or could be anticipated based on current project surveys. If ethnographic resources became apparent during construction, construction would cease in the area of the discovery until the resources are adequately documented and assessed by NPS staff in consultation with the Alaska SHPO, the Council of Katmai Descendants, and/or other concerned tribal members and individuals. NPS staff would further consult on ways to avoid significant sites and/or to carry out necessary mitigation and data recovery measures if avoidance cannot be achieved.

In late summer 2010, the National Park Service began an ethnographic resource survey to identify the character-defining features of a potential ethnographic landscape in the general vicinity of the mouth of Brooks River. The investigations are also anticipated to include an evaluation of the landscape as a potential traditional cultural property meeting the criteria of eligibility for listing in the National Register of Historic Places. Information acquired from these investigations, together with any issues or recommendations imparted by the Council of Katmai Descendants, the heirs of Palakia Melgenak, and/or other culturally associated groups would assist the National Park Service in efforts to identify and protect ethnographic resources and places of cultural importance, and ensure continued access to these places and resources by associated groups.

Alternative 2 would be expected to have long-term, localized, minor adverse impacts on ethnographic resources. The impacts would not appreciably alter resource conditions or impede traditional access. The long-term preservation of ethnographic resources near the Brooks Camp area would also benefit following project completion because pedestrian and vehicle access to the bridge crossing would be directed along the boardwalks and ramps, thereby reducing the potential for ongoing erosion and compaction impacts on buried archeological/ethnographic resources by use of existing roads and trails. Traditional access to the spit would be improved by removing vehicular and boat traffic from the lower river below the bridge. Measures to identify and document ethnographic resources in the Brooks Camp area would also benefit the long-term preservation of these resources.

After applying ACHP criteria of adverse effect (36 CFR Part 800.5, *Assessment of Adverse Effects*), the National Park Service concludes that implementing alternative 2 would result in *no adverse effect* on ethnographic resources.

**Cumulative Impacts.** Other past, present, and reasonably foreseeable future projects and actions have had, or have the potential to adversely impact ethnographic resources in the project area. As described in the "Cumulative Impacts" section under alternative 1 (above), these impacts are generally attributed to the establishment, development and operation of Brooks Camp and to a lesser extent to natural and human-caused erosion and localized ground disturbance associated with NPS and concessioner development and operations. Increases in numbers of bears have inhibited human use of the spit on the south shore of Brooks River.

The effects of alternative 2, when added to the effects identified above from other past, present, and reasonably foreseeable actions, would result in a long-term, localized, moderate adverse cumulative impact on ethnographic resources. Alternative 2 would contribute a small adverse increment to this cumulative impact.

**Conclusion.** Alternative 2 would have long-term, localized, minor adverse impacts on ethnographic resources associated with Brooks River and the Brooks River Archeological District. Adverse impacts would occur primarily from erosion or other disturbances associated with visitor use and park/concessioner operations, operational use of the spit and barge landing, and from wildlife conditions that discourage native Sugpiat people from accessing the lower Brooks River to conduct traditional activities.

Moving the spit road, barge landing, and boat mooring area from the south bank of Brooks River to the proposed barge landing and boat storage area on Naknek Lake near the Beaver Pond would have a beneficial impact on access to the south bank for traditional users. However, the high numbers of bears on Brooks River and application of minimum wildlife distance rules would continue to limit traditional use Although ground-disturbing construction activities have the potential to adversely impact ethnographic resources, site avoidance and protection measures would be implemented to minimize or avoid site disturbances.

## Alternative 3

**Analysis.** Ethnographic resources in the project area include natural resources and landmark features significant to the traditionally associated Sugpiat people as well as archeological sites and burial locations of the Brooks River Archeological District National Historic Landmark. Sites comprising the archeological district are also potential elements of the Brooks River ethnographic landscape. Archeological testing conducted in 2008, 2009, and 2010 confirmed the presence of intact archeological/ethnographic resources near Brooks Camp where the proposed boardwalk and vehicle access points to the bridge are planned to originate, and at the north bank of Brooks River. The resources are associated with a previously recorded prehistoric site that contains human burials and associated house features, as well as artifacts and a pit exposed in the north bank of the river associated with traditional use in the mid-20th century. The sites have sustained (and continue to be threatened by) development impacts (NPS 1992). Another site, also partially disturbed by previous development, is located to the north in the general project area of Brooks Camp. Measures to limit possible adverse effects on ethnographic resources include avoiding construction activities north of the fish freezing station, and ensuring that boardwalk footings avoid resources associated with a former Sugpiat fish camp between the fish freezing station and the Corner.

No ethnographic resources are anticipated to be affected by boardwalk and bridge construction on the south side of the river or near the Lake Brooks access road (NPS 2010a).This alternative includes construction of a new barge landing site approximately 200 ft south of the existing landing and construction of approximately 100 ft of new road from the spit road to the new barge landing. Moving the barge landing south would slightly improve access to the spit, but the spit road would continue to be used by the NPS and contractors. The new landing would be closer to the northwest edge of the private Melgenak property.

It is anticipated that the site avoidance measures recommended above can be adequately addressed through project design modifications that restrict or direct ground-disturbing construction activities away from areas likely to contain ethnographic resources. Consequently, although ground-disturbing construction would occur, measures would be implemented to minimize or avoid disturbance of identified sites in the Brooks Camp area and at other project locations. The effects due to moving the barge landing south would be neutral or of minor beneficial impact. As necessary, monitoring would accompany construction in all areas where sensitive archeological/ ethnographic resources have been previously identified or could be anticipated based on current project surveys. If ethnographic resources became apparent during construction, construction would cease in the area of the discovery until the resources are adequately documented and assessed by NPS staff in consultation with the Alaska SHPO, the Council of Katmai Descendants, and/or other concerned tribal members and individuals. NPS staff would further consult on ways to avoid significant sites and/or to carry out necessary mitigation and data recovery measures if avoidance cannot be achieved.

In late summer 2010, the National Park Service began an ethnographic resource survey to identify the character-defining features of a potential ethnographic landscape in the general vicinity of the mouth of Brooks River. The investigations are also anticipated to include an evaluation of the landscape as a potential traditional cultural property meeting the criteria of eligibility for listing in the National Register of Historic Places. Information acquired from these investigations, together with any issues or recommendations imparted by the Council of Katmai Descendants, the heirs of Palakia Melgenak, and/or other culturally associated groups would assist the National Park Service in efforts to protect ethnographic resources and places of cultural importance, and ensure continued access to these places and resources by associated groups.

Alternative 3 would be expected to have long-term, localized, minor adverse impacts on ethnographic resources. The impacts would not appreciably alter resource conditions or further impede traditional access. The long-term preservation of ethnographic resources near the Brooks Camp area would also benefit following project completion because pedestrian and vehicle access to the bridge crossing would be directed along the boardwalks and ramps, thereby reducing the potential for ongoing erosion and compaction impacts on buried archeological/ethnographic resources by use of existing roads and trails. Measures to identify and document ethnographic resources in the Brooks Camp area would also benefit the long-term preservation of these resources.

After applying ACHP criteria of adverse effect (36 CFR Part 800.5, *Assessment of Adverse Effects*), the National Park Service concludes that implementing alternative 3 would result in *no adverse effect* on ethnographic resources.

**Cumulative Impacts.** Other past, present, and reasonably foreseeable future projects and actions have had, or have the potential to adversely impact ethnographic resources in the project area. As described in the "Cumulative Impacts" section under alternative 1 (above), these impacts are generally attributed to the establishment, development, and operation of Brooks Camp, and to a lesser extent to natural and human-caused erosion and localized ground disturbance associated with NPS and concessioner development and operations. Increases in numbers of bears have inhibited human use of the spit on the south shore of Brooks River.

The effects of alternative 3, when added to the effects identified above from other past, present, and reasonably foreseeable actions would result in a long-term, localized, moderate adverse cumulative impact on ethnographic resources. Alternative 3 would contribute a small adverse increment to this cumulative impact.

**Conclusion.** Alternative 3 would have long-term, localized, minor adverse impacts on ethnographic resources associated with Brooks River and the Brooks River Archeological District. Adverse impacts would occur primarily from reduced access to the lower Brooks River for native Sugpiat people to conduct traditional activities, and from erosion or other disturbance associated with visitor use and park/concessioner operations. Although ground-disturbing construction activities have the potential to adversely impact ethnographic resources, site avoidance and protection measures would be implemented to minimize or avoid site disturbances. Movement of the loading ramp and barge landing 200 ft south would have a neutral or minor beneficial effect on access to the lower river for conducting traditional practices. High numbers of bears on Brooks River and application of minimum wildlife distance rules would continue to limit traditional use.

## Alternative 4

**Analysis.** Ethnographic resources in the project area include natural resources and landmark features significant to the traditionally associated Sugpiat people as well as archeological sites and burial locations of the Brooks River Archeological District National Historic Landmark. Sites comprising the archeological district are also potential elements of the Brooks River ethnographic landscape. Archeological testing conducted in 2008, 2009, and 2010 confirmed the presence of intact archeological/ethnographic resources near Brooks Camp where the proposed boardwalk and vehicle access points to the bridge are planned to originate, and at the north bank of Brooks River. The resources are associated with a previously recorded prehistoric site that contains human burials and associated house features, as well as artifacts and a pit exposed in the north bank of the river associated with traditional use in the mid-20th century. The sites have sustained (and continue to be threatened by) development impacts (NPS 1992). Another site, also partially disturbed by previous development, is located to the north in the general project area of Brooks Camp. Measures to limit possible adverse effects on ethnographic resources include avoiding construction activities north of the fish freezing station, and ensuring that boardwalk footings avoid resources associated with a former Sugpiat fish camp between the fish freezing station and the Corner.

Boardwalk and bridge construction on the south side of the river or near the Lake Brooks access road are not anticipated to introduce new effects to ethnographic resources. Archeological investigations along the route of the proposed barge landing access road led to the discovery of significant prehistoric resources found in association with previously known historic archeological resources in the form of post-1912 cabin ruins. Ethnographic survey may attribute ethnographic significance to the historic cabin ruins. To avoid adverse impacts to these sites by road construction, it is recommended that the proposed right-of-way be modified to avoid subsurface disturbance, particularly the final 164 ft (50 meters) to the proposed location of the barge landing (NPS 2010b).

The barge road will pass along the southern boundary of the conservation easement and terminate along the southeast edge of the private parcel owned by the heirs of Palakia Melgenak. The National Park Service would consult with the heirs to identify their concerns about the project work and to seek ways to avoid affecting their land rights. Installation of the access road, barge landing, and boat storage area will improve access to the spit on the south side of Brooks River for conducting traditional activities.

Under this alternative, the spit road and barge landing would be removed, thereby eliminating vehicles and heavy equipment handling cargo at the river mouth. Additionally, NPS boats currently parked along the spit would be parked and stored at the barge landing, leaving the river mouth free of concessioner and NPS activities. Frequent bear use of the spit would continue to impede traditional activities.

It is anticipated that the site avoidance measures recommended above can be adequately addressed through project design modifications that restrict or direct ground-disturbing construction activities away from areas likely to contain ethnographic resources. Consequently, although ground-disturbing construction would occur, measures would be implemented to minimize or avoid disturbance of identified sites in the Brooks Camp area and at other project locations. The effects due to moving the barge landing south would be neutral or of minor beneficial impact. As necessary, monitoring would accompany construction in all areas where sensitive archeological/ ethno-graphic resources have been previously identified or could be anticipated based on current project surveys. If ethnographic resources became apparent during construction, construction would cease in the area of the discovery until the resources are adequately documented and assessed by NPS staff in consultation with the Alaska SHPO, the Council of Katmai Descendants, and/or other concerned tribal members and individuals. NPS staff would further consult on ways to avoid significant sites and/or to carry out necessary mitigation and data recovery measures if avoidance cannot be achieved.

In late summer 2010, the National Park Service began an ethnographic resource survey to identify the character-defining features of a potential ethnographic landscape in the general vicinity of the mouth of Brooks River. The investigations are also anticipated to include an evaluation of the landscape as a potential traditional cultural property meeting the criteria of eligibility for listing in the National Register of Historic Places. Information acquired from these investigations, together with any issues or recommendations imparted by the Council of Katmai Descendants, the heirs of Palakia Melgenak, and/or other culturally associated groups would assist the National Park Service in efforts to protect ethnographic resources and places of cultural importance, and ensure continued access to these places and resources by associated groups.

Alternative 4 would be expected to have long-term, localized, minor adverse impacts on ethnographic resources. The impacts would not appreciably alter resource conditions or further impede traditional access. The long-term preservation of ethnographic resources near the Brooks Camp area would also benefit following project completion because pedestrian and vehicle access to the bridge crossing would be directed along the boardwalks and ramps, thereby reducing the potential for ongoing erosion and compaction impacts on buried archeological/ethnographic resources by use of existing roads and trails. Measures to identify and document ethnographic resources in the Brooks Camp area would also benefit the long-term preservation of these resources.

After applying ACHP criteria of adverse effect (36 CFR Part 800.5, *Assessment of Adverse Effects*), the National Park Service concludes that implementing alternative 4 would result in *no adverse effect* on ethnographic resources.

**Cumulative Impacts.** Other past, present, and reasonably foreseeable future projects and actions have had, or have the potential to adversely impact ethnographic resources in the project area. As described in the "Cumulative Impacts" section under alternative 1 (above), these impacts are generally attributed to the establishment, development, and operation of Brooks Camp and to a lesser extent to natural and human-caused erosion and localized ground disturbance associated with NPS and concessioner development and operations. Increases in numbers of bears have inhibited human use of the spit on the south shore of Brooks River.

The effects of alternative 4, when added to the effects identified above from other past present and reasonably foreseeable actions, would result in a long-term, localized, moderate adverse cumulative impact on ethnographic resources. Alternative 4 would contribute a small adverse increment to this cumulative impact.

**Conclusion.** Alternative 4 would have long-term, localized, minor adverse impacts on ethnographic resources associated with Brooks River and the Brooks River Archeological District. Adverse impacts would occur primarily from reduced access to the lower Brooks River for native Sugpiat people to conduct traditional activities, and from erosion or other disturbance associated with visitor use and park/concessioner operations. The establishment of a barge landing, access road, and boat storage area near the Beaver Pond, and removal of the spit road and loading ramp on the south bank of Brooks River would have a beneficial impact on ethnographic resources. Although ground-disturbing construction activities have the potential to adversely impact ethnographic resources, site avoidance and protection measures would be implemented to minimize or avoid site disturbances.

## Alternative 5

**Analysis.** Ethnographic resources in the project area include natural resources and landmark features significant to the traditionally associated Sugpiat people, as well as archeological sites and burial locations of the Brooks River Archeological District National Historic Landmark. Sites comprising the archeological district are also potential elements of the Brooks River ethnographic landscape. Archeological testing conducted in 2008, 2009, and 2010 confirmed the presence of intact archeological/ethnographic resources near Brooks Camp where the proposed boardwalk and vehicle access points to the bridge are planned to originate, and at the north bank of Brooks River. The resources are associated with a previously recorded prehistoric site that contains human burials and associated house features, as well as artifacts and a pit exposed in the north bank of the river associated with traditional use in the mid-20th century. The sites have sustained (and continue to be threatened by) development impacts (NPS 1992).

Another site, also partially disturbed by previous development, is located to the north in the general project area of Brooks Camp. Measures to limit possible adverse effects on ethnographic resources include avoiding construction activities north of the fish freezing station, and ensuring that boardwalk footings avoid resources associated with a former Sugpiat fish camp between the fish freezing station and the Corner.

Boardwalk and bridge construction on the south side of the river or near the Lake Brooks access road are not anticipated to introduce new effects to ethnographic resources. Archeological investigations along the route of the proposed barge landing access road led to the discovery of significant prehistoric resources found in association with previously known historic archeological resources in the form of post-1912 cabin ruins. Ethnographic survey may attribute ethnographic significance to the historic cabin ruins. To avoid adverse impacts to these sites by road construction, it is recommended that the proposed right-of-way be modified to avoid subsurface disturbance, particularly the final 164 ft (50 meters) to the proposed location of the barge landing (NPS 2010b).

The barge road will pass along the southern boundary of the conservation easement and terminate along the southeast edge of the private parcel owned by the heirs of Palakia Melgenak. The National Park Service will consult with the heirs to identify their concerns about the project work and to seek ways to avoid affecting their land rights. Installation of the access road, barge landing, and boat storage area will improve access to the spit on the south side of Brooks River for conducting traditional activities.

Under this alternative, the spit road and barge landing would be removed, thereby eliminating vehicles and heavy equipment handling cargo at the river mouth. Additionally, NPS boats currently parked along the spit would be parked and stored at the barge landing leaving the river mouth free of concessioner and NPS activities. Frequent bear use of the spit would continue to impede traditional activities there.

It is anticipated that the site avoidance measures recommended above can be adequately addressed through project design modifications that restrict or direct ground-disturbing construction activities away from areas likely to contain ethnographic resources. Consequently, although ground-disturbing construction would occur, measures would be implemented to minimize or avoid disturbance of identified sites in the Brooks Camp area and at other project locations. As necessary, monitoring would accompany construction in all areas where sensitive archeological/ethnographic resources have been previously identified or could be anticipated based on current project surveys. If ethnographic resources became apparent during construction, construction would cease in the area of the discovery until the resources are adequately documented and assessed by NPS staff in consultation with the Alaska SHPO, the Council of Katmai Descendants, and/or other concerned tribal members and individuals. NPS staff would further consult on ways to avoid significant sites and/or to carry out necessary mitigation and data recovery measures if avoidance cannot be achieved.

In late summer 2010, the National Park Service began an ethnographic resource survey to identify the character-defining features of a potential ethnographic landscape in the general vicinity of the mouth of Brooks River. The investigations are also anticipated to include an evaluation of the landscape as a potential traditional cultural property meeting the criteria of eligibility for listing in the National Register of Historic Places. Information acquired from these investigations, together with any issues or recommendations imparted by the Council of Katmai Descendants, the heirs of Palakia Melgenak, and/or other culturally associated groups would assist the National Park Service in efforts to protect ethnographic resources and places of cultural importance, and ensure continued access to these places and resources by associated groups.

Alternative 5 would be expected to have long-term, localized, minor adverse impacts on ethnographic resources. The impacts would not appreciably alter resource conditions or impede traditional access. The long-term preservation of ethnographic resources near the Brooks Camp area would also benefit following project completion because pedestrian and vehicle access to the bridge crossing would be directed along the boardwalks and ramps, thereby reducing the potential for ongoing erosion and compaction impacts on buried archeological/ethnographic resources by use of existing roads and trails. Measures to identify and document ethnographic resources in the Brooks Camp area would also benefit the long-term preservation of these resources.

After applying ACHP criteria of adverse effect (36 CFR Part 800.5, *Assessment of Adverse Effects*), the National Park Service concludes that implementing alternative 5 would result in *no adverse effect* on ethnographic resources.

**Cumulative Impacts.** Other past, present, and reasonably foreseeable future projects and actions have had, or have the potential to adversely impact ethnographic resources in the project area. As described in the "Cumulative Impacts" section under alternative 1 above, these impacts are generally attributed to the establishment, development and operation of Brooks Camp and to a lesser extent to erosion and localized ground disturbance associated with NPS and concessioner development and operations. Increases in numbers of bears have inhibited human use of the spit on the south shore of Brooks River.

The effects of alternative 5, when added to the effects identified above from other past present and reasonably foreseeable actions, would result in a long-term, localized, moderate adverse cumulative impact on ethnographic resources. Alternative 5 would contribute a small adverse increment to this cumulative impact.

**Conclusion.** Alternative 5 would have long-term, localized, minor adverse impacts on ethnographic resources associated with Brooks River and the Brooks River Archeological District. Adverse impacts would occur primarily from reduced access to the lower Brooks River for native Sugpiat people to conduct traditional activities, and from erosion or other disturbance associated with visitor use and park/concessioner operations. The establishment of a barge landing, access road, and boat storage area near the Beaver Pond, and removal of the spit road and loading ramp on the south bank of Brooks River would have a beneficial impact on ethnographic resources. Although ground-disturbing construction activities have the potential to adversely impact ethnographic resources, site avoidance and protection measures would be implemented to minimize or avoid site disturbances.

# VISITOR EXPERIENCE

## ALTERNATIVE 1

### Recreational Opportunities, Crowding, and Quality of Experience

The primary recreational opportunities at Brooks Camp are viewing (97 percent) and photographing (80 percent) bears, according to a study conducted in July 2006 (Littlejohn and Hollenhorst 2007).Although comprising less than 10 percent of annual visitation, anglers also come to Brooks Camp for its world-class sport fishing opportunities. Under the no-action alternative, opportunities to view bears and to fish in Brooks River would be retained.

Overall visitor use levels have steadily increased over the years at Brooks Camp. The number of visitors wishing to access the bridge and the extended bridge closures caused by bears in the area disrupt the visitor experience by creating a bottleneck of visitors as they wait for the bridge to reopen. Eighty-seven percent of visitors in the July 2006 study reported experiencing bears blocking access to facilities (Littlejohn and Hollenhorst 2007).

Consequently, crowding has been noted to affect visitor experiences. In the July 2006 study, 56 percent of visitors to Brooks Camp felt "moderately crowded," "very crowded" or "extremely crowded", and an additional 30 percent felt "a little crowded" (Littlejohn and Hollenhorst 2007). The delays caused by closures can also create stress for visitors if they need to make transport connections to leave Brooks Camp but cannot cross the bridge. The lower bear viewing platform on the south side of Brooks River can be congested at times and is subject to access restrictions when bears come too close. The no-action alternative would perpetuate these conditions.

Even though the closures cause crowding, 48 percent of visitors in the July 2006 survey indicated that bears blocking access to facilities added to their experience (Littlejohn and Hollenhorst 2007), most likely because the closures provide an atmosphere of adventure by allowing visitors to have close proximity to bears while still providing a sense of safety due to the presence of rangers. These closures also provide additional opportunities for park rangers to provide orientation, interpretation, and safety information to a captive audience of visitors as they wait for the bridge to reopen (NPS 2009f), which also contributes to a positive visitor experience.

### Transportation, Access, and Circulation

The Brooks Camp area is accessed primarily by floatplane, but is also accessed by boat. The landing area is located on the south side of the river, so visitors and supplies must cross the river to reach Brooks Camp.

The floating bridge, which is 320 ft long, is periodically closed because of bear encounters and is shared between pedestrians and light utility vehicles. It provides direct access to Brooks Camp from the south, and an access trail then connects the north end of the floating bridge to Brooks Camp. The area of the trail known as the Corner is especially subject to disruptions from bear encounters, as it is close to the riverbank. Similarly, access to the barge landing is also periodically subject to disruptions from bear encounters. The no-action alternative would perpetuate temporary disruptions to visitor access in these areas. Floatplane access would remain the same.

Bear viewers use the trail from the camp, through the Corner, and over the bridge as the access corridor the reach the Brooks Falls Viewing Platform upstream of the bridge. Anglers, however, have much different circulation patterns. A collection of social trails is used by anglers to reach the prime sport fishing locations on the northwest side of the bridge, such as the oxbow and the north bank of the river. Other popular fishing areas on the south bank of the river are near the west side bridge and the upper portion of the river above the falls. Anglers and bear viewers alike enjoy easy access to the riverbank.

### Bridge, Boardwalk, and Viewing Platform Capacities

A recommended standard for pedestrian capacity on walkways, boardwalks, and viewing platforms was developed by Parks Victoria in Australia by adapting the U.S. Federal Highway Administration highway capacity manual to apply to a national park setting very similar to that of Brooks Camp. The results suggested 15–40 $ft^2$ of space per pedestrian for walkways and boardwalks, and 15–23 $ft^2$ per visitor for defined viewing areas (Itami 2002).

Data collected in September 2011 show that the maximum number of people recorded in the vicinity of the bridge at any one time is 72 people, which includes the number of people on the lower platform, the satellite platform, the corner, and the bridge, as well as the people in the river fishing, below the platforms and on the ground below the corner to the gravel bar (NPS 2011b). Based on this, it is unlikely that the number of people that would attempt to cross the bridge at any one time would be less than 72. The square footage of the bridge in alternative 1 (2,560 $ft^2$), when using the above standard, allows 64 to 171 pedestrians to travel comfortably across, even taking into account the likelihood that recreational users will stop briefly to take a photo or enjoy the view. This bridge capacity, therefore, does not detract from visitor experiences because even the highest potential visitation level at one time is within acceptable parameters.

The existing viewing platform, on the south side of the river, is 600 $ft^2$. When using the standard of 15–23 $ft^2$ per visitor, the ideal capacity for the viewing platform is 26–40 visitors. While up to 75 visitors may be able to physically stand on the platform, any number higher than 40 people would represent a diminished visitor experience. As this is the only viewing platform near the bridge and provides a wide view of the river, it is the main gathering point for visitors to watch bears and is subject to crowding. Based on the historic maximum of 72 people at one time throughout the entire area near the bridge, the current capacity of the platform would be likely not exceed acceptable standards.

### Visitor Safety—Human-Bear Interaction and Pedestrian-Vehicle Conflicts

Currently, though there have historically been very few incidents reported, human-bear interactions pose a potential risk to visitor safety at Brooks Camp. An extensive education and monitoring program is in place to improve visitor safety. These programs notwithstanding, the floating bridge and its access trails continue to pose risks to visitor safety because human-bear interactions cannot easily be avoided. Furthermore, there are no emergency exits from the floating bridge that would allow for evacuation of the area in the event of unexpected bear encounters. Consequently, the bridge is closed as a precautionary measure when bears are present to prevent people from accessing it. Similarly, the Corner area continues to be a choke point of visitor access to the bridge, and bear encounters are especially common there. Overall, the no-action alternative would have adverse impacts on visitor safety because of the potential risks associated with human-bear interactions that would likely continue to occur.

Additionally, though no incidents have been recorded, risk is inherent in allowing pedestrians and vehicles to use the same bridge, trail, and access points. This results in the potential risk of vehicle-pedestrian conflicts.

Crowding, access disruptions, and human-bear interactions are all caused or exacerbated by bears blocking access to facilities, which is experienced by 87 percent of visitors. This results in a localized, major, long-term, adverse impact on safety, yet creates localized, moderate, long-term beneficial impacts to visitor experience.

**Cumulative Impacts.** Past and present programs and projects in the Brooks Camp area have had an overall effect on the visitor experience. In particular, the visitor orientation program provides visitors with important information about recreational and other opportunities at Brooks Camp. This program also provides visitors with key information about bear and visitor safety. Similarly, projects related to facility and infrastructure developments and their continued maintenance, such as improvements to the picnic area, would be favorable to the visitor experience.

Reasonably foreseeable actions that might affect the visitor experience include the planned relocation of Brooks Camp south of the river. For instance, pedestrian-vehicle conflicts would be reduced because fewer vehicles would need to use the bridge and boardwalk since boats would dock on the same side of the river as the camp and their cargo would be transported over land to the south, rather than over the bridge to the north. Additionally, improvements to facilities, such as the picnic area, including food storage upgrades and the construction of a new trail from the campground to lodge area, would also have a positive effect on visitor safety by decreasing the likelihood of bear encounters.

Additional factors that might affect this project in the foreseeable future include changes to visitor use patterns. Use has risen at Brooks Camp as it has increasingly become renowned and popular for bear viewing. However, it is not expected that visitation would substantially change over the time frame being analyzed.

Under the no-action alternative, greater pedestrian-vehicle conflicts may occur during camp relocation activities because of the narrow floating bridge design. After the relocation activities have been completed, however, they would be reduced because the fewer vehicles would need to access the north side of the river.

Overall, localized, moderate, beneficial cumulative impacts on visitor experiences, and especially safety, would occur long-term when impacts of current conditions and operations are added to future proposed actions. Short-term impacts, however, may be localized, moderate, and adverse due to relocation and construction activities that create pedestrian-vehicle conflicts on the current bridge, as well as potential facility closures, increased noise levels, and a diminished natural experience. The contribution of impacts from alternative 1 are minimal to the overall scenario since the adverse impacts from the no-action alternative would be substantially mitigated by cumulative actions.

**Conclusion.** The no-action alternative would affect visitor experience and visitor safety differently. There would be localized, moderate, long-term beneficial impacts on visitor experience because the current floating bridge and its closures provide a atmosphere of adventure by allowing close proximity to bears while still providing a sense of safety due to the presence of rangers.

Even though visitors perceive safety, and despite substantial efforts to educate visitors, monitor human-bear interactions and staff visitor areas with NPS rangers, the no-action alternative would have localized, major, long-term, adverse impacts on visitor safety because of the risk associated with continued frequent human-bear interactions.

## ALTERNATIVE 2

### Recreational Opportunities, Crowding, and Quality of Experience

Under alternative 2 visitors would continue to enjoy the range of activities they currently participate, including photography, camping, hiking, fishing, and bear viewing. Actions proposed would also not affect overall visitor use levels at the Brooks Camp (which may continue to gradually increase) but could disperse use to mitigate crowding.

Seven new platforms—two on either side of bridge at each end, two on the north boardwalk, and one on the south boardwalk—and wide boardwalks on both sides of the river would be added under alternative 2 to improve visitor movement, reduce vehicle-pedestrian conflicts, and potentially reduce crowding by distributing use. Crowding in the Corner area would be alleviated since the current trail would be removed and the elevated north boardwalk would begin adjacent to the lodge, about 535 ft from the riverbank. The mitigation of bridge closures caused by bear jams; however, may alter visitor behavior such that visitors would now have the ability to view bears for a longer period of time without being compelled to return to Brooks Camp earlier than needed to ensure compliance with travel itineraries. This may increase crowding and congestion. At present, visitors often spend several hours on the current platforms (NPS 2009f), which might be extended since the additional platforms would provide a greater diversity of viewing and photography perspectives.

The ability to view bears from certain locations will affect the popularity level of and length of stay at the platforms, and those with the best viewing opportunities at any given time are likely to be more crowded for longer periods of time than others.

Alternative 2 would enable visitors and staff to travel across the river unimpeded on raised boardwalks that still allow visitors to view bears without being inconvenienced by their proximity. The addition of viewing platforms would improve bear viewing options by providing more visitors with diverse opportunities to watch and photograph bears, the most popular visitor activities at Brooks Camp. Additionally, since bears are less sensitive to human presence on a raised bridge/boardwalk (NPS 2009f), visitors would be able to observe the bears' more natural behavior than if the people were at ground level. The quality of anglers' experience would also be enhanced by the unimpeded access provided by the raised travel corridor.

Short-term construction and restoration activities during project implementation would affect visitor experience because of noise and visual disruptions to the otherwise natural setting. These impacts would be partially mitigated by scheduling work during nonpeak visitor use hours and avoiding key access points.

Transportation, Access and Circulation
The Brooks Camp area would continue to be accessed primarily by floatplane under this alternative. The barge landing would be improved, positively affecting a small number of visitors who access Brooks Camp by boat.

New elevated bridge and boardwalks would provide a safe travel corridor for visitors to cross Brooks River without interruption from bear interactions and other conflicts.

The north boardwalk would be approximately 535 ft long, 335 ft of which would be solely for pedestrian access and 200 ft would be shared with vehicles, which would have a separate access ramp to minimize pedestrian-vehicle conflicts. This would also eliminate the need for the access trail through the Corner, an area that has high potential for human-bear interaction. There would be two locations on the north boardwalk for visitors to step off the travel corridor into a defined viewing area overlooking the wetlands, one on the strictly pedestrian section and a second on the shared section which would serve a dual-purpose as a viewing area and as a place for visitors to let a vehicle pass. Two additional platforms, one facing east and one facing west of the bridge, would allow visitors to safely stop and overlook either side of the river without interfering with vehicles or other pedestrians who are crossing the bridge. These additions would improve visitor circulation.

On the south end, two more viewing areas would overlook the river, one on each side. There would also be another pedestrian boardwalk, extending a length of 715 ft, which would reach to the bus parking area and include one viewing area facing the wetland. A vehicle ramp would branch off at the terminus of the bridge and extend approximately 215 ft to meet up with the access road, again minimizing pedestrian-vehicle conflicts and improving circulation.

Bear activity at the boardwalk entry points and subsequent closures may continue to disrupt visitor opportunities for bear watching. This would be mitigated, however, by locating access points well away from the riverbank, although increasing the number of access points by separating pedestrian and vehicle access can create more potential for human-bear interactions (NPS 2009f). Visitors wishing to access the riverbank would be able to use the short vehicle ramp on the south side of the river, which is not only the safer side from the standpoint of human-bear interactions, but it also has better visibility and photography opportunities than the north side.

Angler access would continue to be provided without restriction. The unmaintained social trails to the oxbow area of the river and along the north bank would be unaffected. After the discontinued maintenance of the trail through the Corner, it would become an unmaintained social trail like the others. Anglers would also continue to cross the bridge frequently to gain access to the south bank and the upper portion of the river above the falls.

Overall, this alternative would improve visitor access and circulation because the bridge and boardwalk would allow free flow and safety of travel across Brooks River.

## Bridge, Boardwalk, and Viewing Platform Capacities

The square footage of the bridge in alternative 2 (2,880 $ft^2$), when using the standard described in alternative 1 of 15–40 $ft^2$ of space per pedestrian, would allow 72 to 192 pedestrians to travel comfortably across unimpeded.

The three viewing platforms overlooking the wetlands would each have 150–225 $ft^2$ of space. Using the minimum standard of 15 $ft^2$ per visitor, as few as 10 (if the platform is 150 $ft^2$) or as many as 15 visitors (if the platform is 225 $ft^2$) could comfortably stand to take in the view.

The additional four viewing platforms overlooking the river would each have areas of 225–300 $ft^2$. The capacity for these would range from 15 to 20 visitors.

In total, if each of the seven platforms were at maximum capacity, 90 to 125 visitors (depending on size of platforms) could comfortably occupy the designated viewing areas and be safely protected from both bear and vehicle interactions. Given that the greatest number of visitors currently documented to be in the area of the bridge at any one time is 72 (NPS 2011b), this capacity is sufficient for current use levels and also allows for a substantial increase in visitation. It must be taken into consideration, however, that the ability to view bears from certain locations will affect the popularity level of the platforms, and those with the best viewing opportunities at any given time are likely to be more crowded than other locations.

Overall, the visitor capacities of the bridge, boardwalks, and viewing platforms are enough to support high-quality visitor experiences.

### Visitor Safety—Human-Bear Interaction and Pedestrian-Vehicle Conflicts

Alternative 2 includes numerous measures, addressing conflicts between visitors and both bears and vehicles, that improve the safety of visitors.

The elevation of the bridge would improve visitor safety by avoiding unwanted human-bear interactions in key areas such as the Corner and along the riverbanks. The 10-year average for human-bear interactions that may not have occurred if an elevated bridge and walkway were constructed between Brooks Camp and the south side of the river is 48, but the 5-year average is 77. This shows an increasing trend of potentially dangerous interactions. In 2007, a record 125 of such interactions were reported (NPS 2009h). The elevation of the primary pedestrian travel corridor, especially through the Corner, would considerably mitigate those potentially unsafe interactions.

Anglers would continue to have a greater chance to experience a human-bear interaction due to the nature of fishing taking place along the riverbanks, near areas that are frequented by bears. Bear orientations and safety instructions would remain important, especially for anglers.

Only a section of the north boardwalk and the entire bridge would have shared vehicle and pedestrian use. To the south, the boardwalk would be only for pedestrians and the current access road would be used for vehicles. These improvements would reduce the risk to visitor safety from potential pedestrian-vehicle conflicts.

The continued use of part of the north boardwalk and bridge by both user groups, however, would still pose some risk to visitor safety. Vehicles cross approximately six to fourteen times per day, the higher number of trips resulting from the arrival of floatplanes and the transportation of their cargo. The length of the boardwalk and reduced line of sight would affect the flow of vehicle traffic, but the viewing platforms would decrease the tendency of visitors to stop along the bridge or boardwalk, which, along with good etiquette among user groups, would further reduce pedestrian-vehicle safety conflicts.

Another safety precaution in alternative 2 would be the installation of an emergency ladder on the north side of the bridge that would provide increased opportunities for entry or exit from the bridge if there is an unexpected bear encounter or other emergency.

Overall, alternative 2 would result in localized, moderate, long-term, beneficial impacts to visitor experience and safety. There would be, however, localized, moderate, short-term adverse impact due to effects of construction activities such as noise and visual disruptions.

**Cumulative Impacts.** The past, present, and reasonably foreseeable actions that have an effect on the Brooks Camp area are outlined in alternative 1.

When the beneficial effects of the visitor orientation program, construction of the new inland trail from the campground to the lodge, and the eventual relocation of Brooks Camp are added to the moderate beneficial impacts of the new bridge and boardwalk in alternative 2, there would be the potential for a localized, major, long-term, beneficial cumulative impact on the visitor experience overall. The contribution of impacts from alternative 2 would considerably add to the cumulative impacts.

**Conclusion.** Alternative 2 would have localized, long-term, major, beneficial impacts on both visitor experience and safety in the Brooks River area associated with creating a safe travel corridor that would (1) avoid human/bear interactions; (2) avoid delays from bear conflicts; and (3) provide new bear viewing areas along the bridge and boardwalks. Temporary construction and potential vehicle-pedestrian conflicts on the shared access corridor, and boardwalk/bridge access restrictions due to bear encounters would have short- and long-term, respectively, minor, adverse impacts.

## ALTERNATIVE 3

### Recreational Opportunities, Crowding, and Quality of Experience

Under alternative 3, visitors would continue to enjoy the range of activities they currently participate, including photography, camping, hiking, fishing, and bear viewing. Actions proposed would not affect overall visitor use levels in the Brooks Camp area (which may continue to gradually increase) but could disperse use to mitigate crowding.

Four new platforms—two on each end of the bridge that face in opposite directions to provide a diversity of river views—and wide boardwalks would allow for improved visitor movement and would have the potential to reduce crowding by distributing use. Crowding in the Corner area would be alleviated since the current trail would be removed and the elevated north boardwalk would begin near the fish freezing station, about 330 ft from the riverbank. The mitigation of bridge closures caused by bear jams, however, may alter visitor behavior such that visitors would now have the ability to view bears for a longer period of time without being compelled to return to Brooks Camp earlier than needed. This may increase crowding and congestion. At present, visitors often spend several hours on the current platforms, which might be extended since the additional platforms would provide a greater diversity of viewing and photography perspectives.

The ability to view bears from certain locations will affect the popularity level of and length of stay at the platforms, and those with the best viewing opportunities at any given time are likely to be more crowded for longer periods of time than others.

Alternative 3 would enable visitors and staff to travel across the river unimpeded on raised boardwalks that still allow visitors to view bears without being inconvenienced by their proximity. The addition of viewing platforms would create additional opportunities for bear watching and photography, the most popular visitor activities at Brooks Camp. Additionally, since bears are less sensitive to human presence on a raised bridge/boardwalk, visitors would be able to observe the bears' more natural behavior than if the people were at ground level. The quality of anglers' experience would also be enhanced by the unimpeded access provided by the raised travel corridor.

As mentioned in alternative 2, construction and restoration activities would negatively affects the visitor experience in the short term, but steps would be taken mitigate these effects.

## Transportation, Access and Circulation

Overall, Brooks Camp would continue to be accessed primarily by floatplane. Developments at the barge landing would also improve access to Brooks Camp for a small number of private boaters who use the landing area.

The new elevated bridge and boardwalks would provide a safe travel corridor for visitors to cross Brooks River and access the camp area without interruption from bear interactions. The length of the bridge would increase to 415 ft due to the angle created by relocating the north end closer to the Corner.

The north boardwalk would be 300 ft long and would be completely shared between pedestrians and vehicles. No viewing platforms/pullouts would be located on this boardwalk. This would cause vehicle traffic to move slowly since there are no opportunities for visitors to completely step out of the path of traffic, although if visitors were to pause along the railing, the eight-foot width of the boardwalk would allow sufficient space for even the widest vehicle in use to pass. Once at the bridge, visitors would be able to step off of the travel corridor onto one of the two viewing platforms, located on either side of the bridge, to allow vehicles to pass.

On the south side, two more viewing platforms would allow visitors to move out of the flow of traffic before the 210-foot-long south boardwalk would begin. This short boardwalk would also be shared by pedestrians and vehicles, and connects to the access road.

Bear activity at the boardwalk entry points and subsequent closures may continue to disrupt visitor opportunities for bear watching. This would be mitigated on the north side, however, by locating the access point further away from the riverbank and by limiting the number of access points to one on each side of the river (NPS 2009f). Visitors wishing to access the riverbank would be able to do so easily using the short boardwalk on the south side of the river, which is not only the safer side from the standpoint of human-bear interactions, but it also has better visibility and photography opportunities than the north side.

Angler access would continue to be provided without restriction. The unmaintained social trails to the oxbow area of the river and along the north bank would be unaffected. After the discontinued maintenance of the trail through the Corner, it would become an unmaintained social trail like the others. Anglers would also continue to cross the bridge frequently to gain access to the south bank and the upper portion of the river above the falls.

Overall, this alternative would improve visitor transportation and access because the bridge and boardwalk would allow free flow and safety of travel across Brooks River. The vicinity of the south boardwalk access point to the river, however, would maintain the potential for closures due to bear jams.

## Bridge, Boardwalk, and Viewing Platform Capacities

The square footage of the bridge in alternative 3 (3,320 $ft^2$), when using the standard described in alternative 1, would allow 83 to 221 pedestrians to travel comfortably across unimpeded. That capacity is well above current visitation levels, given that the average of visitors per day in July, the peak month, is 188 people (NPS 2010g).

The four new viewing platforms on the bridge would each have an area of 225–300 $ft^2$. The capacity for these would range from 15 to 20 visitors per platform.

In total, if each of the four platforms was at maximum capacity, 60 to 80 visitors could comfortably occupy the designated viewing areas and be safely protected from both bear and vehicle interactions. This capacity is sufficient for current use levels and also allows for increasing visitation.

Overall, the visitor capacities of the bridge, boardwalks, and viewing platforms are enough to support high-quality visitor experiences.

### Visitor Safety—Human-Bear Interaction and Pedestrian-Vehicle Conflicts

Alternative 3 includes numerous measures, addressing conflicts between visitors and both bears and vehicles, that improve the safety of visitors.

This alternative would improve visitor safety by elevating the bridge and boardwalks to avoid unwanted human-bear interactions in key areas such as the Corner and along the riverbanks. Evidence presented in the analysis of alternative 2 suggests that a substantial number of such interactions could be prevented with an elevated bridge and boardwalk. The nearness of the south boardwalk access point to the river, however, maintains the potential for frequent human-bear interactions (NPS 2009f).

The addition of an emergency ladder on the north side of the bridge would provide increased opportunities for entry or exit from the bridge if there is an unexpected bear encounter or other emergency.

Anglers would continue to have a greater chance to experience a human-bear interaction due to the nature of fishing taking place along the riverbanks, near areas, which are frequented by bears. Bear orientations and safety instructions would remain important, especially for anglers.

The continued use of the boardwalks and bridge by both pedestrians and vehicles would still pose some risk to visitor safety. The length of the boardwalk and reduced line of sight would affect the flow of vehicle traffic, but the viewing platforms would decrease the tendency of visitors to stop along the bridge, which, along with good pedestrian-vehicle etiquette, would somewhat reduce pedestrian-vehicle safety conflicts.

Overall, alternative 3 would result in localized, moderate, long-term, beneficial impacts to visitor experience and safety. There would also be localized, moderate, short-term adverse impact due to effects of construction activities such as noise and visual disruptions.

**Cumulative Impacts.** The past, present, and reasonably foreseeable actions that have an effect on the Brooks Camp area are outlined in alternative 1.

When the beneficial effects of the visitor orientation program, construction of the new inland trail from the campground to the lodge, and the eventual relocation of Brooks Camp are added to the moderate beneficial impacts of the new bridge and boardwalk in alternative 3, there would be the potential for a major, long-term, beneficial cumulative impact on the visitor experience overall. The contribution of impacts from alternative 3 would considerably add to the cumulative impacts.

**Conclusion.** Alternative 3 would have localized, long-term, major, beneficial impacts on the visitor experience and safety in the Brooks River area associated with creating a safe travel corridor that would (1) avoid human/bear interactions; (2) avoid delays from bear conflicts; and (3) provide new bear viewing areas along the bridge and boardwalks. Temporary construction and potential vehicle-pedestrian conflicts on the shared access corridor, and boardwalk/bridge access restrictions due to bear encounters would have short- and long-term (respectively), minor, adverse impacts.

## ALTERNATIVE 4

### Recreational Opportunities, Crowding, and Quality of Experience

Under alternative 4 visitors would continue to enjoy the range of activities they currently participate, including photography, camping, hiking, fishing, and bear viewing. Actions proposed in this alternative would not affect overall visitor use levels at the Brooks Camp area (which may continue to gradually increase), but could disperse use to mitigate crowding.

Seven new platforms—two on either side of bridge at each end, two on the north boardwalk, and one on the south boardwalk—and wide boardwalks would allow for improved visitor movement and would have the potential to reduce crowding by distributing use. Crowding in the Corner area would be alleviated because the current trail would be removed and the elevated north boardwalk would begin adjacent to the lodge, about 560 ft from the riverbank. The mitigation of bridge closures caused by bear jams, however, may alter visitor behavior such that visitors would now have the ability to view bears for a longer period of time without being compelled to return to Brooks Camp earlier than needed. This may increase crowding and congestion. At present, visitors often spend several hours on the current platforms, which might be extended since the additional platforms would provide a greater diversity of viewing and photography perspectives.

The ability to view bears from certain locations will affect the popularity level of and length of stay at the platforms, and those with the best viewing opportunities at any given time are likely to be more crowded for longer periods of time than others.

Alternative 4 would provide an elevated travel corridor to permit unrestricted visitor movement without interruption from the presence of bears. The addition of viewing platforms would create additional opportunities for bear watching and photography, the most popular visitor activities at Brooks Camp. Additionally, since bears are less sensitive to human presence on a raised bridge/boardwalk, visitors would be able to observe the bears' more natural behavior than if the people were at ground level.

The quality of anglers' experience would also be enhanced by the unimpeded access provided by the raised travel corridor.

As mentioned in alternative 2, construction and restoration activities would negatively affects the visitor experience in the short term, but steps would be taken mitigate these effects.

### Transportation, Access and Circulation

Overall, Brooks Camp would continue to be accessed primarily by floatplane. Developments at the barge landing would also improve access to Brooks Camp for a small number of private boaters who use the landing area.

As in the previous alternatives, the new elevated bridge and boardwalks would provide a safe travel corridor for visitors to cross Brooks River and access the camp area without interruption from bear interactions. The length of the bridge would be increased slightly over the current length, to 350 ft, based on the placement of the permanent structure.

The north boardwalk would be 560 ft long and would be completely shared between pedestrians and vehicles. The access point would be located adjacent to the lodge; therefore, the boardwalk would eliminate the need for the walking trail through the Corner. There would be two locations on the north boardwalk for visitors to step off the travel corridor into a defined viewing area overlooking the wetlands, which would improve the flow of vehicle traffic. Two additional platforms, one facing east and one facing west, would allow visitors to safely stop and overlook either side of the river without interfering with vehicles or other pedestrians who are crossing the bridge.

On the south side, two more viewing platforms would allow visitors to move out of the flow of traffic before the 630-foot-long south boardwalk would begin. This long boardwalk would also be shared by pedestrians and vehicles, and would include one viewing platform/pullout facing the wetland. The access point for the south boardwalk would be conveniently located about 100 ft from the bus parking area.

Bear activity at the boardwalk entry points and subsequent closures may continue to disrupt visitor opportunities for bear watching. This would be mitigated on the both sides of the river; however, by locating the access points a substantial distance from the riverbank and by limiting the number of access points to one on each side of the river (NPS 2009f). Visitors wishing to access the riverbank would be able to use the short access ramp on the south side of the river, which is not only the safer side from the standpoint of human-bear interactions, but it also has better visibility and photography opportunities than the north side. The provision of access ramp is an effective way to provide riverbank access to those relatively few visitors who desire it while still providing a long elevated boardwalk to facilitate unimpeded flow of pedestrian and vehicle traffic.

Angler access would continue to be provided without restriction. The unmaintained social trails to the oxbow area of the river and along the north bank would be unaffected. After the discontinued maintenance of the trail through the Corner, it would become an unmaintained social trail like the others. Anglers would also continue to cross the bridge frequently to gain access to the south bank and the upper portion of the river above the falls.

In general, this alternative would improve visitor transportation and access because the bridge and boardwalk would allow free flow and safety of travel across Brooks River.

### Bridge, Boardwalk, and Viewing Platform Capacities

The square footage of the bridge in alternative 4 (2,800 $ft^2$), when using the standard described in alternative 1, would allow 70 to 187 pedestrians to travel comfortably across unimpeded.

The three viewing platforms overlooking the wetlands each would have 150–225 $ft^2$ of space. Using the prescribed standard for viewing areas, as few as 10 or as many as 15 visitors could comfortably stand to take in the view on each platform.

The new four viewing platforms on the bridge would each have an area of 225–300 $ft^2$. The capacity for these would range from 15 to 20 visitors per platform.

In total, if each of the seven platforms were at maximum capacity, 90 to 125 visitors could comfortably occupy the designated viewing areas and be safely protected from both bear and vehicle interactions. This capacity is sufficient for current use levels and allows for a substantial increase in visitation.

Overall, the visitor capacities of the bridge, boardwalks, and viewing platforms are enough to support high-quality visitor experiences.

### Visitor Safety—Human-Bear Interaction and Pedestrian-Vehicle Conflicts

Alternative 4 includes numerous measures, addressing conflicts between visitors and both bears and vehicles, that improve the safety of visitors.

This alternative would improve visitor safety by elevating the bridge and boardwalks to avoid unwanted human-bear interactions in key areas such as the Corner and along the riverbanks. Evidence presented in the analysis of alternative 2 suggests that a considerable number of such interactions could be prevented with an elevated bridge and boardwalk.

The addition of an emergency ladder on the north side of the bridge would provide increased opportunities for entry or exit from the bridge if there is an unexpected bear encounter or other emergency.

Anglers would continue to have a greater chance to experience a human-bear interaction due to the nature of fishing taking place along the riverbanks, near areas, which are frequented by bears. Bear orientations and safety instructions would remain important, especially for anglers.

The continued use of the boardwalks and bridge by both user groups would still pose some risk to visitor safety. The length of the boardwalk and reduced line of sight would affect the flow of vehicle traffic, but the viewing platforms would decrease the tendency of visitors to stop along the bridge, which, along with good pedestrian-vehicle etiquette, would somewhat reduce pedestrian-vehicle safety conflicts.

Overall, alternative 4 would result in localized, major, long-term, beneficial impacts to visitor experience and safety. There would also be localized, moderate, short-term adverse impact due to effects of construction activities such as noise and visual disruptions.

**Cumulative Impacts.** The past, present, and reasonably foreseeable actions that have an effect on the Brooks Camp area are outlined in alternative 1.

When the beneficial effects of the visitor orientation program, construction of the new inland trail from the campground to the lodge, and the eventual relocation of Brooks Camp are added to the major beneficial impacts of the new bridge and boardwalk in alternative 4, there would be the potential for a major, long-term, beneficial cumulative impact on the visitor experience overall. The contribution of impacts from alternative 4 would substantially add to the cumulative impacts.

**Conclusion.** Alternative 4 would have localized, long-term, major, beneficial impacts on the visitor experience and safety in the Brooks River area associated with creating a safe travel corridor that would (1) avoid human/bear interactions, (2) avoid delays from bear conflicts, and (3) provide new bear viewing areas along the bridge and boardwalks. Temporary construction and potential vehicle-pedestrian conflicts on the shared access corridor, and boardwalk and bridge access restrictions due to bear encounters would have short- and long-term (respectively), minor, adverse impacts.

## ALTERNATIVE 5

### Recreational Opportunities, Crowding, and Quality of Experience

Under alternative 5 visitors would continue to enjoy the range of activities they currently participate, including photography, camping, hiking, fishing, and bear viewing. Actions proposed in this alternative would not affect overall visitor use levels at the Brooks Camp area (which may continue to gradually increase) but could disperse use to mitigate crowding.

Six new platforms—two on either side of bridge at each end and two on the north boardwalk—and wide boardwalks would allow for improved visitor movement and would have the potential to reduce crowding by distributing use. Crowding in the Corner area would be alleviated since the current trail would be removed and the elevated north boardwalk would begin adjacent to the lodge, about 560 ft from the riverbank. The mitigation of bridge closures caused by bear jams, however, may alter visitor behavior such that visitors would now have the ability to view bears for a longer period of time without being compelled to return to Brooks Camp earlier than needed. This may increase crowding and congestion. At present, visitors often spend several hours on the current platforms, which might be extended since the additional platforms would provide a greater diversity of viewing and photography perspectives.

The ability to view bears from certain locations will affect the popularity level of and length of stay at the platforms, and those with the best viewing opportunities at any given time are likely to be more crowded for longer periods of time than others.

Alternative 5 would provide an elevated travel corridor on the north side of the river to permit unrestricted visitor movement without interruption from the presence of bears. The addition of viewing platforms would create additional opportunities for bear watching and photography, the most popular visitor activities at Brooks Camp. Additionally, since bears are less sensitive to human presence on a raised bridge/ board-walk, visitors would be able to observe the bears' more natural behavior than if the people were at ground level. The quality of anglers' experience would also be enhanced by the unimpeded access provided by the raised travel corridor.

As mentioned in alternative 2, construction and restoration activities would negatively affects the visitor experience in the short term, but steps would be taken mitigate these effects.

### Transportation, Access and Circulation

Overall, Brooks Camp would continue to be accessed primarily by floatplane. Developments at the barge landing would also improve access to Brooks Camp for a small number of private boaters who use the landing area.

The new elevated bridge and boardwalks would provide a safe travel corridor for visitors to cross Brooks River and access the camp area without interruption from bear interactions. The length of the bridge would be increased slightly over the current length, to 350 ft.

The north boardwalk would be 560 ft long and would be completely shared between pedestrians and vehicles. The access point would be located adjacent to the lodge; therefore, the boardwalk would eliminate the need for the walking trail through the Corner. There would be two locations on the north boardwalk for visitors to step off the travel corridor into a defined viewing area overlooking the wetlands, which would improve the flow of vehicle traffic. Two additional platforms, one facing east and one facing west, would allow visitors to safely stop and overlook either side of the river without interfering with vehicles or other pedestrians who are crossing the bridge.

On the south side, two more viewing platforms would allow visitors to move out of the flow of traffic before the 215-foot-long south boardwalk would begin. This short boardwalk would also be shared by pedestrians and vehicles, and connects to the access road.

Bear activity at the boardwalk entry points and subsequent closures may continue to disrupt visitor opportunities for bear watching. This would be mitigated on the north side, however, by locating the access point further away from the riverbank and by limiting the number of access points to one on each side of the river (NPS 2009f). Visitors wishing to access the riverbank would be able to use the short boardwalk on the south side of the river, which is not only the safer side from the standpoint of human-bear interactions, but it also has better visibility and photography opportunities than the north side.

Angler access would continue to be provided without restriction. The unmaintained social trails to the oxbow area of the river and along the north bank would be unaffected. After the discontinued maintenance of the trail through the Corner, it would become an unmaintained social trail like the others. Anglers would also continue to cross the bridge frequently to gain access to the south bank and the upper portion of the river above the falls. Overall, this alternative would improve visitor transportation and access because the bridge and boardwalk would allow free flow and safety of travel across Brooks River. The vicinity of the south boardwalk access point to the river, however, would maintain the potential for closures due to bear jams.

### Bridge, Boardwalk, and Viewing Platform Capacities

The square footage of the bridge in alternative 5 (2,800 ft$^2$), when using standard described in alternative 1, would allow 70 to 187 pedestrians to travel comfortably across unimpeded.

The two viewing platforms overlooking the wetlands on the north boardwalk would each have 150–225 ft$^2$ of space. Using the prescribed standard for viewing areas, as few as 10 or as many as 15 visitors could comfortably stand to take in the view on each platform.

The additional four viewing platforms on the bridge would each have an area of 200–250 ft$^2$. The capacity for these would range from 15 to 20 visitors per platform.

In total, if each of the seven platforms were at maximum capacity, 80 to 110 visitors could comfortably occupy the designated viewing areas and be safely protected from both bear and vehicle interactions. This capacity is sufficient for current use levels and allows for a substantial increase in visitation.

### Visitor Safety — Human-Bear Interaction and Pedestrian-Vehicle Conflicts

Alternative 5 would improve visitor safety by elevating the bridge and boardwalks to avoid unwanted human-bear interactions in key areas such as the Corner and along the riverbanks. Evidence presented in the analysis of alternative 2 suggests that a considerable number of such interactions could be prevented with an elevated bridge and boardwalk. The nearness of the south boardwalk access point to the river, however, maintains the potential for frequent human-bear interactions (NPS 2009f).

The addition of an emergency ladder on the north side of the bridge would provide increased opportunities for entry or exit from the bridge if there is an unexpected bear encounter or other emergency.

Anglers would continue to have a greater chance to experience a human-bear interaction due to the nature of fishing taking place along the riverbanks, near areas, which are frequented by bears. Bear orientations and safety instructions would remain important, especially for anglers.

The continued use of the boardwalks and bridge by both user groups would still pose some risk to visitor safety. The length of the boardwalk and reduced line of sight would affect the flow of vehicle traffic, but the viewing platforms would decrease the tendency of visitors to stop along the bridge, which, along with good pedestrian-vehicle etiquette, would somewhat reduce pedestrian-vehicle safety conflicts.

Overall, alternative 5 would result in localized, moderate, long-term, beneficial impacts to visitor experience and safety. There would also be localized, moderate, short-term adverse impact due to effects of construction activities such as noise and visual disruptions.

**Cumulative Impacts.** The past, present, and reasonably foreseeable actions that have an effect on the Brooks Camp area are outlined in alternative 1.

When the beneficial effects of the visitor orientation program, construction of the new inland trail from the campground to the lodge, and the eventual relocation of Brooks Camp are added to the moderate beneficial impacts of the new bridge and boardwalk in alternative 5, there would be the potential for a major, long-term, beneficial cumulative impact on the visitor experience overall. The contribution of impacts from alternative 5 would substantially add to the cumulative impacts.

**Conclusion.** In general, alternative 5 would have localized, long-term, major, beneficial impacts on the visitor experience and safety in the Brooks River area associated with creating a safe travel corridor that would (1) avoid human/bear interactions, (2) avoid delays from bear conflicts, and (3) provide new bear viewing areas along the bridge and boardwalks. Temporary construction and potential vehicle-pedestrian conflicts on the shared access corridor, and boardwalk and bridge access restrictions due to bear encounters would have short- and long-term, respectively, minor, adverse impacts.

# VISUAL OR SCENIC RESOURCES

## ALTERNATIVE 1

### Analysis

Under alternative 1 the floating bridge would remain. Access to the bridge on the north side of Brooks River would be via a trail, well masked by vegetation. On the south side of the river, the bridge would continue to be accessed by the gravel road connecting to the barge landing site. The bridge itself is a temporary, low-profile structure that is easily identifiable against the surrounding landscape as it crosses the river. However, during winter the bridge is removed and no longer presents an intrusion to visual resources and scenery.

The barge landing site would remain in its current location at the mouth of Brooks River. A dirt access road runs to the site along the south shore of the river, and loading and unloading of boats by park and concessioner staff is in full view of visitors. Visually the site would continue to exhibit impacts on native vegetation and show some denuded areas that affect foreground views.

Overall, the no-action alternative would have a localized, moderate, long-term, adverse impact on visual resources and scenery because of the low-profile floating bridge and vegetation impacts at the barge landing site affecting foreground views in the largely natural landscape.

**Cumulative Impacts.** Past and present actions that have affected and affect visual resources include facility improvements to and ongoing maintenance of roads, trails, utilities, and housing. Together, these buildings, utilities, roads, and trails have created a large development footprint in the Brooks Camp area over time.

Future actions that would affect visual resources and scenery include the relocation of Brooks Camp to the south side of the river. The new location would shift visual resource impacts from the site of existing developments to a new, previously undisturbed area; however, that new location is even more well-screened from the river than the current camp.

These actions would have localized, long-term, major, beneficial impacts on scenic resources of the river because all development except the necessary bridge access would be relocated away from the river. Combined with alternative 1, localized, long-term, moderate, beneficial cumulative impacts would result since the retention of the floating bridge would detract somewhat from the beneficial impacts of cumulative actions.

**Conclusion.** Though easily identifiable from foreground views along the immediate shorelines of Brooks River, the floating bridge is low upon the overall landscape. Similarly, the barge landing, access roads, and trails would continue to be noticeable within the viewshed. The no-action alternative would continue to have localized, moderate, long-term, adverse impacts on visual resources and scenery.

## ALTERNATIVE 2

### Analysis

Alternative 2 proposes a high degree of new infrastructure with new elevated boardwalks extending well into the landscape on both the north and south sides of the bridge. Separate boardwalk and access roads south of the bridge would also increase the amount of infrastructure and development intruding on the landscape from near and distant views. Additionally, both the bridge and boardwalks would be about 10 ft above grade, blending less into the low vegetation in the immediate river shoreline area than the floating bridge and therefore impacting foreground views. This alternative would include a permanent truss bridge, but having only two sets of pilings supporting the structure would help to minimize the visual profile of the bridge. Nevertheless, the structure would extend visual impacts year-round instead of being removed for the winter season.

The elevated bridge and boardwalk, on the other hand, would create longer visual profiles and the revegetation of the trail through the Corner would restore natural conditions in that area. In moving the barge landing site about 2,000 ft to the south, the access road along the south bank of the river would also be eliminated and reclaimed as part of the riparian environment, which would be visible by visitors on the bridge and boardwalks.

The barge landing's new location would be more wooded and farther from the main visitor corridor, mitigating its intrusion into the natural scenery of the Brooks River / Brooks Camp area by removing it from public view. However, the development of a new and longer access road would create a new cut in the tree line and vegetation along with the development of a new hardened beach landing ramp and parking in the area of the new barge landing site.

The elevated bridge and boardwalks would be highly visible developments (both from land and from floatplanes), but while on those structures visitors would enjoy improved visual resources due to the reclamation of the trail through the Corner and access road to the former barge landing. Therefore, alternative 2 would result in localized, moderate, long-term, adverse impacts on the visual resources from the perspective of a visitor looking at the bridge or new barge landing site, but would result in localized, moderate, long-term, beneficial visual impacts for visitors while on the bridge or boardwalks.

**Cumulative Impacts.** Past, present, and future actions affecting visual resources at Brooks Camp are outlined in alternative 1.

These actions would have localized, long-term, major, beneficial impacts on scenic resources of the river because all development except the necessary bridge access would be relocated away from the river. The actions in alternative 2 would result in localized, moderate, long-term adverse impacts on the visual resources from the perspective of a visitor looking at the bridge or new barge landing site, but would result in localized, moderate, long-term, beneficial visual impacts for visitors while on the bridge or boardwalks. Overall, impacts to the visual and scenic resources would be localized, moderate, long term, and beneficial. The contribution of actions in alternative 2 would be marginal compared to the cumulative impacts.

**Conclusion.** Alternative 2 would result in localized, moderate, long-term, adverse impacts on the visual resources from the perspective of a visitor looking at the bridge or new barge landing site, but would result in localized, moderate, long-term, beneficial visual impacts for visitors while on the bridge or boardwalks.

## ALTERNATIVE 3

### Analysis

Alternative 3 includes minimal development of bridge and boardwalks, especially on the south bank. Both the bridge and boardwalks would be about 10 ft above grade, and the bridge would be realigned and use a permanent, medium span design with six sets of pilings creating a longer, more noticeable profile against the landscape. This design would not blend as well into the low vegetation in the immediate river shoreline area as the current bridge, and foreground views would be impacted to a greater extent. The permanent nature of this structure would also extend visual impacts into the winter season. However, the removal of the trail through the Corner area would allow that area to be restored to natural and more visually appealing conditions.

In this alternative, the barge landing site would be moved from the largely open river mouth area slightly to the south to a wooded site and would use most of the current access road. This would increase the masking of the barge landing, mitigating its intrusion into the natural scenery. However, the continued use of the current access road along the shores of Brooks River and the development of a new hardened beach landing ramp and parking would cause visible signs of human activity and detract from the natural scenery.

The elevated bridge and boardwalks would be highly visible developments (both from land and from floatplanes), but while on those structures visitors would enjoy slightly improved visual resources due to the reclamation of the trail through the Corner.

Overall, alternative 3 would result in localized, moderate, long-term, adverse impact on the visual and scenic resources of the area.

**Cumulative Impacts.** Past, present, and future actions affecting visual resources at Brooks Camp are outlined in alternative 1.

These actions would have localized, long-term, major, beneficial impacts on scenic resources of the river because all development except the necessary bridge access would be relocated away from the river. The actions in alternative 3 would result in localized, moderate, long-term, adverse impacts, making the cumulative impacts localized, minor, long term, and beneficial.

**Conclusion.** Alternative 3 would result in localized, moderate, long-term, adverse impact on the visual and scenic resources of the area.

## ALTERNATIVE 4

### Analysis

Alternative 4 proposes a high degree of new infrastructure with new elevated boardwalks extending well into the landscape on both the north and south sides of the bridge. Both the bridge and boardwalks would be about 10 ft above grade, blending less into the low vegetation in the immediate river shoreline area than the floating bridge and therefore impacting foreground views. The new bridge would use the current floating bridge alignment and consist of a permanent, wooden, short-span design with 14 sets of pilings giving the visual impression of a continuous boardwalk. This design would give the bridge a substantially more noticeable year-round profile against the landscape than the existing floating bridge.

The elevated bridge and boardwalk, on the other hand, would create longer visual profiles and the revegetation of the trail through the Corner would restore natural conditions in that area. In moving the barge landing site about 2,000 ft to the south, the access road along the south bank of the river would also be eliminated and reclaimed as part of the riparian environment, which would be visible by visitors on the bridge and boardwalks.

The barge landing's new location would be more wooded and farther from the main visitor corridor, mitigating its intrusion into the natural scenery of the Brooks River / Brooks Camp area by removing it from public view. However, the development of a new and longer access road would create a new cut in the tree line and vegetation along with the development of a new hardened beach landing ramp and parking in the area of the new barge landing site.

The elevated bridge and boardwalks would be highly visible developments (both from land and from floatplanes), but while on those structures visitors would enjoy improved visual resources due to the reclamation of the trail through the Corner and access road to the former barge landing. Therefore, alternative 4 would result in localized, moderate, long-term, adverse impacts on the visual resources from the perspective of a visitor looking at the bridge or new barge landing site, but would result in localized, moderate, long-term, beneficial visual impacts for visitors while on the bridge or boardwalks.

**Cumulative Impacts.** Past, present, and future actions affecting visual resources at Brooks Camp are outlined in alternative 1.

These actions would have localized, long-term, major, beneficial impacts on scenic resources of the river because all development except the necessary bridge access would be relocated away from the river. The actions in alternative 4 would result in localized, moderate, long-term adverse impacts on the visual resources from the perspective of a visitor looking at the bridge or new barge landing site, but would result in localized, moderate, long-term, beneficial visual impacts for visitors while on the bridge or boardwalks. Overall, impacts to the visual and scenic resources would be localized, moderate, long term, and beneficial. The contribution of actions in alternative 4 would be marginal compared to the cumulative impacts.

**Conclusion.** Alternative 4 would result in localized, moderate, long-term, adverse impacts on the visual resources from the perspective of a visitor looking at the bridge or new barge landing site, but would result in localized, moderate, long-term, beneficial visual impacts for visitors while on the bridge or boardwalks.

## ALTERNATIVE 5

### Analysis

Alternative 5 proposes a high degree of new infrastructure with new elevated boardwalks extending well into the landscape on the north side of the bridge. Both the bridge and boardwalks would be about 10 ft above grade, blending less into the low vegetation in the immediate river shoreline area than the floating bridge and therefore impacting foreground views. The new bridge would use the current floating bridge alignment and consist of a permanent, wooden, short-span design with 14 sets of pilings giving the visual impression of a continuous boardwalk. This design would give the bridge a substantially more noticeable year-round profile against the landscape than the existing floating bridge.

The elevated bridge and boardwalk, on the other hand, would create longer visual profiles and the revegetation of the trail through the Corner would restore natural conditions in that area. In moving the barge landing site about 2,000 ft to the south, the access road along the south bank of the river would also be eliminated and reclaimed as part of the riparian environment, which would be visible by visitors on the bridge and boardwalks.

The barge landing's new location would be more wooded and farther from the main visitor corridor, mitigating its intrusion into the natural scenery of the Brooks River / Brooks Camp area by removing it from public view. However, the development of a new and longer access road would create a new cut in the tree line and vegetation along with the development of a new hardened beach landing ramp and parking in the area of the new barge landing site.

The elevated bridge and boardwalks would be highly visible developments (both from land and from floatplanes), but while on those structures visitors would enjoy improved visual resources due to the reclamation of the trail through the Corner and access road to the former barge landing. Therefore, alternative 5 would result in localized, moderate, long-term, adverse impacts on the visual resources from the perspective of a visitor looking at the bridge or new barge landing site, but would result in localized, moderate, long-term, beneficial visual impacts for visitors while on the bridge or boardwalks.

**Cumulative Impacts.** Past, present, and future actions affecting visual resources at Brooks Camp are outlined in alternative 1.

These actions would have localized, long-term, major, beneficial impacts on scenic resources of the river because all development except the necessary bridge access would be relocated away from the river. The actions in alternative 5 would result in localized, moderate, long-term adverse impacts on the visual resources from the perspective of a visitor looking at the bridge or new barge landing site, but would result in localized, moderate, long-term, beneficial visual impacts for visitors while on the bridge or boardwalks. Overall, impacts to the visual and scenic resources would be localized, moderate, long term, and beneficial. The contribution of actions in alternative 5 would be marginal compared to the cumulative impacts.

**Conclusion.** Alternative 5 would result in localized, moderate, long-term, adverse impacts on the visual resources from the perspective of a visitor looking at the bridge or new barge landing site, but would result in localized, moderate, long-term, beneficial visual impacts for visitors while on the bridge or boardwalks.

# SOCIOECONOMIC ENVIRONMENT

## ALTERNATIVE 1

### Analysis

Under alternative 1 spending, labor, and tax receipts to harden the barge landing site would minimally benefit the economy for a very short period of time. Most of the labor force working on this project would probably come from outside the local area, so only minimal spending would occur in the local area. Materials and supplies may need to be barged in, which would benefit shipping businesses and port laborers. Although the local economy would benefit, it would be barely detectable given the short time period and expected cost.

The provision of commercial services at Brooks Camp would continue to contribute to the economy by employing a seasonal work force and through spending related to transporting equipment, materials, and supplies. The continued provision of services by CUA holders would continue to benefit individual businesses and in turn benefit the economy by providing jobs, local spending, and tax receipts. Visitor spending and associated tax receipts would remain within the historical range and continue to benefit the economy, but remain subject to broader economic variables and conditions, including tourism demand for trips to and within Alaska. Benefits tied to visitor spending would continue to accrue almost exclusively during the summer season. Job creation would remain within the historical range.

All of the effects described would continue under alternative 1. Overall, economic activity would continue to be primarily tied to federal and visitor spending, as well as the provision of commercial and guide services in the park. Actions in alternative 1 would have long-term, minor, beneficial impacts to the regional economy. No change in the social character of the area would be expected.

**Cumulative Impacts.** Many past actions have had beneficial effects on the local and regional economy. The most economically beneficial past actions would be the creation of Brooks Camp and visitor and operational facilities. The construction of Brooks Camp itself required large purchases of materials and supplies and provided business revenue and employment. The availability of overnight accommodations and visitor services made it possible for tourists to experience the park in a developed setting, which increased visitation from levels when park visitors could only visit as part of day trips or primitive overnight trips. An increase in the number of people visiting the park resulted in an increased demand for visitor services and amenities, which resulted in new business and job creation and associated tax revenue locally and regionally. Once constructed, the facilities and infrastructure developments had to be maintained, which also benefited the economy over time. Economic activity tied directly or indirectly to park visitation and spending has benefited the local and regional economy since Brooks Camp was constructed.

Spending on materials, supplies, and labor to finish current improvements to Brooks Camp would benefit individual businesses and construction crews. Although some local construction labor might be used, most labor would come from outside the local area. Thus, most economic benefits associated with finishing improvements at Brooks Camp would be at the regional level. The benefits would only be a small contributor to the regional economy.

The eventual relocation of Brooks Camp to the south side of the river is a reasonably foreseeable future action that would benefit the economy. The economic benefit would be primarily felt during construction as a result of spending and tax receipts. The transportation of materials, supplies, and laborers would increase revenue to barge and floatplane businesses and operators and increase tax receipts, which would benefit the economy. However, because the labor force working on relocation would likely come from outside of the local area, the economic benefits from business purchases, personal employee spending, and associated tax receipts would benefit economies outside of the local area. For example, the purchase of supplies and labor for such projects are typically made in Anchorage and sometimes in the lower 48 states, which would increase business sales and tax revenue outside of the local area.

Collectively, the other past, present, and reasonably foreseeable future projects and actions would have long-term, moderate, beneficial impacts to the regional economy. When the likely effects of actions in alternative 1 are added to the effects of other past, present, and reasonably foreseeable future actions, there would be a long-term, moderate, beneficial cumulative impact to the regional economy. Alternative 1 would contribute a very small increment to this cumulative impact.

**Conclusion.** Alternative 1 would have minor, long-term beneficial effects to the regional economy. These effects would be primarily tied to federal and visitor spending, as well as the provision of commercial and guide services in the park.

## ALTERNATIVE 2

### Analysis

Under alternative 2 spending and employment related to construction of the bridge, boardwalk, viewing platforms, vehicle ramps, and power connection and septic pump-out would provide some short-term benefits to the local economy.

Benefits would primarily accrue during construction, which would likely start in August of year one and be completed by June of year three; most construction activity would occur in winter and spring. The extent of the construction spending benefit would largely depend on where the labor force resides and where the materials and supplies are purchased. Based on past construction jobs in the park, most if not all of the approximately 12-person construction crew working on this project would be housed at Brooks Camp during staging and construction. The labor force would have minimal time to spend money locally, so this type of spending would likely be beneficial, but very small. Additional economic benefit would accrue locally as some food and personal supplies for the construction crew would be purchased locally and flown in. The contractor and subcontractors would benefit in the form of business revenue and continued employment. Few, if any new jobs would accrue to the local or regional economy. The resulting tax revenue would be generated outside of the local area.

Construction would require large material and supply purchases in the short term and smaller purchases to maintain the new infrastructure over the long term. Construction material and supply purchases would primarily be made in the region or outside of Alaska, benefitting nonlocal businesses and tax revenue. Transporting materials, supplies, and the construction crews to the site would benefit individual businesses, including barging businesses and fuel suppliers. Barge shipment to Naknek would provide work to local port laborers and fuel suppliers, which would have a very small beneficial impact locally. Local and regional floatplane and barging businesses could be employed for temporary transport assignments to Brooks Camp at various stages of construction, which would benefit their revenues and benefit the local and regional economy in the form of tax revenue and indirect spending.

The development of a new barge landing/ access road and removal of the old access road on the south side of the river would provide some economic benefit to the local economy before the construction of the bridge/boardwalk. This work would occur during one visitor season and would provide a small economic benefit locally because the labor force, as well as supplies and most materials would come from the larger regional market.

The area that includes King Salmon, Naknek, and South Naknek is a very small business market and is very isolated. As a result, the impact of spending in the local economy is not as great as it would be in larger business markets given that the business revenue and personal income associated with construction activity is for the most part likely to be transferred to business owners and laborers outside of the area. So although construction of the bridge/boardwalk and barge landing / access road would benefit the local economy, the effect is not as great as it would be in a larger market, such as Anchorage or Fairbanks. Alternative 2 would likely have the largest economic impact of all the alternatives due to the highest construction cost estimate; yet, the economic benefits of all construction under alternative 2 would still only constitute a very small amount of the overall regional economy; benefits accruing to the economy outside of Alaska would be essentially undetectable outside of the economic output of specific industries.

The provision of commercial services would continue during and after construction. No change in tourism and related tax receipts would be expected during the short term because staging, phasing, and timing of construction would ensure that the area remains easily accessible. In the long term, overnight visitation would not change because the number of rooms at the lodge and campground spaces would not change. Day trips, however, could possibly increase in the long term because some commercial services operators may choose to bring clients to Brooks Camp because of reduced delays in river crossings and the ability to get people onboard floatplanes in a timely manner. This would likely result in some additional concession sales at the Brooks Camp lodge and gift shop and additional business revenue and taxes generated from contracts and commercial use authorizations over the long term. Overall, commercial service operator revenue would likely remain unchanged during construction, but increase slightly over the long term.

All of the above effects would continue under alternative 2. Overall, the benefits of economic activity would be tied to construction of the bridge/boardwalk, barge landing/access road, and some additional commercial activity. No adverse impacts are expected. Overall, actions in alternative 2 would have minor, beneficial impacts to regional economic activity during the short and long term. No change in the social character of the area would be expected.

**Cumulative Impacts.** Past, present, and reasonably foreseeable projects and actions that would have an effect on economic activity in or near the park are described and summarized in the socioeconomic environment section of alternative 1.

Collectively, the other past, present, and reasonably foreseeable future projects and actions would have long-term, moderate, beneficial impacts to the regional economy. When the likely effects of actions in alternative 2 are added to the effects of other past, present, and reasonably foreseeable future actions, there would be a long-term, moderate, beneficial cumulative impact to the regional economy. Alternative 2 would contribute a very small increment to this cumulative impact.

**Conclusion.** Alternative 2 would result in short and long-term, minor, beneficial impacts on the regional economy. These effects would primarily result from construction of the bridge/boardwalk, barge landing/access road, and some additional commercial activity.

## ALTERNATIVE 3

### Analysis

The impacts associated with alternative 3 are largely the same as the other action alternatives. Based on experience, the construction contractor would come from outside the local area. Thus, economic activity tied to employment, business, and employee expenditures, and associated tax receipts would benefit other areas in the region and to a very small degree, some businesses in the lower 48 states. Benefits from proposed barge landing site modifications would be slightly greater than those in alternative 1. The economic benefits from construction would likely be the smallest of all the action alternatives because this alternative has the lowest construction cost estimate. The effects of the continued provision of commercial services would be the same as those in alternative 2.

Overall, the benefits of economic activity would be tied to construction of the bridge/boardwalk, barge landing/access road, and some additional commercial activity. No adverse impacts are expected. Overall, actions in alternative 3 would have minor, beneficial impacts to regional economic activity during the short and long term. No change in the social character of the area would be expected.

**Cumulative Impacts.** Past, present, and reasonably foreseeable projects and actions that would have an effect on economic activity in or near the park are described and summarized in the socioeconomic environment section of alternative 1. Collectively, the other past, present, and reasonably foreseeable future projects and actions would have long-term, moderate, beneficial impacts to the regional economy. When the likely effects of actions in alternative 3 are added to the effects of other past, present, and reasonably foreseeable future actions, there would be a long-term, moderate, beneficial cumulative impact to the regional economy. Alternative 3 would contribute a very small increment to this cumulative impact.

**Conclusion.** Alternative 3 would result in short and long-term, minor, beneficial impacts on the regional economy. These effects would primarily result from construction of the bridge/boardwalk, barge landing / access road, and some additional commercial activity.

## ALTERNATIVE 4

### Analysis

The impacts associated with alternative 4 are largely the same as the other action alternatives. Based on experience, the construction contractor would come from outside the local area. Thus, economic activity tied to employment, business, and employee expenditures, and associated tax receipts would benefit other areas in the region and to a very small degree, some businesses in the lower 48 states. The economic benefits from construction would likely be slightly lower than those in alternative 2 based on construction cost estimates. The effects of the continued provision of commercial services would be the same as those in alternative 2.

Overall, the benefits of economic activity would be tied to construction of the bridge/boardwalk, barge landing / access road, and some additional commercial activity. No adverse impacts are expected. Overall, actions in alternative 4 would have minor, beneficial impacts to regional economic activity during the short and long term. No change in the social character of the area would be expected.

**Cumulative Impacts.** Past, present, and reasonably foreseeable projects and actions that would have an effect on economic activity in or near the park are described and summarized in the socioeconomic environment section of alternative 1.

Collectively, the other past, present, and reasonably foreseeable future projects and actions would have long-term, moderate, beneficial impacts to the regional economy. When the likely effects of actions in alternative 4 are added to the effects of other past, present, and reasonably foreseeable future actions, there would be a long-term, moderate, beneficial cumulative impact to the regional economy. Alternative 4 would contribute a very small increment to this cumulative impact.

**Conclusion.** Alternative 4 would result in short and long-term, minor, beneficial impacts on the regional economy. These effects would primarily result from construction of the bridge/boardwalk, barge landing/access road, and some additional commercial activity.

## ALTERNATIVE 5

### Analysis

The impacts associated with alternative 5 are largely the same as the other action alternatives. Based on experience, the construction contractor would likely come from outside the local area. Thus, economic activity tied to employment, business, and employee expenditures, and associated tax receipts would benefit other areas in the region and to a very small degree, some businesses in the lower 48 states. The effects of the continued provision of commercial services would be the same as those in alternative 2.

Overall, the benefits of economic activity would be tied to construction of the bridge/boardwalk, barge landing/access road, and some additional commercial activity. No adverse impacts are expected. Overall, actions in alternative 5 would have minor, beneficial impacts to regional economic activity during the short and long term. No change in the social character of the area would be expected.

**Cumulative Impacts.** Past, present, and reasonably foreseeable projects and actions that would have an effect on economic activity in or near the park are described and summarized in the socioeconomic environment section of alternative 1.

Collectively, the other past, present, and reasonably foreseeable future projects and actions would have long-term, moderate, beneficial impacts to the regional economy. When the likely effects of actions in alternative 5 are added to the effects of other past, present, and reasonably foreseeable future actions, there would be a long-term, moderate, beneficial cumulative impact to the regional economy. Alternative 5 would contribute a very small increment to this cumulative impact.

**Conclusion.** Alternative 5 would result in short and long-term, minor, beneficial impacts on the regional economy. These effects would primarily result from construction of the bridge/boardwalk, barge landing / access road, and some additional commercial activity.

# OTHER REQUIRED IMPACT ANALYSIS

## UNAVOIDABLE ADVERSE IMPACTS

Unavoidable adverse impacts are defined as impacts that cannot be fully mitigated or avoided. All of the alternatives in this document would have unavoidable adverse impacts. In alternative 1, the no-action alternative, without a new elevated bridge and boardwalk there would continue to be ground level interactions between people and brown bears in high use areas, such as the mouth of the river and the Corner area, with continuing unsafe interactions and continual habituation of bears to humans. The floating bridge would continue to be an obstacle to fish migrations, and the annual installation and removal of the bridge would regularly disturb the riverbed. The floating bridge would also continue to alter river flow hydraulics and geomorphology (because of blocking upper levels of the water column), as well as contribute to bank erosion in areas near the bridge anchor points. Human activity in the Brooks Camp area would continue to have the potential to disturb nesting bald eagles. Some trampling of vegetation would continue from people in the Corner area on the north side of the river and between the floating bridge and the bus parking area on the south side of the river. Finally, the continuation of the floating bridge would have unavoidable adverse impacts on visitors, with visitors being subject to inconveniences when the bridge is closed.

In all of the action alternatives there would be unavoidable adverse impacts both from the construction of the bridge/boardwalk, barge landing site, and access road, and from the operation of these facilities, although the extent of the adverse impacts would differ. Even with the application of mitigation measures, the construction of the facilities would adversely affect the project area's natural resources. Some bear behavior probably would be altered during construction. After construction is completed, the presence and sounds of people and vehicles on the bridge and boardwalks could alter the behavior of some bears in the area. The close proximity of bears to people (primarily vertical separation) also could contribute to the habituation of bears to people, which in turn could result in unsafe conditions for both bears and people at ground level within the Brooks River area and beyond. The development of the new barge landing access road in alternatives 2, 4 and 5 would increase noise and human disturbance in a part of the park that has been relatively free of disturbance, which could also affect the behavior of some bears.

The construction and use of the new access road and barge landing area in alternatives 2, 4, and 5 could adversely affect bald eagles nesting and use of Beaver Pond, possibly deterring use of this area for nesting.

The bridge in all of the alternatives would likely have in varying degrees an unavoidable adverse impact on river hydrology, the floodplain, and salmon and other fish. The adverse impacts would result from the addition of pile systems in the river, which would act as permanent flow obstructions to the channel.

Alternatives 4 and 5 would have the highest potential for adverse impacts because of the number of piles. The support piles and river debris that catches on the piles could partially obstruct fish passage and alter flow hydraulics, although none of the alternatives would block most fish from migrating and spawning.

The construction of the boardwalks, access road, and barge landing site in the action alternatives would result in the loss and alteration of vegetation and disturbance to wetlands along the proposed alignments. Unavoidable adverse impacts would occur to the soundscape in the Brooks Camp area. Most of these impacts would be from construction activities, but there also would be increased noise impacts from subsequent use of the elevated bridge and boardwalks. Human and motorized vehicle noise from the elevated bridge and boardwalks also would carry farther. In alternatives 2, 4, and 5 there would be increased noise along the new access road and barge landing site in an area that in the past was relatively quiet.

The four action alternatives also could have unavoidable adverse impacts on cultural resources in the project area even with mitigation measures. Ground disturbance and construction of the pilings for the boardwalks could adversely affect archeological resources along the alignment, particularly where the pilings penetrate the ash layer in the soil. Likewise, construction of the new access road in alternatives 2, 4, and 5 could also adversely affect archeological resources. The construction of the new bridge and boardwalks also would have adverse effects on the cultural landscape that contributes to the significance of the Brooks Camp Historic District, although the overall integrity of the cultural landscape would not be diminished to the point that its National Register eligibility would be jeopardized. Likewise, the ground-disturbing activities and the presence of an elevated bridge in the four alternatives could adversely affect ethnographic resources and the Brooks River ethnographic landscape.

The construction of the bridge and boardwalks in the four action alternatives would have an unavoidable adverse effect on the visual resources/scenery of the area. The new infrastructure would be easily visible in the natural viewshed. The permanent elevated bridge would extend visual impacts to be year-round instead of only in the summer-fall months.

## IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

This question focuses on long-term, permanent effects on park resources. The bridge, boardwalks, access road, and utility connections all are seen as "permanent" facilities because they would remain for at least the next 20 years. As identified in the analysis of the action alternatives, all of the alternatives would have long-term effects on the area's natural, cultural, and visual resources. For the lifetime of the bridge there would be irreversible impacts to natural and visual resources, and the cultural landscape. Although impacts to archeological and ethnographic resources would not be expected with careful siting of the facilities and mitigation, there still could be irreversible impacts to these resources. The use of gravel in construction of the access roads in the action alternatives also would be an irreversible/irretrievable commitment of resources.

## THE RELATIONSHIP BETWEEN SHORT-TERM USES OF THE ENVIRONMENT AND LONG-TERM PRODUCTIVITY

This question explores long-term effects of an alternative and whether the productivity of park resources is being traded for the immediate use of land. In all of the alternatives, the National Park Service would continue to manage the Brooks Camp area to maintain ecological processes and native biological communities and to provide appropriate recreational opportunities consistent with preservation of cultural and natural resources. Most of the project area would continue to be protected in its current state and would maintain its long-term productivity. The primary short-term uses of the Brooks Camp area would continue to be recreational use. Under the four action alternatives, there would be expanded development to support recreational use and park operations, resulting in some localized loss of ecological productivity. Adverse impacts on the area's vegetation from construction of the bridge, boardwalks, access road, and barge landing site would reduce the productivity of natural resources in localized areas over time, although overall no measurable effect on the area's long-term productivity would be expected. On the other hand, efforts to restore native vegetation, such as the removal and revegetation of the barge landing access road and the existing trail from the camp to the north side of the river in alternatives 2, 4, and 5 would increase long-term productivity of the environment in localized areas.

# CONSISTENCY OF THE ALTERNATIVES WITH THE PURPOSES OF THE NATIONAL ENVIRONMENTAL POLICY ACT

The National Environmental Policy Act in section 101(b) provides policy goals to improve and coordinate federal plans, functions, programs, and resources to the end that the nation may

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

The Council on Environmental Quality has promulgated regulations for federal agency implementation of the National Environmental Policy Act, section 1500.2, states that federal agencies shall, to the fullest extent possible, interpret and administer the policies, regulations, and public laws of the United States in accordance with the policies set forth in the act (sections 101[b] and 102[1]); therefore, other acts and NPS policies are referenced, as appropriate, in the following discussion.

All alternatives considered in this draft environmental impact statement, including the no-action alternative, comply with NPS laws and policies (e.g., NPS Organic Act, NPS *Management Policies 2006*).

Management of park resources under the provisions of the NPS Organic Act and NPS policies would assure safe, healthful, and pleasing surroundings. Safety of visitors and staff would continue to be a high priority under all alternatives. The elevated bridge and boardwalk systems and elimination of barge landing operations at the river's mouth under each action alternative would reduce the risk of human-bear conflicts in areas where brown bears concentrate.

The action alternatives support diversity and variety of individual choice and opportunities to experience the Brooks River area of Katmai National Park and Preserve. The alternatives would improve the visitor experience when compared to the no-action alternative through improved access across Brooks River and elimination of barge landing operations at the mouth of the river that can detract from the visitor experience.

All alternatives meet the obligations of the National Park Service to protect the historic, cultural, and natural aspects of the Brooks River area. Each alternative meets this goal, although alternatives 2, 4, and 5 would enhance the natural environment through elimination of existing resources conflicts at the mouth of Brooks River.

# 5

# Consultation and Coordination

# PUBLIC AND AGENCY INVOLVEMENT

The National Park Service consulted with various agencies, organizations, and interested persons in preparing this document. The process of consultation and coordination is an important part of this project. The public had three primary avenues for participation during the development of the plan—participation in public meetings; responses to newsletters; and comments submitted by regular mail and electronically through the NPS Planning, Environment, and Public Comment (PEPC) system website.

## PUBLIC MEETINGS AND NEWSLETTERS

The notice of intent to prepare an environmental impact statement for the Brooks River project was published in the March 30, 2009, *Federal Register* (vol. 74 [59, p.14155]). The notice was also posted on the NPS PEPC website.

Public meetings and newsletters were used to keep the public informed on the planning process. A mailing list was compiled of members of governmental agencies, organizations, businesses, legislators, local governments and tribal councils, and interested citizens.

### Public Scoping Meetings

Public scoping meetings were held on September 28, 2009, in Anchorage, and on September 29, 2009, in King Salmon. The meetings were announced via newsletters (see below), advertisements in the September 24 issue of *The Bristol Times* and the September 25 issue of *The Anchorage Daily News,* public service radio announcements (sent to KSKA, KBFX, KMXS, KBRJ, and KDLG), and through online advertisements submitted to the "What's Up" list serve and the "Anchorage Community Datebook." The purpose of these public meetings was to disseminate information about the proposed project and to identify issues and concerns that should be addressed in the document. The meetings combined an open house with a brief, formal presentation, followed by a public comment opportunity.

Four individuals attended the Anchorage meeting, and seven attended the King Salmon meeting. Much of the discussion focused on the design and alignment of the various proposals and the relationship to other projects in the park. Oral comments were received at both meetings. In addition, 14 comments were received by e-mail or through the PEPC system.

Public comments fell into 11 categories (NPS 2009b). The primary issues and concerns that were raised included the following:

- purpose and need for the project
- relationship of the proposed project to the 1996 development concept plan
- access to the Brooks River area
- impacts on cultural, visual, water, and wildlife resources and park operations
- design of the proposed action alternatives (including bridge span distances, viewing platforms, costs, clearance for bears, protection from bears, and provision for floatplane landings)
- notification of the public about the project

### Newsletters

Two newsletters with project information, public scoping meeting announcements, and information on how to submit comments were mailed June 18, 2009, and September 18, 2009, to agencies, organizations, and individuals identified on the project mailing list. The September newsletter included preliminary alternative design concepts for the north and south boardwalks and the bridge.

A third (alternatives) newsletter was distributed and posted on the PEPC website in summer 2010. This newsletter described five alternatives (including the no-action alternative) that the planning team was considering. The descriptions of the alternatives covered the boardwalks, bridge, and a barge landing site. Similar elements shared by all of the action alternatives were identified.

## CONSULTATION WITH OTHER AGENCIES/OFFICIALS AND ORGANIZATIONS

### Section 106 Consultations

On multiple occasions beginning in 2006, the National Park Service consulted with concerned Alaska Native groups/families, i.e., Council of Katmai Descendants, heirs of Palakia Melgenak, and the Alaska state historic preservation office regarding general project activities in the Brooks Camp area. In 2006, the council expressed support for relocating the operations at Brooks Camp in accordance with the 1996 development concept plan and did not support additional development in the area. A meeting was held at the NPS regional office in Anchorage, Alaska, on February 27, 2009, among NPS and council representatives with a discussion of the proposal to construct a permanent bridge across Brooks River. Following this initial meeting, an NPS archeologist met with council representatives in February 2009 to discuss traditional uses of the Brooks River area and to arrange subsequent interviews with knowledgeable council members.

At a meeting in December 2009, council representatives again expressed that the bridge project went against their understanding that development would be removed from Brooks Camp and that their traditional access and activities are impacted by too many people in the area. Similar sentiments were expressed in a letter to U.S. Senator Lisa Murkowski in March 2010 by the attorney representing the heirs. The National Park Service went over schematic bridge designs and alternative alignments with council members at a meeting in May 2010. The National Park Service advised the group that cultural resources (e.g., archeological resources, cultural landscapes, and ethnographic resources) could be potentially affected by the project. An agreement was reached to hold subsequent meetings in King Salmon and Brooks Camp during July 2010; these meetings did not occur; however, primarily because of NPS emergency operations in Valley of Ten Thousand Smokes that curtailed staff availability at the time. In June 2010, an NPS anthropologist interviewed Alaska Native, Vera Angasan, in King Salmon (transcripts of the interview are on file at the Katmai National Park and Preserve cultural resources office, 240 West 5th Avenue, Anchorage, AK 99501).

An on-site visit was conducted June 9–10, 2010, with an NPS archeologist and representatives of the Alaska state historic preservation office to discuss potential project effects on cultural resources in accordance with section 106 requirements. The state historic preservation office representatives noted potential project effects on the cultural landscape.

### U.S. Fish and Wildlife Service

The planning team checked the U.S. Fish and Wildlife Service's Alaska Region endangered species consultation website (http://alaska.fws.gov/fisheries/endangered/consultation.htm) on September 22, 2010. Based on the website map, no federally listed species are present in the project area.

Therefore, section 7 consultation with the U.S. Fish and Wildlife Service is not necessary.

The planning team contacted the U.S. Fish and Wildlife Service's Alaska Region Permitting Branch on August 19, 2010, requesting coordination assistance for a possible incidental take of a bald eagle nest near Beaver Pond, as required under the Bald and Golden Eagle Protection Act. The agency responded by providing an eagle permit fact sheet and information on how to avoid and minimize eagle disturbances. Based on the information provided, a project-specific decision tree was developed to aid in determining if a permit is needed.

### National Oceanic and Atmospheric Agency Fisheries Service

No endangered or threatened species under the management of the National Oceanic and Atmospheric Administration (NOAA)—National Marine Fisheries Service are in the Brooks River area. Therefore, no consultation is required.

The Magnuson-Stevens Fishery Conservation and Management Act (16 USC 1855(b)) requires federal agencies to consult with the National Marine Fisheries Service if essential fish habitat may be adversely affected. Essential fish habitat (salmon spawning areas) is present in Brooks River and Naknek Lake in the project area. The effects of the alternatives on essential fish habitat are addressed in appendix C. The National Marine Fisheries Service concurred with the NPS finding that the adverse effects on essential fish habitat would be minor.

### Environmental Protection Agency

The Environmental Protection Agency reviewed the DEIS in accordance with their responsibilities under the National Environmental Policy Act and section 309 of the Clean Water Act. The Environmental Protection Agency assigned a rating of Lack of Objections to the draft EIS. The EPA review did not identify any potential environmental impacts requiring substantial changes to the proposal.

### Public Review of Draft Plan

The *Brooks River Visitor Access Draft Environmental Impact Statement* was released to the public on June 22, 2012. The Notice of Availability for the draft environmental impact statement was published in the *Federal Register* on that date (77 FR 37707). The public comment period ran from June 22 through August 20, 2012. Three public meetings were held in Alaska to review the draft EIS and receive public comment: July 31, 2012, in Homer; August 1 in Anchorage; and August 2 in King Salmon, Alaska. Sixteen individuals attended the public meetings.

During the 60-day comment period, comments were received via mail, e-mail, and through the NPS Planning, Environment, and Public Comment (PEPC) site. In total, 22 comment letters were received via these means. The 22 comment letters included two environmental organizations (National Parks and Conservation, and Sierra Club), state and federal agencies (State of Alaska, Environmental Protection Agency, and National Marine Fisheries Service), the State of Alaska, Bristol Bay Native Corporation, Katmailand, Inc., and 14 individuals. Letters from agencies are included in appendix D. Letters from organizations and individuals are on file at the NPS Alaska regional office.

# COMMENTS AND RESPONSES ON THE DRAFT PLAN / ENVIRONMENTAL IMPACT STATEMENT

This section summarizes the comments received following the release of the *Brooks River Visitor Access Draft Environmental Impact Statement* on June 22, 2012. All written comments were considered during the preparation of the final environmental impact statement in accordance with the requirements of the Council on Environmental Quality's regulations for implementing the National Environmental Policy Act (40 CFR 1503).

A total of 127comments were derived from the 22 pieces of correspondence received.

These comments were classified as substantive or nonsubstantive. A substantive comment is defined in the "Director's Order 12 Handbook" (section 4.6A) as one that does one or more of the following:

- Question, with a reasonable basis, the accuracy of information presented in the EIS.
- Question, with reasonable basis, the adequacy of the environmental analysis.
- Present reasonable alternatives other than those presented in the EIS.
- Cause changes or revisions in the proposal.

As further stated in the Handbook, substantive comments "raise, debate, or question a point of fact or policy. Comments in favor of or against the proposed action or alternatives, or comments that only agree or disagree with NPS policy, are not considered substantive." The NPS prepared responses to all comments determined to be substantive. In addition, the NPS elected to respond to some nonsubstantive comments when they represented common questions or misunderstandings among the public or other stakeholders.

Comments were grouped by similar themes, and summarized with an issue summary statement. Following each issue statement are one or more "representative quotes," which are comments taken directly from the correspondence to illustrate the issue, concern, or idea expressed by the comments grouped under that issue statement.

## BROOKS CAMP RELOCATION

### Comment 1

The elevated bridge and boardwalk will provide little incentive to relocate Brooks Camp Lodge and Campground, therefore making it unlikely that the eventual relocation will occur.

### Representative Quote

The availability of a permanent structure that improves the operations for Katmailand and helps the experience of visitors at the Brooks Lodge will likely result in making it LESS likely that the concession operation moves across the Brooks River. With disruptions removed from anglers & bus riders crossing the river, the incentive to move operations is greatly reduced.

### NPS Response

The relocation of Brooks Camp Lodge and the campground are outside the scope of this EIS. The 1996 Brooks River Area – Final Development Concept Plan EIS and Record of Decision (ROD) address lodge and campground relocation to the Beaver Pond terrace area. A phased relocation of facilities would be enhanced by a bridge to provide improved access across the river for people, supplies and equipment.

### Comment 2

Moving Brooks Camp after the construction of the bridge is a misallocation of public funds and should therefore not be considered. The large cost of the bridge is a tiny fraction of the cost to move Brooks Camp. The massive cost associated with relocation of all facilities is unreasonable and counterproductive.

### Representative Quote

According to the DEIS, the estimated cost of the elevated bridge described in Alternative 4 will be $7.4 million, which is considerable, even for a federal agency. However, the cost of the proposed bridge is a tiny fraction of the funding that would be necessary to move all of the existing facilities. I feel that the predicted major disturbances and massive costs associated with relocation of virtually all facilities are unreasonable, counter-productive, and will result in still more impacts at the proposed new site. All-in-all, this action is a waste of federal money.

### NPS Response

The NPS currently does not have funding to relocate all of Brooks Camp. The feasibility, including costs, of future relocation of the remaining facilities will be evaluated as the DCP is implemented.

### Comment 3

The 1996 Development Concept Plan (DCP) is not being followed accurately with the implementation of this plan. This plan fails to accomplish the people free zone found in the DCP by allowing buildings to remain on the north side of the river. The DCP calls for the relocation of Brooks Camp to occur in one step rather than in many steps over a period of time.

### Representative Quote

However, a major alternative is being disregarded given that the 1996 DCP and current NPS guidance states that Brooks Lodge & all NPS/visitor operations will move to the South side of the River.

The most environmentally preferable alternative would be simply to move everything en masse in the near future, without building a new bridge. Once (or, more likely, if) the move across the river occurs we will be left with a somewhat imposing and permanent structure left across the river. If the DCP's people free zone is implemented it will be a proverbial "Bridge to nowhere, in the middle of nowhere."

### NPS Response

The 1996 Development Concept Plan (DCP) defined a large-scale concept. As specific plans for implementation have evolved and funding appropriated, minor modifications have been made to the DCP. The DCP was not funded in its entirety. The NPS is proposing some modifications to the DCP to continue its phased implementation. The NPS proposes to remove the proposed floatplane access and the breakwater required for floatplane access to the south side of Brooks River from the DCP. The NPS proposes to construct a elevated bridge and boardwalk system to facilitate movement of visitors and staff and transport supplies in the Brooks River area. The NPS also proposes to relocate the existing barge landing site.

The environmental effects of these proposed changes on park resources have been evaluated in this EIS. The proposed access will lessen the environmental impacts of implementing the DCP by negating the need to build a large breakwater in Naknek Lake and by moving the barge landing access road away from the south bank of the Brooks River. Although the DCP envisioned a “people-free zone” on the north side of the river, the proposed elevated bridge and boardwalk system would reroute and vertically separate people from bears, allowing people to traverse the area with minimal impact to bears.

### Comment 4

The DCP should be withdrawn in favor of a Day Use plan.

### Representative Quote

The DCP should be withdrawn in favor of a Day Use plan.

### NPS Response

A day use plan is outside the scope of this EIS, as is the suggestion that the DCP be withdrawn. The DCP considered an alternative that removed Brooks Camp facilities from the park and managed the site as a day use area. This alternative was not selected by the NPS.

### Comment 5

The campground should remain in its current location. The current camp is located in an ideal place and provides a breezy, less buggy, more enjoyable camping experience. The lodge and campground are within ideal walking distance for a day of fishing.

### Representative Quote

More specifically, we request the Service leave the campground in its existing location. The campground's proximity to Naknek Lake provides a breezier, less buggy, more enjoyable camping experience. The campground's separation from the lodge buildings and its setting along a smaller trail add to the camper's rustic experience. Additionally, its location adjacent to the start of the Dumpling Mountain trail is especially convenient considering campers often must relocate from the campground to camp along the trail if the campground is at capacity. The campground does not require significant infrastructure, and what infrastructure is needed is already in place.

### NPS Response

Issues concerning the campground are outside the scope of this EIS. The 1996 Brooks River Area – Final Development Concept Plan EIS and Record of Decision (ROD) address lodge and campground relocation to the Beaver Pond terrace area.

### Comment 6

There is a need to reassess the benefits of alternative facility and programmatic approaches for Brooks Camp as a whole before committing significant funds to these incremental yet expensive improvements.

### Representative Quote

We believe there is a need to re-assess the benefits of alternative facility and programmatic approaches for Brooks Camp as a whole before committing significant funds to these incremental yet expensive improvements.

We share with the Park Service the goal of improving facilities at Brooks Camp for visitors, the Park Service, the concessioner, and the bears. We would like to work with the Park Service and other stakeholders to develop a better vision for the future of the Park. This vision would encompass the following characteristics:

- Revisit key DCP-proposed facility changes.
- Utilize improved bear management techniques to minimize adverse human-bear interactions. Accept that occasional delays while walking through Brooks Camp are part of the experience of the place, and not necessarily entirely negative.
- Work with the Council of Katmai Descendants, BBNC and other local Native entities to develop a new, more active program to tell the story of the thousands of years of native life along the river. We recognize that cultural resources will likely always

be secondary to bears and fish as a reason to travel to Katmai. But we believe the cultural dimensions of the Brooks River experience are grossly underdeveloped. Brooks River is one of the most important, concentrated cultural sites in Bristol Bay if not in all of Alaska. Much more could and should be done to share and celebrate these traditions.

## NPS Response

The NPS is continuing to implement the DCP as funding becomes available. Consideration of a different bridge has emerged as a critical link between the north and south sides of the river. If an action alternative is selected, visitor access to the south side of the river, the lower viewing platform and Brooks Falls would be improved for those arriving by floatplane on Naknek Lake north of the river.

The NPS considered an alternative that focused on management of bears and people to address safety concerns rather than proposing a bridge and boardwalk system. This alternative was dismissed because it is not certain that such management would increase human safety.

The NPS agrees that more can be done to tell the public about the fantastic cultural resources at Brooks Camp and will continue to work with the Council of Katmai Descendants, Bristol Bay Native Corporation, and local native groups to do so.

## Comment 7

The EIS lacks evidence to support a bridge to provide continued operations during the relocation of Brooks Camp. The EIS should consider other options for continued operations during the relocation, such as a combination of boat access and management of the floating bridge.

## Representative Quote

In the Need Statement and throughout this EIS it states that dependable access is needed to provide for continued operations during the relocation of Brooks Camp to the south side of the Brook River. What analytical or scientific data do you have that would indicate that continued operations would not be possible if elevated walkways and bridge were not built? As a foremost expert in this matter I would disagree. Isn't it in fact just a degree of convenience instead of necessity? What is this need? Is it so that supplies and equipment can be transported from the barge landing on the south side of the river to Brooks Camp side? This EIS makes the assumption that barge landings only occur on the south side of the river but isn't it a fact and a common practice to land the barge and associated supplies and equipment on the north side of the river? Just today (August 15, 2012) those activities on the north side of the river occurred including pumping out outhouses at the Visitor Center into a tank for transportation to the disposal pit on the valley road. So isn't it possible and environmentally safer to pump and transport sewage at the end of the season in this manner and avoid having it pumped across the proposed boardwalks and bridge or hauling it across the river mouth at the beginning of the season? Is the Need so NPS and concession employees can access the north side of the river from the new housing area being constructed on the valley road? Couldn't the movement of the housing be done in a manner that would allow enough housing be left on the north side of the river till the majority of facilities are functional on the south side of the river? Isn't access across the river for the most part only impacted for the month of July and the last 7-10 days of the lodge's season in September? Doesn't this EIS in fact state that " a 2011 study found that the bridge was open more often than closed in July." (page103)? So isn't this EIS in part justifying the building of a $4.2 to $8.9 million elevated boardwalks and bridge to allow for access of employees and visitors for a period of at most six weeks and in reality mostly 7-10 days? Couldn't other means be used to allow for dependable access? Couldn't a combination of boat transport and management of the bridge allow for sufficient crossings? Aren't they for a large part being utilized at the present including the use of bridge escorts?

### NPS Response

Despite the best efforts of NPS staff, delays of an hour or more to cross the river occur due to bear activity. The current system does not provide reliable access across the river.

NPS plans to remove existing housing as new housing is developed to avoid an increase in facility footprints inside the park. Because relocation of housing facilities is currently underway, it is not an option to retain housing on the north side of the river until most of the facilities are functional on the south side of the river. Once the panabodes are completed on the south side, NPS plans to remove the tent frames from the north side.

## BROOKS CAMP CARRYING CAPACITY

### Comment 8

The EIS should discuss the DCP visitor use limits or carrying capacity as a means of meeting the purpose and need of this project.

### Representative Quote

When will visitor use limits be implemented and why haven't they been implemented already? Wouldn't they go a long way toward addressing some of the purposes and needs associated with this proposal?

### NPS Response

Brooks Camp carrying capacity is outside the scope of this EIS. In addition, the visitor use limits in the DCP have no bearing on the need for the bridge and boardwalk proposed in this EIS—regardless of how many people are at Brooks Camp during the peak bear viewing and sportfishing periods, the proposed bridge and boardwalk will help reduce human-bear encounters, improve visitor and employee safety, enhance resource protection, improve the visitor experience in the Brooks River area, and meet operational needs for Brooks Camp facilities.

## BEAVER POND ACCESS

### Comment 9

The EIS is unclear as to whether a road would access facilities (lodge and campground) relocated to the Beaver Pond Terrace as per the 1996 DCP.

### Representative quote

We are glad to see that this EIS changes the plans in the 1996 GMP for a new access road and shuttle bus system to the Beaver Pond Terrace and they will now not be constructed. We do have a question, however, about a potential conflict between the decision not to construct that new access road and a statement on page 11 that reads, subject to available funding, the lodge and campground would be relocated to the Beaver Pond Terrace in 15+ years. If this EIS makes the decision that no road or shuttle system will be built to support the Beaver Pond Terrace site, why is it still listed as something that could happen 15+ years from now? And if the Beaver Pond Terrace is not the location for those facilities, when will the decision be made on where those facilities should/could be relocated?

### NPS Response

As indicated in the 1996 DCP, the lodge and campground would be relocated to an area south of the Brooks River at the Beaver Pond terrace. An access road would be constructed to connect these facilities to the Valley of Ten Thousand Smokes Road. The text on pages 10 and 11 of the DEIS will be revised to clarify proposed access to the relocated facilities at the Beaver Pond terrace.

## OTHER ALTERNATIVES TO THOSE PRESENTED IN THE DEIS

### Comment 10

The EIS should include an alternative with the barge landing moved 2,000 feet south on Naknek Lake and no elevated bridge.

### Representative Quote

We recommend the adoption of Alternative 1, No Action, revised to eliminate the $1.54 million hardened ramp at the current site at the mouth of Brooks River. We agree with the NPS's plan in Alternatives 2, 4, and 5 of the DEIS to move the existing barge landing out of the prime bear habitat and salmon feeding area at the mouth of the river.

### NPS Response

While the commenter's suggested alternative would address the barge landing, it does not address the other elements identified in the DEIS' "Purpose and Need." This suggested alternative would not address such issues as river/wetland restoration, visitor and employee (both NPS and lodge) access across the river, bear/human interactions, cultural resource concerns (sensitive archeological sites, cultural landscape), management of sewage, and electrical connectivity between both sides of the river.

### Comment 11

A multi-million dollar bridge is not necessary because reliable visitor and employee access can be provided through a combination of increased staffing levels and by modifying existing policy.

### Representative Quote

Dependable access could be provided through a combination of increased staffing levels and by modifying existing policy to allow both visitors and employees more reliably access to work and bear viewing areas during July and September when bears most often impede human traffic flow across the floating bridge. It is not necessary to build a multi-million dollar bridge to provide more reliable access. For example, currently many Brooks Lodge employees have early work shifts that, in September, start well before sunrise. The bridge is not necessary to provide concession staff (who will in the near future presumably be living in the new housing areas near the Valley Road Administrative Area) access to work.

### NPS Response

To date, the NPS has not been able to provide dependable access across the river and between the fish freezing building and the Corner despite numerous adjustments in staffing levels and human-bear management approaches. The presence and number of bears in the lower river area make this especially difficult. Bear management at Brooks Camp has been evaluated and improved. In addition, increased staff and additional housing for that staff is expensive. While the safety record at Brooks Camp is remarkable, the NPS desires to take a proactive approach. An elevated bridge and boardwalks would provide effective, safe vertical separation between bears and people.

### Comment 12

The EIS should include an alternative with an elevated bridge but no relocation of Brooks Camp or removal of Brooks Camp facilities from the Brooks River Area.

### Representative Quote

The campground move and lodge move are referenced as next steps if a bridge is built on page 4.

The bridge would facilitate these ill-conceived plans, and the cost, at a time of scarce federal money, seems unjustified. The cost could be limited with an "Alternative" that allows building of a bridge, but no expensive camp and lodge relocation following bridge construction. That is an "Alternative" that hasn't been included in the Draft EIS, and should be added...The current camp is located in an ideal place. Fishermen who camp and lodge users can congregate together, and camp or overnight at a lodge, which leaves them within ideal walking distance for a day of fishing.

### NPS Response

The relocation of the Brooks Camp lodge and campground is outside the scope of this EIS. The 1996 Brooks River Area – Final Development Concept Plan EIS and Record of Decision (ROD) address lodge and campground relocation to the Beaver Pond terrace area.

### Comment 13

The EIS should include an alternative that implements the 1996 DCP preferred alternative of relocating Brooks Camp to the south side of the river, moves the barge landing 2000 feet to south on Naknek Lake, but does not include an elevated bridge.

### Representative Quote

Wouldn't a reasonable alternative be simply move the Barge landing/access road from the site in the DCP to the site proposed in the Preferred Alternative of this EIS, and retain all other aspects of the DCP with or without a phased relocation (CEQ regulations 1500.2 (e), 1502.14 (a), 1508.25 (a) (1) (iii))? Wouldn't with this alternative there be many of the positive effects stated in Implementing the Preferred Alternative of the DCP above compared to the Preferred Alternative of this EIS but also 1) cost much less by not having to expend resources on building the elevated boardwalks and bridge (between $8,948,500 and $4,244,000, differences between building the elevated boardwalks and bridge and not building the bridge), and also save money compared to building the access road identified in the DCP, then the cost savings could be put toward finishing the new housing area and/or building a new lodge complex and access road from the Valley road 2) reduce the time needed to relocate Brooks Camp since 3 years would not be needed to build the elevated boardwalks and bridge?

### NPS Response

The NPS has determined that the current floatplane and boat access north of Brooks River to be more dependable than the access south of the river as described in the DCP. Maintaining floatplane and boat access on the north side of the river would require dependable access across the river. The DCP is being implemented in phases because of budgetary considerations. NPS has elected to maintain a fully functioning operation at Brooks Camp as the DCP is implemented. The proposed bridge would facilitate continued operations of Brooks Camp during the phased relocation.

Funding is obtained for a specific project, to be built within certain constraints. Federal funds specifically appropriated by Congress can only be used for the purposes stated.

## BROWN BEAR

### Comment 14

The EIS presents no objective scientific data to support the hypothesis that a 10-foot elevated bridge will "decrease adverse effects on brown bears due to elimination of the floating bridge". The EIS contention that bears will move more freely with an elevated bridge is mere speculation.

### Representative Quote

However, the NPS presents no objective scientific data to support their hypothesis that a 10-foot elevated bridge will "decrease adverse effects on brown bears due to elimination of the floating bridge" (p. 45 in DEIS). Importantly, there is at least some published information from research conducted by DeBruyn et al. (2004; Wildlife Society Bulletin 32:1132-1140; cited in the DEIS on p. 140} that showed negative responses by Brooks River bears to the elevated structures near the falls. The DEIS cites no experimental studies that examine bear behavior and or quantifies bear movements when confronted with a bridge. Therefore, I suggest that the NPS contention that bears will move more freely with an elevated bridge is mere speculation, and that the opposite bear response may occur as indicated in the work of DeBruyn et al. (2004).

## NPS Response

A comparison of bear movements before and after the construction of the falls boardwalks provides an example of bear behavior when confronted with an elevated structure. DeBruyn's observations showed a short-term change in bear activity along bear trails under the current falls boardwalk after its construction (DeBruyn et al. 2004). The presence of a newly people-free zone on the ridge where the ground-level foot trail had been may have attracted more bear activity to that alternate location, but this was not studied. However, bear activity in the Brooks River, including at Brooks Falls, continued to increase after construction of the boardwalk, and human-bear interactions of a significant nature declined to near zero in the area of the boardwalk and have remained low since, despite the highest bear counts in the history of the monitoring program. Based on observed changes in human-bear interactions in the falls boardwalk area, we assume that elevating human activity reduces the direct human confrontation.

## Comment 15

The DEIS (pp. 66-67) inaccurately characterizes the increase of brown bear activity. The conclusory statement on p. 67 implies that the increasing trend in brown bear activity may be due to protections from hunting. Based on the list of potential factors discussed in this paragraph, the final EIS should at least acknowledge that this increase may be due to a combination of factors.

## Representative Quote

Page 66 and 67, brown bear activity. While we agree that brown bear activity has increased in the vicinity, we disagree with the characterization of this increase. Specifically, bear hunting did not end due to "increased NPS presence" - it was Congress that ended brown bear hunting in Katmai National Park. Additionally, we request modification of the last sentence. As currently written, this conclusion implies that the increasing trend in brown bear activity may be due to protections from hunting. Based on the list of potential factors discussed in this paragraph, the final EIS should at least acknowledge that this increase may be due to a combination of factors. In fact, a case could be made that the brown bear population has been high for well over the last decade, and that any recent increases in brown bear densities at Brook's Camp are attributed to a change in bear distribution resulting from a change in the strength of fish runs and habituation to people.

## NPS Response

The text of the EIS has been modified to address this comment.

## Comment 16

There is a lack of precision with the summary of information regarding bear use of Brooks River. For example, the information on bear numbers appears to refer specifically to independent bears rather than all bear including dependent offspring. This information should be revised to represent the referenced reports and data accurately.

### Representative Quote

There is a lack of precision with the summary of information regarding bear use of Brooks River. For example, the information on bear numbers appears to refer specifically to independent bears rather than all bear including dependent offspring. This information should be revised to represent the referenced reports and data accurately.

### NPS Response

The text of the EIS has been changed to refer to independent bears rather than to all bears including dependent offspring.

### Comment 17

There is a lack of a thorough discussion of the relationship of the preferred alternative to the Park's Bear-Human Conflict Management Plan, which is a step-down plan from the Park's General Management Plan.

### Representative Quote

There is a lack of a thorough discussion of the relationship of the preferred alternative to the Park's Bear-Human Conflict Management Plan, which is a step-down plan from the Park's General Management Plan.

### NPS Response

The “Katmai Bear/Human Conflict Management Plan” is an internal guide for employees to implement law, regulation, and policy pertaining to Katmai while managing bear and human activity. Documents developed through public processes, such as the current EIS, inform any decisions made that may change current bear management practices. Any changes would be reflected when the BHCMP is revised.

### Comment 18

The EIS states that autumn bears had a low tolerance for human activity. The north boardwalk along the outside of the treed area would create a significant visual and noise disturbance that would impact all parts of the lower river, thus impacting most of the bears in the fall.

### Representative Quote

P. 68 par. 5 and 6. It states the fall feeding pattern of bears in the lower river and that "the autumn bears generally had a low tolerance for human activity" so I think that the north boardwalk along the outside of the treed area would create a significant visual and noise disturbance that would impact all part of the lower river, thus impacting most of the bears in the fall.

### NPS Response

Bratten and Gilbert (1987) indicated that in the 1980s, when bear and visitor activity was much lower, bears that came to Brooks Camp in the fall appeared to be less tolerant of human activity. In the intervening time, bear and human activity have both increased, and subsequent studies have not observed this behavior. This has been clarified in the final document.

## FISH, FISHING, AND REDFISH FISHERY

### Comment 19

NPS has not provided adequate data and analysis on current effects of the floating bridge on fish migration and spawning habitats. Without proof that fish are being negatively impacted, the need for the elevated bridge is not justified.

### Representative Quote

Significantly, the DEIS offers no objective scientific evidence that any of these species of fish have been negatively affected by the existing floating bridge. Equally perplexing is the NPS contention that a permanent, elevated bridge as proposed in Alternatives 2-5 "would eliminate ... the associated impacts to fish migration and spawning (e.g., impeded passage and spring riverbed disturbances, turbidity, and sedimentation}." If the NPS has not documented any impacts of the existing floating bridge on fish migration behavior and spawning habitats through experimental research, then how can there be an improved situation with an elevated bridge? This whole section of the DEIS (pp.148-157) is little more than anecdotal and apparently intended only to enhance the argument in favor of constructing a bridge.

### NPS Response

While no formal studies have been conducted on the impact of the floating bridge on fish migration, driving tracked vehicles in the river to install and remove the bridge, as well as to transport waste across the river in early spring, is the most damaging to fish migration of all river crossing alternatives. The impact analysis has been revised to reflect this and to address the uncertainty of the other impacts.

### Comment 20

The EIS does not mention catch and release fishing. Catch and release fishing should be retained under all alternatives so long as healthy populations of fish are assured.

### Representative Quote

Finally, although there is no mention of any changes in areas open to catch-and-release fishing on Brooks River in either the EIS (1996) or the DEIS (2012), I recommend that this historic use activity be retained and unaffected by any future developments as long as healthy populations of rainbow trout, Dolly Varden, and Arctic grayling are assured. Indeed, this fishery and these fish species, as well as the all-important sockeye salmon run, have been sustained since sport fishing began on the Brooks River in the 1950's.

### NPS Response

The NPS is not proposing any changes to catch and release fishing on the Brooks River. Recreational fishing is highly valued by both the NPS and the public. The NPS recognizes the historic importance of catch and release fishing to the Brooks River area as part of the living history and cultural fabric of the park.

### Comment 21

The EIS suggests that angler access on north side of the Brooks River may be restricted.

### Representative Quote

The State strongly supports continued uninhibited access to the Brooks River for fishing.

Though the DEIS states that angler access would continue to be provided without restriction, it does not describe angler access in detail, nor is angler access easily identified on the diagrams. Other statements in the DEIS suggest that general access, including angler access, will eventually be restricted in the area referred to as "the Corner."

To alleviate the impression that the new elevated bridge and viewing platforms are the only areas people may travel and that access may be reduced or eliminated from the Corner, we request the final EIS clearly identify angler access.

### NPS Response

It is not the intent of the NPS to limit or inhibit angler access to the Brooks River. The NPS values this activity and is committed to protecting it while simultaneously conserving fishery resources. Anglers may continue to access the river by traveling down existing footpaths from the Lodge to the north side beach; traveling across the boardwalk to the south side of the river; or by walking upriver from the Lodge to the oxbow to fish. No foot travel restrictions are contemplated; however, the trail that currently exists from the Lodge to the Corner would not be maintained, and would be revegetated.

### Comment 22

NPS should consider how to best manage angler access, including sight distance, at the restored areas of the current barge landing and barge landing access road and the trail to the Corner.

### Representative Quote

In addition, the current barge landing, barge landing access road, and the trail to the Corner, which the Service proposes to remove and restore to natural conditions, are areas used by anglers to access the Brooks River. One unintended consequence of restoring these areas to natural conditions may be reduced sight distance for anglers en route to fishing spots. We request the Service consider how best to maintain angler access to these areas while minimizing social trails and the potential for negative human-bear encounters.

### NPS Response

It is not the intent of the NPS to limit or inhibit angler access to the world-class Brooks River fishery. The NPS values this activity and is committed to protecting it while simultaneously conserving fishery resources. The NPS will work with anglers to understand their needs and desires for access and to best minimize human-bear encounters.

### Comment 23

The EIS should discuss the impacts of alternatives on the authorized red fish fishery activities at the mouth of the Brooks River.

### Representative Quote

Similarly, we encourage the Service to accommodate the traditional red fish fishery during construction, and to consider and minimize impacts to the fishery. According to the Actions Common to All Action Alternatives, the work is largely scheduled for late fall, when the red fish fishery takes place, and early spring to avoid peak bear and visitor periods. We suggest contacting participants to discuss ways to reduce impacts to the fishery well in advance of construction.

While we recognize the Service does not consider this a subsistence fishery under Title VIII of ANILCA, the authorized red fish fishery takes place at the mouth of the Brooks River within the project area. The final EIS should specifically describe the anticipated effects, both during and after construction, of the viewing platforms, elevated bridge, and relocation of the barge access road on the red fish fishery. Currently, the draft EIS only makes generic statements about subsistence in general within the preserve, while briefly mentioning that the red fish fishery occurs.

### NPS Response

The traditional harvest of redfish would continue to be authorized under all of the alternatives, so it was not developed as an impact topic. We have clarified this by adding the redfish fishery as an impact topic that was considered and dismissed in the Final EIS.

## HYDROLOGY AND STREAMBANK RESTORATION

### Comment 24

The short-term and long-term effects of the pilings used for the elevated bridge have not been adequately analyzed. The EIS lacks an assessment of hydraulic impacts to fish habitat.

### Representative Quote

Equally troublesome is the very casual evaluation of potential impacts associated with placement of piles in the river bed. I see no evidence in the DEIS of a rigorous hydraulic assessment of the proposed action, nor is it evident that fisheries ecologists have been consulted in determining potential impacts of the pilings on fish habitats.

### NPS Response

Bridges, including those with pilings, are generally accepted as the least impact to fish passage of any manner of crossing streambeds. The floating bridge design incorporates a need to drive tracked vehicles in the water for installation of the bridge each year as well as for hauling waste across the river in the spring before the bridge is installed, and repeatedly operating vehicles in a river is generally considered to be the highest potential impact of any crossing method. The floating bridge also requires management of a riverbank abutment on each side, which are elements of poor bridge design that impact the hydrologic function. These points have been clarified in the document.

### Comment 25

The EIS does not provide quantitative evidence to support conclusions that retention of the floating bridge would have adverse effects on hydrology and floodplans or that hydrology would benefit from the removal of the floating bridge.

### Representative Quote

The conclusion in the DEIS (p. 176) that Alternative 1 (retention of the floating bridge) "would continue to have a long-term, moderate, adverse and localized effect on hydrology and floodplains" is not supported by any quantitative evidence presented in the DE IS. Further, the DEIS (p. 181) concludes under Alternative 4 that "the hydrology would benefit from the removal of the floating bridge (that alters river flow hydraulics and flooding, and contributes to bank erosion near its anchors} ... " Again, there is no meaningful documentation of negative impacts of the floating bridge, just conjecture.

### NPS Response

The abutments are constructed of boulders and artificially constrain channel movement. Erosion of the corner downstream of the bridge requires well over one yard of material per year to maintain the location and function of the trail at the corner (some years more than 12 yards). Maintenance of the spit road limits the hydrologic connection to the wetland behind the road, which has to be actively maintained by adding material in high water years.

### Comment 26

Removing the floating bridge will negate the need to stabilize the riverbank on the north side and the riverbank will return to a more natural condition. This benefit is missing in the EIS.

### Representative Quote

Similarly we understand that removing the floating bridge will negate the need to stabilize the riverbank on the north side. With the floating bridge removed, the riverbank will return to a more natural condition. We didn't see this benefit expressed in any of the alternatives discussions and suggest that it might be included.

### NPS Response

The text of the EIS has been modified to address this comment.

### Comment 27

The NPS could improve the streambank conditions near the floating bridge and the Corner regardless of the alternative chosen. It would be possible to retain the floating bridge while also rehabilitating the streambank.

### Representative Quote

We note that the Service could improve the streambank conditions near the floating bridge and the Corner regardless of the alternative chosen. It would be possible to retain the floating bridge while also rehabilitating the streambank.

### NPS Response

The current human traffic flow to the corner area necessitates maintaining the corner. The river is naturally eroding this feature, and any effort to stabilize this bank is contrary to the natural movement of the river. The NPS has attempted to use vegetative erosion prevention, but bears have dug up the materials before they have taken root.

## VISITOR USE AND EXPERIENCE

### Comment 28

The EIS lacks evidence that visitor experience suffers because of bear-caused delays, and does not provide justification that the bridge would substantially improve the visitor experience beyond what could be accomplished through increased staffing levels and policy modification.

### Representative Quote

However, can the NPS provide any evidence that the visitor experience suffers because of delays to visitors' movements that bears cause? If so, it should be included in the EIS and the park should provide justification that the bridge would substantially improve the experience in a way that increase staffing levels and policy modification cannot.

### NPS Response

The preferred alternative will provide visitors increased and enhanced bear-viewing opportunities along the length of the boardwalks and while crossing the bridge. For some, the current situation with waiting periods to approach the Corner or cross the river are at first a new and interesting part of their experience, but for many, after 45 minutes or an hour, the novelty begins to wear off. Some will retain their fascination with the wait and this will become a part of the story of their trip to Brooks Camp. For others, their frustration may be compounded by a missed meal or flight.

### Comment 29

The EIS does not include data on the length of bear-caused bridge closures, even though NPS has been gathering statistics on the length of bear delays.

### Representative Quote

Delays caused by bears across the current floating bridge, in some instances, are long in duration, but the vast majority of these delays are short even during peak times of bear use along the lower Brooks River in July and September. The park has been gathering some statistics on the length of bridge closures. Does this data support the need for an elevated bridge? If so, why is not included in the EIS?

### NPS Response

At the time of preparation of the DEIS, bear delay data was not available. Since then, we have collected and compiled data from 2011. That data shows that bridge closures are frequent, with more than 20 per day most days in July and more than 30 per day in September. Most closures are brief, less than 10 minutes long, but most days in July and September for which we have data had closures of more than 30 minutes length, some more than 60 minutes. Staff experience indicates that the length and frequency of delays is strongly affected by the salmon run and water levels, and multiple years of data would be needed to assess the specific numbers more appropriately. This new data has been added to chapter 3 of the EIS.

## Comment 30

Moving Brooks Camp will negatively impact pedestrian experience by creating a mile-long sprawling complex requiring a vehicle shuttle system resulting in increased vehicular traffic.

## Representative Concern

First and foremost, the area north of the river is already disturbed and would be permanently connected to the south side via the proposed elevated walkway and bridge. Moving the camp while maintaining the visitor contact station at its current location, and building the new infrastructure would result in a sprawling complex over a mile long, as well as necessitate a vehicle shuttle system for visitors. Currently, visitors walk easily between Brooks Camp and the viewing platforms, whereas if the Camp is relocated, pedestrians would share the road with frequent vehicle shuttles, or be forced to ride in a vehicle to access the viewing platforms, which would significantly alter the visitor experience.

## NPS Response

The 1996 Brooks River Area – Final Development Concept Plan EIS and Record of Decision (ROD) address lodge and campground relocation to the Beaver Pond terrace area. This comment is outside the scope of this EIS.

## Comment 31

The conditions at the Beaver Pond Terrace, the relocation site for Brooks Camp, are uncomfortable for visitors. The current site has fewer bugs and is more conveniently located to the river.

## Representative Quote

There has been talk of moving the camp into the woods, off the river, which would make camping miserable. The current site is the windiest possible site, which is good because the bugs at Brooks Camp are thick (mosquitoes and white socks). The Naknek Lake wind keeps camping comfortable and enjoyable. Brooks Lake, or worse, a camp in the woods away from either lake, are both less windy, and would be very uncomfortable for visitors.

## NPS Response

The 1996 Brooks River Area – Final Development Concept Plan EIS and Record of Decision (ROD) address lodge and campground relocation to the Beaver Pond terrace area. This comment is outside the scope of this EIS.

## Concern 32

Last year Brooks Camp received 100% visitor satisfaction rating. How can the cost of an elevated boardwalk and bridge be justified to improve visitor experience when the visitor experience can be considered exceptional?

## Representative Quote

Isn't this EIS in part justifying this proposal by improving visitor experience? Didn't Brooks Camp get an unprecedented 100% visitor satisfaction rating from its visitor survey last year? What is the significant overriding need to improve visitor experience in light of this fact? How can a $4.2 to $8.9 million dollar elevated boardwalks and bridge be justified to improve visitor experience when the visitor experience can be considered exceptional? Isn't overcrowding by far the element that impacts visitor experience most? Doesn't this EIS's own data indicate this to be so with 56% of visitors rating overcrowding as moderate, very or, extreme (page 103)?

## NPS Response

Visitor satisfaction is one concern, and the NPS's goal is to keep visitor satisfaction high while addressing the other goals identified in the purpose and need section of the EIS.

### Comment 33

On page 99, paragraph 4, the EIS states that "[t]he Corner is a site of high bear activity, and consequently 'bear jams' occur frequently in this area." This is a very general statement, where is the data to support this statement?

### Representative Quote

P.99 par. 4, "The Corner is a site of high bear activity, and consequently 'bear jams' occur frequently in this area." This is a very general statement, where is the data to support this statement?

### NPS Response

See response to concern 30 above.

## SAFETY

### Comment 34

The EIS lacks data on human-bear conflicts to demonstrate the need to improve visitor and employee safety by building an elevated bridge and boardwalk.

### Representative Quote

The purpose of and need for the preferred alternative, in particular the need, are largely not supported sufficiently by the background information and analysis of environmental consequences....The draft EIS states that one of the needs for the preferred alternative is to ". . . improve visitor and employee safety, reducing the risk of human-bear conflicts." However, no data are presented in the draft EIS that clearly demonstrate this need. Statements about suggested increases in human-bear interactions in the lower river near the bridge, for example, are not adequately supported with actual data.

### NPS Response

Human-bear conflicts data at Brooks Camp appears on page 104 of the DEIS. Brooks Camp, and the lower river in particular, have been intensively managed with pressures, subtle and direct, to move people past bears. Bluff charges and more aggressive bear behavior pose risks to visitors and staff because brown bears are highly unpredictable, even in carefully managed settings. A structural solution (elevated bridge and boardwalks) can reduce the risk of bear-human conflicts through vertical separation. Safety is one of many reasons the NPS proposes to construct an elevated bridge and boardwalks. In addition to safety, these proposed structures address the multiple resource concerns raised in the “Purpose and Need” of this EIS. Also see response to comment 11.

### Comment 35

The EIS implies the need for increased hazing of bears in Brooks Camp in the fall. This is a reflection of a shift in management policy rather than an actual change in bear use or human-bear interactions.

### Representative Quote

The draft EIS implies that there has been some sort of need for increased hazing of bears near camp in the fall and that this approach is somehow an important aspect to managing the area. The report referenced for this information actually discusses concerns related to park management' relatively recent push to haze bears outside of the camp for human convenience. Also, the implied trend of increased hazing of bears near the camp is clearly primarily a reflection of a shift in management policy versus an actual change in bear use and/or human-bear interactions there.

### NPS Response

The increased bear activity in the fall over the past two decades has led to longer and longer periods when the bridge is not passable due to bear activity. At times the NPS attempts to move bears with methods such as air horn or shouting to facilitate people movement across the bridge in order to allow businesses to have a reasonable ability to schedule meal service, bus tours, and passenger pickup.

### Comment 36

Failure to enforce current human-bear distance requirements contradicts the need to improve visitor and employee safety through an elevated bridge and boardwalk.

### Representative Quote

It is unclear how many of the details included regarding research on bear behavior at Brooks relate to assessing the consequences of the alternatives considered.
The park currently takes a lax approach to implementing and enforcing the existing distance regulations at Brooks River - for example, management has recently elected to limit enforcement of a 50 m minimum distance standard between people and bears only to the very narrow subset of situations involving a bear actively eating a fish. Failure to enforce a more broad distance requirement clearly contradicts the suggestion in the purpose and needs section of the Draft EIS that there is a need to improve visitor and employee safety.

### NPS Response

The NPS enforces regulations in a considered and careful manner. We are always looking for ways to improve and welcome suggestions either informally or through the annual compendium process.

## OTHER NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) COMMENTS

### Comment 37

The timing of the EIS comment period during the Alaska field season did not allow sufficient time for comments from some interested parties. The comment period should be extended or reopened.

### Representative Quote

I respectfully request that the NPS extend or reopen the comment period on the Brooks River Visitor Access Draft EIS for an additional 30 days. The 60-day comment period is not sufficient to fully analyze the draft EIS and provide useful information to the NPS. Importantly, the comment period overlapped with much of the field season in Alaska, which for many potential commenters, severely reduced the effective time period for preparing meaningful comments.

### NPS Response

All commenters that requested an extension to the 60-day public comment period submitted comments on the draft EIS within that time frame. No individuals or groups indicated that they could not comment on the DEIS due to the length or seasonality of the comment period. The comment period was not extended for these reasons.

### Comment 38

The use of tiering in the EIS is not consistent with NPS guidance.

### Representative Quote

The application of the concept of "tiering" in the new draft EIS is not consistent with NPS guidance... The DO-12 handbook indicates tiering from an existing EIS is applicable only when doing so from ". . . a large scale plan that determines broad direction, such as the

GMP, [when] information can be less detailed and site-specific, because decisions are made on a gross scale (NPS, DO-12 Handbook; 73 CFR 61292, October 15, 2008). Even if one were to argue that this guidance could apply to specific elements of a large project, this argument clearly does not apply in the case of this draft EIS. The elevated bridge and indefinite period of camp operation on the north side (among other elements) are outside the scope of the preferred alternative identified in the 1996 EIS.

### NPS Response

The *Brooks River Visitor Access DEIS* is not tiering from the 1996 *Brooks River Development Concept Plan* but amending the access portion of that plan through this EIS. The NPS has used tiering in conjunction with the 1996 DCP for the maintenance facility and utilities replacement and housing relocation projects that were conceptually considered and approved through the DCP. The maintenance facility and utilities replacement and housing relocation project EAs tiered from the DCP and were used to site facilities in the DCP's designated development area.

### Comment 39

In the cumulative impact analysis section it is expected that visitation at Brooks Camp would not substantially change over the time frame analyzed. This statement cannot be justified because the bridge and increased commercial operations will likely encourage more visitation and because of increased exposure of Brooks Camp in the media.

### Representative Quote

In the Cumulative Impact Analysis section of this EIS it states "For the cumulative impact analysis it is expected that visitation at Brooks Camp would not substantially change over the time frame being analyzed." What is this time frame? How can this statement be justified since for 1) the proposed elevated boardwalks and bridge would most likely encourage visitation due to ease of access, 2) during the 2012 season a web cam was installed and its web site has had remarkable visitation and interest by the public, 3) during the 2012 season the British Broadcasting Corporation (BBC) has been producing a production about the brown bears of Katmai, and in particular at Brooks Camp with a release date within the next year,4) this EIS's own statements about the increased visitation since the passing of the DCP and its statements that increased commercial operations are likely to occur?

### NPS Response

It is unclear what effect the new bridge will have on visitation. Overnight use is not expected to increase. Currently, both the lodge and the campground are booked nearly a year in advance and are full. Day use is weather-dependent and often unpredictable. More viewing opportunities along the elevated boardwalks may alleviate pressure to get to the lower platform at the mouth of the river or to Brooks Falls to view bears.

The new webcam installed this year through a partnership with the Annenberg Foundation through www.explore.org has reached tens of thousands of virtual park visitors who have enthusiastically welcomed this opportunity to view bears feeding on salmon at Brooks Falls and in the Brooks River. The overwhelming response the park has received is of the nature of "I know I may never make it to Katmai, but I really appreciate being able to see the bears." Whether the webcam will increase visitation remains uncertain, but it certainly has generated a profound appreciation for bears and for the NPS mission.

### Comment 40

The NPS inconsistently claimed in a previous NEPA document that unfunded projects are outside the scope of a NEPA analysis, but in this EIS consider moving the camp in an unspecified time frame as a foreseeable future action within the scope of the EIS.

## Representative Quote

In fact, in responding to public comments on the Brooks Lake Maintenance Facility EA (FONSI, 2007) that expressed concern about a likely future proposal to construct an elevated bridge, the NPS stated that "There are no current plans to construct a new bridge across the Brooks River, so this speculation was left out of the EA section on reasonably foreseeable future actions and is considered beyond the scope of the EA." The rationale provided at the time for this claim was that no funding had yet been obtained for a bridge and it thus not foreseeable. It is clearly inconsistent, at the least, for the NPS to claim in a previous NEPA document that unfunded projects are outside the scope of a NEPA analysis, but then claim in this draft EIS that moving the camp in an unspecified time frame is a foreseeable future action within the scope of the EIS.

## NPS Response

The elevated bridge and boardwalk system for the Brooks River area were not included as a reasonable foreseeable future action in prior environmental assessments because NPS had not considered a bridge and boardwalk system through a NEPA process. The NEPA criterion for including projects or activities in a cumulative analysis is that they be reasonably foreseeable future actions. The incremental impacts of past, present and reasonably foreseeable future actions determine the cumulative analysis on any individual resource or activity. The NPS has not been inconsistent in its approach for including specific projects in a cumulative analysis. The NPS considers projects reasonably foreseeable when a decision is made through a NEPA process to select a project or action for implementation.

## Comment 41

Alternatives in this EIS differ from the DCP preferred alternative by continuing aircraft and boat access on the north side of the river rather than managing the north side for bear use only. If the NPS continues to contemplate an elevated bridge, then NPS must prepare an EIS that fully evaluates this action.

## Representative Quote

In addition, there are other changes in the new draft EIS from the preferred alternative identified in the 1996 EIS that are quite substantial and warrant more comprehensive analysis. Specifically, the draft EIS indicates that the NPS is now proposing to continue aircraft and boat access on the north side of the river long-term rather than managing the north side as an area predominantly for bear use only.

If the NPS continues to contemplate an elevated bridge and indefinite time frame for operation of a substantial portion of the camp in its current location, then the Service must prepare an EIS that fully evaluates this action, along with a reasonable range of alternatives (versus just a new elevated bridge not previously contemplated in the preferred alternative of the 1996 EIS).

## NPS Response

The *Brooks River Visitor Access EIS* proposes to amend the access portion of the 1996 *Brooks River Development Concept Plan EIS and* Record of Decision. The NPS has provided a thorough analysis of the access modifications in this EIS.

The NPS realizes that the ultimate impact to the Brooks River area includes implementation of the DCP plus any potential modifications to the plan resulting from this EIS process including maintaining aircraft and boat access on the north side of the river. The cumulative impact analysis for the no-action alternative (and action alternatives) includes implementation of the decisions resulting from the 1996 Brooks River Area DCP and analysis of their environmental effects. These cumulative analyses inform how the Brooks River environment would be affected under the no-action alternative with full DCP implementation and action alternatives with an amended DCP resulting from this NEPA process.

### Comment 42

This EIS and previous compliance documents segment connected projects. If the NPS believes that conditions have changed such that the preferred alternative from the DCP is no longer viable, then the NPS must prepare a single EIS that analyzes the preferred action for future development and management at Brooks River along with a reasonable range of alternatives.

### Representative Quote

The NPS has inappropriately segmented connected projects into several separate EAs and this draft EIS. For example, the draft EIS discusses that the proposed bridge and boardwalk "… would serve to provide an electric connection between Brooks Camp and the Valley Road Administrative Area." and that "… some of the utility systems on the north side of the river need to be connected until the phased relocation is complete." By inappropriately segmenting aspects of the larger overall action into smaller pieces that were and continue to be analyzed in separate NEPA documents, the potential impacts have not been adequately assessed. The draft EIS is clearly another case of inappropriate segmenting of connected projects, rather than a tiered NEPA analysis as the NPS claims. If the NPS believes that conditions have changed such that the preferred alternative identified in the 1996 is no longer viable, then the NPS must prepare a single EIS that analyzes the Service's preferred action for future development and management at Brooks River along with a reasonable range of alternatives (rather than a number of piecemeal connected NEPA analyses of limited components of an overall and changing larger action).

### NPS Response

The NPS has not inappropriately segmented connected action into separate NEPA documents. This EIS proposes an amendment only to the access portions of the 1996 DCP. The NPS has used tiering in conjunction with the 1996 DCP for the maintenance facility and utilities replacement and housing relocation projects that were conceptually considered and approved through the DCP. The maintenance facility and utilities replacement and housing relocation project EAs tiered from the DCP and were used to site facilities in the DCP's designated development area.

### Comment 43

Alternatives that seek to minimize the potential impacts of an elevated bridge through design are missing from this plan.

### Representative Quote

Also, none of the alternatives considered seeks to minimize the potential impacts of a potential elevated bridge. For example, none of the alternatives seeks to minimize the size of the structure and components that could result in increased human presence and potential impacts due to presence of people and vehicles overhead (for example minimizing turnouts/potential "viewing" sites along the proposed bridge).

### NPS Response

The impacts of an elevated bridge have been considered in all of the EIS action alternatives. Some alternatives that were considered, but dismissed, were eliminated from further consideration specifically because of their negative impacts. The proposed preferred alternative was selected in part because it is believed to have the least visual impact. Other mitigation measures that will be considered to reduce potential impacts due to the presence of people and vehicles include making the 42" high guardrail partially solid in some locations instead of an open rail and using bridge decking material and installation details to reduce the noise from vehicles. The EIS has assessed the potential impacts from the pullouts and viewing nodes as shown on the alternative drawings, though the final design may include fewer pullouts and viewing areas.

## Comment 44

The preferred alternative of the DCP needs to be analyzed as a reasonable alternative as required by CEQ regulations. The no-action alternative in this EIS identifies future conditions in the Brooks River area if no major changes to facilities or management occur. The no-action alternative should reflect that the DCP is being implemented.

## Representative Quote

Doesn't the Preferred Alternative of the DCP need to be analyzed as a reasonable alternative as required by CEQ regulations 1500.2 (c), 1502.14 (a), 1508.25 (a) (1)(iii), (a) (2), (a)(3), (c) (2)? Wouldn't including implementation of the DCP Preferred Alternative as the No-Action Alternative or as a reasonable alternative be the best way to analysis the environmental consequences of the proposed action and is required due to CEQ regulation 1502.16 (c)?

## NPS Response

Evaluating the action alternatives against the environment as it exists today provides a benchmark for impact analysis. The no-action alternative in the DEIS represents a continuation of the existing situation that includes maintaining seasonal use of the floating bridge across the Brooks River. The no action alternative sets the baseline of existing impacts against which to compare impacts of the action alternatives. It does not include the selected alternative from the 1996 *Brooks River Development Concept Plan* (DCP) because specific elements of the DCP are scheduled to occur over a 15+ year timeframe with the relocation of Brooks Camp (lodge, campground, and housing) anticipated to occur at the end of this timeframe. The major element of the action alternatives (elevated bridge and boardwalk system) would occur well in advance of the relocation. Prior to relocation, impacts of the elevated bridge and boardwalk will occur to conditions as they exist today.

## Comment 45

The NPS is prejudicing alternative selection before making a decision by including an elevated boardwalk / bridge and floatplane access on north side of Brooks River in all action alternatives.

## Representative Quote

Wouldn't the sections on the Need that says "Provide dependable access…" (in other words dependable access for NPS and lodge employees from the new housing area on the valley road) and "Operations - connect infrastructure utilities" be a violation of CEQ regulation 1502.2 (f) "Agencies shall not commit resources prejudicing selection of alternatives before making a final decision (1506.1)." Wouldn't since all Action Alternatives include an elevated boardwalks and bridge wouldn't there be prejudice in selection of an Action Alternative?

Isn't retention of floatplane and boat access on the north side of Brooks River common to all Action Alternatives, the No-Action Alternative and even both alternatives considered but rejected? As such doesn't it violate CEQ regulation 1502.2 (g) "Environmental impact statements shall serve as a means of assessing the environmental impacts of proposed agencies actions rather than justifying decisions already made."?

## NPS Response

The NPS has considered potential access alternatives and has proposed a bridge/

boardwalk with floatplane access on the north side of the Brooks River as the approach that best meets the project's purpose and need as identified in chapter 1 of the EIS. Other alternatives were considered (intensive bear management and a suspension bridge) but were dismissed from further consideration.

### Comment 46

The impacts of Alternative 1 (no action) on bears should be compared to the impacts of Alternative 4 on bears in the Brown Bears impact topic.

### Representative Quote

In the Brown Bears impact topic it states in part that alternative 4 when compared to alternative 1 would benefit brown bears from the removal of the floating bridge and a reduced potential for ground level human-bear interaction. In this case shouldn't it be stated that alternative 1 when compared to alternative 4 would benefit brown bears because there would be no elevated boardwalks and bridge, and no impact from notable distance reduction of overhead human activity above bears and bear habitat, no increase in visual and audio exposure of human activities, and no disturbance to bear habitat in the project area with construction related activities and noise? Shouldn't there be mention of the impacts on bears from alternative 4 that would result from all the viewing pullouts on the elevated boardwalks and bridge that would not occur in alternative 1? Shouldn't there be mention of the impacts on bears from alternative 4 that would occur due to more or less continual crossings when bears are present close by compared to the very structured controlled crossings of the floating bridge when bears are close by? Because of these adverse impacts related to alternative 4 compared to alternative 1 wouldn't the adverse impacts associated with alternative 4 compared to alternative 1 be greater or at least equal? Shouldn't alternative 1 be considered the Preferred Alternative in light of the above facts and if not why?

### NPS Response

The no-action alternative must be fully analyzed in all EAs and EISs. The no-action alternative is usually a viable alternative, but even when it is not, it sets a baseline for comparing the impacts of existing actions with those of proposed alternatives. This method indicates how the environment will change from existing conditions with the potential implementation of an alternative and provides a means to compare impacts across alternatives. The reverse comparison (no-action to the proposed alternatives) does not provide a useful impact comparison.

## OTHER TECHNICAL COMMENTS

### Comment 47

The EIS does not contain sufficient details about the boardwalk system, such as how many piles are needed to support the boardwalk and whether support wires similar to those on the current boardwalk be used.

### Representative Quote

When it states that the "bridge would be built using techniques similar to the boardwalk system" there are not very specific details about the boardwalk system. How many piles are needed to support the boardwalk? Are there wires going into the ground to support the boardwalk and bridge similar to the current boardwalk to the falls platform?

### NPS Response

The boardwalk spans are projected to be 12 feet, but may be increased to 24 feet, if feasible. There would likely be two piles at the end of each span. The piles supporting the boardwalk and the bridge would be driven into the ground, which is anticipated to eliminate the need for cable cross bracing as now occurs on the existing boardwalks that are constructed with post and pad foundations. If cross bracing is determined to be structurally necessary it would only occur between the paired piles at each bay and would not be parallel to the bridge or boardwalk.

## Comment 48

The purpose statement incorrectly states that the 1996 DCP calls for a phased relocation of Brooks Camp facilities when construction occurs in one phase in the DCP preferred alternative.

## Representative Quote

In the Purpose Statement it incorrectly says "This project is intended to facilitate the phased relocation of Brooks Camp facilities and operations to the south side of Brooks River as called for in the 1996 Brooks River Area-Final Development Concept Plan and Environmental Impact Statement (NPS 1996). In fact the DCP states in Table A-6: Alternative 5: Proposed Action "…that most of the construction would occur in one phase…"

## NPS Response

The Record of Decision for the Final Environmental Impact Statement, Development Concept Plan for the Brooks River area indicates that implementation of the proposed action (alternative 5) will be phased as funding becomes available. The DEIS text in the purpose statement (page 3, paragraph 1) is revised to provide the appropriate citation.

## Comment 49

The EIS states that bears often climb onto the floating bridge when this is a very rare occurrence.

## Representative Quote

This EIS state that bears often climb onto the floating bridge, but in fact isn't it true that this is a very rare occurrence (Katmai Bear Management Report Forms)?

## NPS Response

Bears regularly climb onto the ramps that are the ends of the bridge. This has been clarified in the text.

## Comment 50

The EIS incorrectly states that Brooks Camp Policy requires people to maintain a distance of 50 yards from bears. 36 CFR sec. 13.1206 requires humans maintain 50 yards from bears in the entire park, not only Brooks Camp.

## Representative Quote

P. 3 “The NPS Brooks Camp policy requires people maintain a distance of 50 yards from brown bears” This is incorrect, the 50 yards comes from a regulation that applies to the entire park and is not specific to Brooks Camp. It also states that people cannot approach a bear within 50 yards.

## NPS Response

The text of the EIS has been revised to address this comment.

## Comment 51

The EIS implies that alternative 4 will reduce human-bear interactions along the Brooks River corridor when the alternative only applies to a small section of the lower river where the bridge is located.

## Representative Quote

P. 53 "However, when compared to alternative 1, brown bears would benefit from the removal of the floating bridge, a reduced potential for ground level human-bear interactions along the Brooks River corridor?" This statement is misleading and implies that this will reduce ground level interactions along the Brooks River corridor and in fact this only applies to a small section of lower river where the bridge is. There is and will continue to be ground level human bear interactions in the rest of the river corridor and Brooks camp area.

### NPS Response

The text of the EIS has been revised to address this comment.

### Comment 52

The EIS overstates the frequency of bears climbing on the floating bridge and the ratio of human-bear conflicts at the corner area to the rest of the Brooks River corridor.

### Representative Quote

On P. 7 under Need and then Improve safety, it states that "Visitor and employee safety needs to be improved to reduce the risk of human-bear conflicts where brown bears concentrate near the mouth of Brooks River-the center of bear viewing activity. Bears often swim along and climb onto the floating bridge, barge road, and docking area. The human-bear conflicts with visitors accessing the floating bridge, landing the barge, and trucking materials along the barge road are numerous, dangerous, and time consuming for NPS and lodge employees, contractors, and the public."
This statement contain things that not accurate. Bears do not "often" climb onto the floating bridge, it has occurred but very infrequently. The lower river is the center of bear viewing activity in the fall and the Falls in July. I would disagree that the human-bear conflicts are more numerous in the lower river than elsewhere in the area, especially between anglers and bears in the river. The "corner" area may have more documented cases merely because that is where the rangers are and are able to see and document such things. There is much less ranger presence on the river, on the falls trail, on the roads and at Brooks Lake so that human-bear incidents may not be recorded or reported in those areas. I would also disagree that the area is any more dangerous than any other area in the Brooks River corridor. The entire area has a high density of brown bears and I have seen much closer encounters between bears and humans on the falls trail, with anglers in the river, on Naknek beach and people are less likely to abide by the distance regulation in areas with a lower presence of rangers. Whereas the area around the bridge is managed by rangers and so people are generally further away from bears and also in larger groups (arguably safer).

### NPS Response

Bears regularly climb onto the ramps that are the ends of the bridge. This has been clarified in the text. The bridge and lower river area are where most visitors with limited mobility will encounter bears at ground level. While NPS records are more complete for the lower river area, it is clear that the number of people crossing and the concentration of bears along the river make this an area with high potential for human-bear conflicts. The text has been modified to reflect the uncertainty of the information.

### Comment 53

The heavy concentration of bear trails and bedding sites existing in the proposed elevated bridge and boardwalk (page 67) seems largely overlooked and is not mentioned when evaluating the impacts of the boardwalks into these areas.

### Representative Quote

Ground survey results indicate heavy concentration of bear trails and bedding sites existing in the proposed elevated bridge and boardwalk This seems largely overlooked and is not mentioned when evaluating the impacts of the boardwalks into these areas.

### NPS Response

The alignments were designed to pass through any areas with bear bed concentrations as quickly as possible, and are mostly routed through open areas because this reduces the amount of intrusion into bedding areas. It is expected that areas along the spit and the corner would see increased bed use with lower human activity under the alternatives that abandon those locations. A figure identifying bear beds and heavily worn bear trails in the lower river area has been added to the FEIS.

## Comment 54

In contrast to the statement on page 103, the floating bridge does not contribute to human-bear interactions more than other portions of the Brooks River Corridor.

## Representative Quote

P. 103 "The fact that the floating bridge is at ground level also contributes to higher opportunities for human-bear interactions." I do not see how this contributes to higher opportunities for human bear interaction that is different than any other areas where people are on the ground like the falls trail, the river itself. I think there are far more dangerous and close interactions between bears and anglers on the river as mentioned on P. 104 "Another major safety concern involves recreational anglers coming into contact with bears in the waters of Brooks River or on its banks." The rest of the river is also an "important feeding ground for bears"

## NPS Response

The text of the EIS has been modified to address this comment.

## Comment 55

The EIS incorrectly states that pilots are prohibited from inadvertently disturbing bears within 50 yards. The CUA stipulation prohibiting pilots from operating within 100 yards of a bear was removed in 2007, leaving pilots subject only to the regulation that visitors not approach bears within 50 yards.

## Representative Quote

P. 72. "To help minimize such impacts, all floatplane pilots are prohibited from inadvertently disturbing bears within 50 yards." This statement is incorrect, there is no regulation prohibiting this. As mentioned previously, through 2006, there was a stipulation included in the Commercial Use (CUA) stipulations that "Landing, taking off or taxiing within 100 yards of visible bears, moose or caribou is not permitted" and this was removed in 2007. The distance regulation can be applied but again only to approaching bears, so planes can technically taxi away from the beach with a bear behind them.

## NPS Response

The text has been revised to indicate that floatplane pilots are prohibited from approaching bears within 50 yards.

## Comment 56

The EIS incorrectly states the allowable distance between humans and bears.

## Representative Quote

P. 71 par. 3 "Like all other visitors, anglers too must maintain the 50-yard separation from bears." This is incorrect, (see comments P. 3)

## NPS Response

The text has been revised to indicate that to continuing to engage in fishing within 50 yards of a bear is prohibited.

## Comment 57

Page 71 of the EIS incorrectly states that NPS rangers use rubber bullets to haze bears along pedestrian routes. Rangers most commonly haze bears in the corner area and do not use rubber bullets.

### Representative Quote

P. 71 par. 1 "When bears cause substantial delays along pedestrian travel routes, NPS staff resorts to the use of hazing techniques (e.g., rubber bullets). "This in inaccurate, bear management staff most commonly hazes bears in the corner area and rubber bullets are not used and this is also a relatively new policy change.

### NPS Response

In response to this comment, we have removed the reference to rubber bullets.

### Comment 58

Lighting on the bridge could potentially alter the behavior of bears and limit their access to the food source.

### Representative Quote

P. 17 par. 1 Do you mean "by designing and installing the minimum level of light sources needed for staff safety" that there will be lighting on the bridge and boardwalk? Is this included in the impact analysis on wildlife? I disagree with putting lights on a structure over an area where bears feed especially since I have observed bears that are not habituated to humans come to the river late in the evening. Having lights could potentially alter the behavior of bears and limit their access to the food source.

### NPS Response

No lighting would be installed on the elevated bridge. The text of the EIS has been modified to address this comment.

### Comment 59

The EIS incorrectly states that lodge supplies arrive by boat or barge when almost all lodge supplies arrive by plane.

### Representative Quote

Doesn't this EIS incorrectly state that lodge supplies arrive by boat or barge when in fact doesn't almost all lodge supplies arrive by plane?

### NPS Response

Lodge supplies do arrive primarily by plane. The text in the EIS has been corrected to reflect this comment.

### Comment 60

The EIS implies that boats and barges can only land on the south side of Brooks River. However, the NPS barge and other boats land on the north shore when needed.

### Representative Quote

P.3 Intro: "Supplies for the concession operation and park administrative facilities arrive via barge or boat to a landing site at the mouth of Brooks River, on the south shore just 750 ft. along a riverside access route from the bridge." This statement implies that boats and barges can only land on the south side. The NPS barge lands on the north shore when needed, as do many other boats. Also, I have seen the concession bring in supplies predominantly by plane.

### NPS Response

The EIS text has been revised to address this comment.

### Comment 61

The EIS incorrectly states that emergency response time is delayed because the emergency boat is stored further from the camp area. A zodiac boat has been stored in Brooks Camp for emergency response.

### Representative Quote

P. 56 Alternative 4. "delays in emergency response time associated with the storage of emergency boat access further from the camp area" This is not entirely true as there has been a zodiac boat stored in brooks camp for emergency response for the last couple of years.

### NPS Response

The text of table 4 and chapter 4 has been revised to address this comment. When the total move of Brooks Camp is completed limited emergency equipment (i.e., rescue skiff and medical supplies) would remain on the north side of the river.

### Comment 62

The EIS does not analyze the impact of floatplanes, boats, or barges in the visual resource section.

### Representative Quote

P. 105 Visual resources/scenery. Why is there is no mention of float planes and boats that affect visual resources? Float planes, sometimes 15 or more, line Naknek beach and there are several boats (predominantly NPS) in the boat cove. The large NPS barge, the Q'tirvik is also stored in the current barge landing site over winter and is moved, dependent on lake levels, in the spring/summer.

### NPS Response

Large numbers of float planes are rarely present for long periods of time at Brooks Camp and their visual impact is intermittent and expected, which is different than the visual impact of a permanent structure in this setting. Furthermore, no actions in any of the alternatives would have an effect on the level of visual intrusion from the float planes, since the planes can only be seen from the bridge during take-off and landing and that would not change if the bridge was raised. In the action alternatives, NPS boats would be moved away from the cove area. For these reasons, no text was added to address the visual effect of floatplanes and boats in the impact analysis of the alternatives. A sentence was added to the "Visual Resources/Scenery" section of the Affected Environment, however, to acknowledge the presence of floatplanes on the beach of Naknek Lake and boats at the cove.

### Comment 63

The EIS states on page 27 that a purpose of ramps from the elevated bridge would be to provide anglers and other visitors access to Brooks River, then contradicts this statement by stating that the Corner would be rehabilitated and restored and its use reserved primarily for bears.

### Representative Quote

P. 27 "A secondary purpose of these ramps would be to provide anglers and other visitors access to Brooks River." This contradicts the implication that the "corner" area will become an "undisturbed and buffered area for bear resting or movement near the river mouth"

P. 27, last par., states "the Corner would be rehabilitated and restored and its use would be reserved primarily for bears" and yet in other parts of the document, its states that there will be emergency ladders to provide anglers and other visitors access to the Brooks River in this same area. This "corner" area is currently a popular fishing area for both visitors and employees and its proximity to Brooks camp also means people frequently walk down the beach towards the point and corner area so I do not see how it will be reserved primarily for bears unless it is closed to human traffic.

### NPS Response

The trail to the Corner would be rehabilitated and vegetation management in the corner area would cease. Anglers would most likely access the north side of the river by walking the Naknek Lake beach, by entering the river at the oxbow overlook and working their way downriver, or by accessing the river from the south side via egress ramps.

### Comment 64

There is not enough information in the construction schedule (page 26) or elsewhere in the EIS on how long each phase of the construction project will take, what equipment will be needed, number of crew and timing of projects to fully evaluate the impacts of each alternative.

### Representative Quote

P. 26 There is not enough information in the construction schedule or anywhere in the EA on how long each phase of the construction projects will take, what equipment will be needed and utilized, number of crew and timing of projects (late fall is not specific) to fully evaluate the impacts of each alternative. Specifically "Any work that needs to occur during the summer season would be scheduled for the periods of lowest bear and visitor activity" does not give sufficient information to evaluate the environmental impacts of the construction activity. Does this imply that no construction will take place in July and September to mid Oct? Also, p. 26 par. 3 states "Much of the construction is scheduled for late fall and early spring to avoid periods of peak bear numbers, (peak bear use in the fall is generally September to mid-October) and then prior to that in par. 2 it states "construction of the barge landing, road, and parking area would most likely start in fall (September)". These are contradictory statements.

### NPS Response

The construction proposed in the EIS would be performed as individual projects and would be subject to available funding.

The construction of the barge landing and access road would likely begin in the summer with mobilization of equipment and materials and processing of gravel at the 5-mile pit. On-site work on the road or landing area would be performed after or before the visitor season when the lodge and campground are closed. It is expected that construction, including mobilization and demobilization, would occur over two calendar years. The contractor would be allowed to establish a temporary construction camp at Squirrel Camp. Anticipated construction equipment would include heavy construction vehicles as is typically required for road building.

The construction of the bridge and boardwalk would likely occur some years after completion of the barge landing project. The anticipated construction schedule for the bridge and boardwalk would include mobilization of equipment and material in the summer when lake levels are sufficient and most of the work would occur outside of the visitor season. Onsite work may commence after the end of the visitor season; however, work near the river would not begin until mid-October when bear activity along the Brooks River is substantially lower. Work would proceed as weather permits. Heavy construction work (pile driving, etc.) would not occur during the visitor season or periods of high bear activity. Light construction may proceed through the visitor season, but would be limited to activities that generate little noise and may include construction of guardrails, ladders, etc. It is expected that construction, including mobilization and demobilization, would occur over three calendar years. The contractor would be allowed to establish a construction camp at Squirrel Camp. Anticipated construction equipment would include heavy construction vehicles including pile driving equipment.

The EIS has been revised to address the schedule.

### Comment 65

Figure 14 does not adequately explain the visitor use increase. The EIS should replace the term "visitors" with "visitor days."

## Representative Quote

The increase in visitor use suggested in Fig. 13 of the draft EIS beginning in 2003 is not adequately explained and appears to be likely an artifact of data collection, management, and analysis. In fact, the "increase" beginning in 2003 coincided with a change in supervision of the interpretive division at Brooks River, which maintains records of visitor days associated with contacts through the visitor center and campground stays. Also, the EIS should be revised to refer to "visitor days" versus "visitors", as this is the actual metric that has been documented.

## NPS Response

The NPS has not documented a reason for the increase in visitation in 2003; however, the circumstance presented in the comment is a plausible contributing factor for this observed change. The text has been revised to correct the references to figure 14. The bars represented in this graphic are "visitor days," and the red line above represents total visitors.

## Comment 66

The final EIS should include a smaller scale map depicting the proposed barge landing site and elevated bridge/walkway in relation to the current Brooks Camp site, Beaver Pond, the Beaver Pond terrace proposed development site, and the mouth of the Brooks River.

## Representative Quote

Page 36, Barge Landing and Access Road. We request the final EIS include a smaller scale map depicting the proposed barge landing site and elevated bridge/walkway in relation to the current Brooks Camp site, Beaver Pond, the Beaver Pond terrace proposed development site, and the mouth of the Brooks River.

## NPS Response

Figure 3 has been replaced with a new graphic with a smaller scale map.

## Comment 67

On Map 1 (p. 5) park lands need to be corrected to include all islands within five miles of the mainland and that the park boundary should not depicted waters beyond the mean high tide as being owned by the NPS.

## Representative Quote

Page 5, Map 1. Please note that all islands within 5 miles of the mainland are included in the park. The water and submerged lands seaward of the coasts, beyond the mean high tide line, are not included. We request this be depicted on the map.

## NPS Response

Map 1 has been revised as suggested.

# LIST OF AGENCIES, ORGANIZATIONS, BUSINESSES, AND PUBLIC OFFICIALS RECEIVING A COPY OF THIS DOCUMENT

## FEDERAL AGENCIES

Advisory Council on Historic Preservation
Alaska Public Lands Information Center
Bureau of Land Management,
  Anchorage Field Office
Environmental Protection Agency,
  Region 10
National Marine Fisheries Service, Alaska
  Region, Habitat Conservation Division
U.S. Army Corps of Engineers,
  Regulatory Branch
U.S. Department of the Interior, Office of
  Environmental Policy and Coordination
U.S. Fish and Wildlife Service
  Ecological Services Office
  Alaska Peninsula / Becharof National
    Wildlife Refuges
  Kodiak National Wildlife Refuge
U.S. Forest Service

## U.S. SENATORS AND REPRESENTATIVES

Congressman Don Young
Senator Mark Begich
Senator Lisa Murkowski

## ALASKA STATE AGENCIES

Alaska Department of Fish and Game
Alaska Natural Heritage Program
ANILCA Implementation Program, Office
  of Project Management
Alaska State Historic Preservation Office

## ALASKA STATE OFFICIALS

Governor Sean Parnell
Representative Alan Austerman
Representative Bryce Edgmon
Senator Lyman Hoffman
Senator Gary Stevens

## ALASKA NATIVE TRIBAL GOVERNMENTS

Igiugig Village
King Salmon Tribe
Kokhanok Village
Levelock Village
Naknek Native Village
South Naknek Village

## BOROUGH AND REGIONAL GOVERNMENTS

Bristol Bay Borough
Lake and Peninsula Borough

## ALASKA NATIVE ASSOCIATIONS, CORPORATIONS, AND GROUPS

Alaska Peninsula Corporation
Bristol Bay Native Association
Bristol Bay Native Corporation
Council of Katmai Descendants
Heirs of Palakia Melgenak
Igiugig Native Corporation
Paug-Vik Incorporated, Limited

## ORGANIZATIONS AND BUSINESSES

Alaska Audubon Society
Alaska Center for the Environment
Alaska Clean Air Coalition
Alaska Coalition
Alaska Conservation Foundation
Alaska Friends of the Earth

Alaska Forum for Environmental Responsibility
Alaska's Lake Cark Inn and Air
Alaska Outdoor Council
Alaska Quality Rights Coalition
Alaska Rainforest Campaign
Alaska Travel Industry Association
Alaska Wilderness League
Alaska Wilderness Recreation & Tourism Association
Alaska Wildlife Alliance
Audubon Alaska, Alaska State Office
Citizens' Advisory Commission on Federal Areas
Defenders of Wildlife
Earthjustice Legal Defense Fund
Katmailand, Inc.
National Parks Conservation Association
National Wildlife Federation, Alaska Office
Natural Resources Defense Council
Resource Development Council
Sierra Club, Alaska Chapter
The Nature Conservancy of Alaska
The Wilderness Society
Trustees for Alaska
Wilderness Watch
Wildlife Conservation Society

## MEDIA

Alaska Newspapers, Inc.
Anchorage Daily News
Bristol Bay Times
KDLG
KIMO Channel 13
KTUU
KTVA
KUTUU Channel 2
KYES TV

## LIBRARIES

Alaska Resources Library and Information Service (ARLIS)
Egan Library, University of Alaska-Southeast
Elmer E. Rasmuson Library, University of Alaska-Fairbanks
Martin Monsen Regional Library
UAA/APU Consortium Library
Z. J. Loussac Public Library

## INDIVIDUALS

A list of individuals who received a copy of this document is on file at park headquarters, King Salmon, Alaska.

# 6

# Appendixes, Selected References, Preparers and Consultants, Index

# APPENDIX A: ALASKA NATIONAL INTEREST LANDS CONSERVATION ACT (ANILCA) SECTION 810 SUMMARY EVALUATION AND FINDINGS

Readers should note that in this appendix *Katmai National Park* only refers to the park, not to the park and preserve.

## BACKGROUND

Subsistence uses, as defined by the Alaska National Interest Land Conservation Act, section 803, defines subsistence uses as follows:

> [T]he customary and traditional uses by rural Alaska residents of wild, renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools or transportation; for the making and selling of handicraft articles out of nonedible byproducts of fish and wildlife resources taken for personal or family consumption; for barter, or sharing for personal or family consumption; and for customary trade.

Subsistence activities include hunting; fishing; trapping; and collection of berries, edible plants, and wood or other materials.

## I. INTRODUCTION

This appendix complies with title VIII, section 810 of the Alaska National Interest Land Conservation Act. It summarizes the evaluation of potential restrictions to title VIII federal subsistence uses that could result from implementing the NPS preferred alternative to improve visitor and employee access within the Brooks River Camp area of Katmai National Park and Preserve. The National Park Service has developed this document for the proposed project.

## II. EVALUATION PROCESS

Section 810(a) of the Alaska National Interest Land Conservation Act states,

> In determining whether to withdraw, reserve, lease, or otherwise permit the use, occupancy, or disposition of public lands . . . the head of the federal agency . . . over such lands . . . shall evaluate the effect of such use, occupancy, or disposition on subsistence uses and needs, the availability of other lands for the purposes sought to be achieved, and other alternatives which would reduce or eliminate the use, occupancy or disposition of public lands needed for subsistence purposes. No such withdrawal, reservation, lease, permit or other use, occupancy or disposition of such lands which would significantly restrict subsistence uses shall be affected until the head of such Federal agency
>
> (1) gives notice to the appropriate State agency and the appropriate local committees and regional councils established pursuant to Section 805;
>
> (2) gives notice of, and holds, a hearing in the vicinity of the area involved; and determines

> that (A) such a significant restriction of subsistence uses is necessary, consistent with sound management principles for the utilization of the public lands, (B) the proposed activity will involve the minimal amount of public lands necessary . . . and (C) reasonable steps will be taken to minimize adverse impacts upon subsistence uses and resources resulting from such actions.

A proclamation by President Woodrow Wilson in 1918 created Katmai National Monument from a reservation of approximately 1,700 square miles. Three major purposes of the monument designation were (1) to preserve an area important to the study of volcanism; (2) to preserve Valley of Ten Thousand Smokes; and (3) to conserve an area potentially popular with persons seeking unique scenery and those with scientific interest. Increased in 1931 to include Lake Brooks, Grosvenor Lake, Lake Colville, and part of Naknek Lake, again in 1942 to include offshore islands within 5 miles of the monument coastline, and again in 1969 to include the remainder of Naknek Lake, the monument grew to contain 4,361 square miles.

With the passage of the Alaska National Interest Land Conservation Act in 1980, the designation of 3.7 million acres of the monument was changed to a national park and an additional 308,000 acres was included as a national preserve. Furthermore, 3.4 million acres of the park and preserve were designated as wilderness. Katmai Preserve was created by the Alaska National Interest Land Conservation Act section 202(2) for the following purposes (among others):

> [T]o protect habitats for, and populations of, fish and wildlife including, but not limited to, high concentrations of brown/grizzly bears and their denning areas; to maintain unimpaired the water habitat for significant salmon populations; and to protect scenic, geological, cultural, and recreational features.

The taking of fish and wildlife for subsistence uses is allowed by the Alaska National Interest Land Conservation Act in Katmai National Preserve pursuant to section 203; however, subsistence activities are not authorized within Katmai National Park.

## III. PROPOSED ACTION ON FEDERAL PUBLIC LANDS

The proposed action involves the installation of two primary boardwalks on the north and south sides of the Brooks River within Katmai National Park each connected by an elevated bridge across the river. The boardwalks would contain a number of viewing/pullout areas, each capable of accommodating between 20-25 people. The existing barge landing would be relocated to an area approximately 2,000 ft south of the existing site and would require the construction of a new access road approximately 1,500 ft in length.

### North Boardwalk

The north boardwalk would start adjacent to the lodge and then continue south through the wetlands for approximately 560 ft. The boardwalk would be at least 10 ft above grade once it clears the area around the lodge. This boardwalk would be 8 ft wide and designed to accommodate both pedestrians and vehicles simultaneously.

The north boardwalk would consist of four viewing/pull out areas. Two would face west and overlook the wetland and Brooks River. Two would be placed on the each side of the north end of the bridge to provide upriver and downriver viewing opportunities.

## Bridge

The bridge would follow the existing alignment of the floating bridge. This bridge would be a wooden short-span bridge, approximately 350 ft in length, with a minimum distance of 24 ft between piles. There would be up to 14 sets of piles in the riverbed. The bridge would be built using the same techniques as the boardwalk system. This bridge would be a minimum of 10 ft above the river.

## South Boardwalk

An 8-foot-wide pedestrian-vehicle boardwalk would cross a wetland south of the southern bridge terminus and then cut west through a wooded area. The boardwalk would follow the edge of the western wetland before ending approximately 100 ft from the existing bus parking area. This boardwalk would be 10 ft above grade and would ramp down to grade as it approaches the bus parking area. This section of boardwalk has an estimated length of 630 ft.

The south boardwalk would consist of three primary viewing/pullout areas. Two would be placed on the each side of the south end of the bridge to provide upriver and downriver viewing opportunities. One would face east and overlook the wetland. Because of the length of the south boardwalk, one to two additional smaller pullout areas may be installed to allow for the safe passage of pedestrians and vehicles.

## Barge Landing and Access Road

A barge landing would be located on the shore of Naknek Lake approximately 2,000 ft south of the existing barge landing. There would be a hardened beach landing ramp (24 ft to 30 ft wide and 170 ft to 240 ft long) and parking for miscellaneous small boats / trailers during the summer operating season. The boat parking area would also be used to overwinter the park's landing craft.

A new access road, approximately 1,500 ft in length, would replace the one proposed in the development concept plan that went around the south side of Beaver Pond. The existing barge landing site and the access road on the south side of the river would be removed and the landscape restored.

# IV. AFFECTED ENVIRONMENT

The preferred alternative would affect a total area of approximately 12 acres as is described in this document. Concerning subsistence resources within the project area, adverse moderate impacts would occur on wildlife and wildlife habitat during project implementation, and a beneficial moderate impact on these resources from elevating pedestrian and small vehicle access across Brooks River and the adjacent wetlands and relocating the barge access away from the mouth of the river.

Naknek Lake and Brooks River provide spawning habitat primarily for sockeye salmon that migrate from Bristol Bay to Naknek Lake and Brooks River. Most of the salmon harvested in the Naknek River system have been produced within Katmai National Park, and many have been produced in the Brooks River / Lake Brooks section of this system. Harvest of salmon generally occurs in Naknek River downstream of the park boundary; however, a limited fishery for "red fish," or spawned-out sockeye salmon, is permitted. This activity is authorized under separate legislation, subsequent to the Alaska National Interest Land Conservation Act at 36 CFR 13.1204 to local residents who are descendants of Katmai residents who lived in the Naknek Lake and River drainage. Other subsistence activities are not permitted in Katmai National Park in accordance with title II section 203, title VIII section 816(a), and title XIII section 1314(c) of the Alaska National Interest Land Conservation Act. However, brown bears, moose, salmon, and other subsistence resources migrate in and around the Brooks River area to other geographic places that permit subsistence activities outside of the park.

Subsistence uses are allowed in Katmai National Preserve in accordance with title II section 203 and provisions of title VIII of the Alaska National Interest Land Conservation Act. Katmai National Preserve, encompassing 308,000 acres, is on the northern end of the Alaska Peninsula in Game Management Unit 9C, and it contains geologic features, scenery, wildlife, and cultural resources of national significance. The Alaska National Interest Land Conservation Act also authorized subsistence uses on adjacent federal public lands managed by the Bureau of Land Management and the U.S. Fish and Wildlife Service.

Subsistence activities in Katmai National Preserve include hunting, trapping, fishing, gathering firewood, picking berries and wild plants, and gathering bird eggs. The area is used for subsistence by residents of Kokhanok, Igiugig, Levelock, Naknek, and King Salmon to harvest caribou, brown bear, moose, beaver, snowshoe hare, fox, lynx, mink, wolf, wolverine, ptarmigan, waterfowl, salmon, trout, berries, wild edible plants, and other wood resources.

Regional subsistence activities include seasonal gathering of wild edible plants and berries, hunting, trapping, and fishing. The main subsistence species are moose, caribou, furbearers, and fish. Subsistence fish include coho, king, and sockeye salmon; northern pike; burbot; Dolly Varden; arctic grayling; lake trout; rainbow trout; and whitefish. Beaver, coyote, red fox, gray wolf, wolverine, river otter, weasel, lynx, marten, mink, and muskrat are important furbearer resources. Subsistence birds include rock and willow ptarmigan, grouse, ducks, and geese.

The National Park Service recognizes that patterns of subsistence use vary from time to time and from place to place depending on the availability of wildlife and other renewable natural resources. A subsistence harvest in a given year may vary considerably from previous years because of weather, migration patterns, and natural population cycles.

## V. SUBSISTENCE USES AND NEEDS EVALUATION

To determine the potential impact on subsistence activities by the proposed installation, upgrade, and maintenance of the bridge, boardwalk, and barge landing site in Katmai National Park, three evaluation criteria were analyzed relative to current subsistence resources that could be impacted.

The evaluation criteria are as follows:

1. The potential to reduce important subsistence fish and wildlife populations by (a) reductions in abundance; (b) redistribution of subsistence resources; or (c) loss of habitat.
2. Potential impacts the action may have on access for subsistence hunters and anglers.
3. The potential for the action to increase competition among hunters and anglers for subsistence resources.

### 1. Potential to Reduce Populations

**(a) Reduction in Numbers.** The proposed project within Katmai National Park is not expected to reduce wildlife species populations. Although about 0.5 acre of wetland habitat and some riparian habitat would be lost because of the construction of the bridge, boardwalks, and barge landing access road in the preferred alternative, with the application of the mitigation measures included in chapter 2 of this document it is expected there would be minimal losses of wildlife that move outside the park and are harvested for subsistence. Natural wildlife population and migratory cycles would continue, and the ongoing regional subsistence pattern would remain unchanged.

**(b) Redistribution of Resources.** The preferred alternative is not expected to redistribute, displace, or stress subsistence wildlife resources. Some individual animals probably would be temporarily displaced during the construction period, but most would be expected to stay in the general area. For example, some individual bears may not use the area during the construction period, but they would still likely stay in the park and preserve. Any such changes would not affect subsistence harvests outside the park.

**(c) Habitat Loss.** The preferred alternative is not expected to cause the loss of beneficial or critical habitat for subsistence species such as salmon, caribou, moose, furbearers, grouse, and waterfowl. The construction of the bridge, boardwalks, and barge landing road in the preferred alternative would result in the loss of approximately 0.5 acre of wetland habitat. However, such impacts would be minor to moderate and localized and would not result in the loss of key habitat. Provisions of the Alaska National Interest Land Conservation Act, the Federal Subsistence Board, and NPS and ADF&G regulations and policies provide for the adequate protection of fish and wildlife populations within Katmai National Preserve while ensuring a subsistence priority for local rural residents.

### 2. Restriction of Access for Subsistence Hunters and Anglers

Under all alternatives, access to subsistence uses in Katmai National Preserve is not expected to be limited or restricted. None of the alternatives propose changes to access regulations.

### 3. Increase in Competition for Subsistence Resources

The preferred alternative is not anticipated to result in increased competition for fish, wildlife, and other subsistence resources on federal public lands. Provisions of the Alaska National Interest Land Conservation Act, the Federal Subsistence Board, and NPS and ADF&G regulations provide the tools for adequate protection of fish and wildlife populations while ensuring a subsistence priority for local rural residents.

## VI. AVAILABILITY OF OTHER LANDS

The preferred alternative is site-specific to Katmai National Park and requires the use of federally managed lands within the Brooks River area. Subsistence users have access to and use other lands within the region for subsistence activities.

## VII. ALTERNATIVES CONSIDERED

Descriptions of other alternatives considered are in chapter 2 of this document.

## VIII. FINDINGS

This analysis concludes that the NPS preferred alternative (alternative 4) would not result in a significant restriction of subsistence uses.

# APPENDIX B: STATEMENT OF FINDINGS FOR FLOODPLAINS AND WETLANDS

**Brooks River Visitor Access**
**Environmental Impact Statement**

National Park Service
Katmai National Park and Preserve

**Recommended:** ____________________________________________
Superintendent Date

**Concurred:** ____________________________________________
NPS Water Resources Division Date

**Approved:** ____________________________________________
Alaska Regional Director Date

## 1.0 INTRODUCTION

Executive Orders 11988, "Floodplain Management" and 11990, "Protection of Wetlands" require the National Park Service and other federal agencies to evaluate the likely impacts of actions in floodplains and wetlands. NPS Director's Order #77-1: *Wetland Protection and Procedural Manual #77-1* provides NPS policies and procedures for complying with Executive Order 11990, and NPS Special Directive 93-4, "Floodplain Management Guideline" provides NPS procedures for complying with Executive Order 11988. This "Statement of Findings" (SOF) documents compliance with these NPS wetland protection and floodplain management procedures.

The National Park Service is proposing to improve visitor access and resource protection within the Brooks River area of Katmai National Park. The project would involve the replacement of the Brooks River floating bridge and access trails with an elevated bridge and boardwalk system. The National Park Service is also proposing to relocate the existing barge landing site and access road to a location away from the mouth of the Brooks River.

## 2.0 NPS PREFERRED ALTERNATIVE

The preferred alternative involves the installation of two primary boardwalks on the north and south sides of the Brooks River within Katmai National Park and Preserve, each connected by an elevated bridge across the river. The boardwalks would contain a number of viewing/pullout areas, each capable of accommodating 20–25 people. The barge landing would be relocated to an area approximately 2,000 ft south of the existing site and would require the construction of a new access road, approximately 1,500 ft in length.

**North Boardwalk:** The north boardwalk would start adjacent to the lodge and then continue south through the wetlands for approximately 560 ft. The boardwalk would be at least 10 ft above grade once it clears the area around the lodge. This boardwalk would be 8 ft wide and designed to accommodate both pedestrians and vehicles simultaneously.

The north boardwalk would consist of up to four viewing/pullout areas. Two would face west and overlook the wetland and Brooks River. Two would be placed on the each side of the north end of the bridge to provide upriver and downriver viewing opportunities.

**Bridge:** The bridge would follow the existing alignment of the floating bridge. This bridge would be a wooden short-span bridge, approximately 350 ft in length, with a minimum distance of 24 ft between piles. There would be up to 14 sets of piles in the riverbed. The bridge would be built using the same techniques as the boardwalk system. This bridge would be a minimum of 10 ft above the river.

**South Boardwalk:** An 8-foot-wide pedestrian-vehicle boardwalk would cross a wetland south of the southern bridge terminus and then cut west through a wooded area. The boardwalk would follow the edge of the western wetland before ending approximately 100 ft from the bus parking area. This boardwalk would be 10 ft above grade and would ramp down to grade as it approaches the bus parking area. This section of boardwalk has an estimated length of 630 ft.

The south boardwalk would consist of up to three primary viewing/pullout areas. Two would be placed on the each side of the south end of the bridge to provide upriver and downriver viewing opportunities. One would face east and overlook the wetland. Because of the length of the south boardwalk, one to two additional smaller pullout areas may be installed to allow for the safe passage of pedestrians and vehicles.

**Barge Landing and Access Road:** A new barge landing would be located on the shore of Naknek Lake about 2,000 ft south of the existing barge landing. There would be a hardened beach landing ramp (24 ft to 30 ft wide and 170 ft to 240 ft long) and parking for miscellaneous small boats / trailers during the summer operating season. The boat parking area would also be used to overwinter the park's landing craft. A new access road, approximately 1,500 ft in length, would replace the one that went around the south side of the Beaver Pond as proposed in the 1996 development concept plan. The existing barge landing site and the access road on the south side of the river would be removed and the landscape would be restored.

## 3.0 FLOODPLAIN

### 3.1 Site Description

Brooks Camp is part of the Katmai National Park and Preserve and is on the lower Brooks River near Naknek Lake. The Brooks River is roughly 1.5 miles long, and flows from Lake Brooks into Naknek Lake (figure B-1). The proposed activities would be within the estimated 100-year floodplain. Brooks Camp, on the north side of Brooks River, appears to be situated above the 100-year floodplain (NPS 2009).

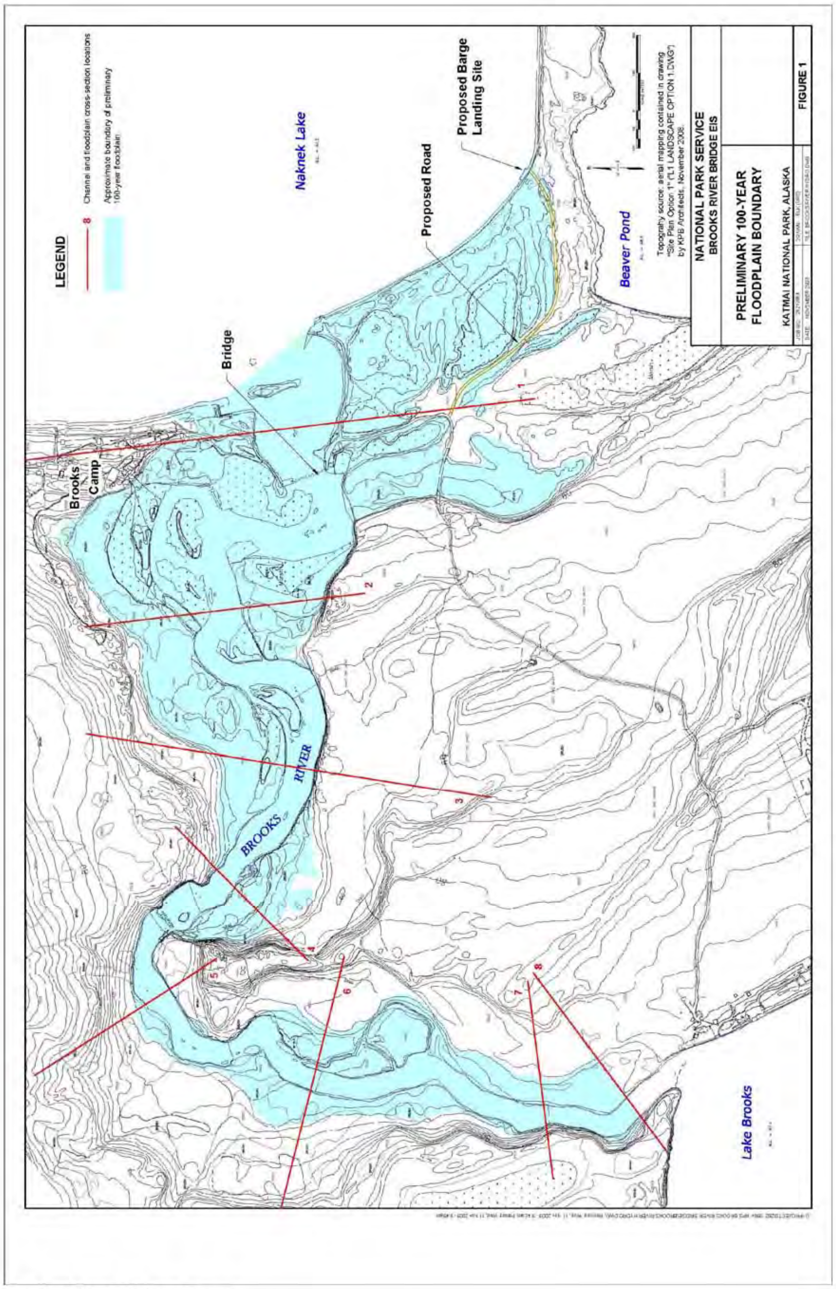
### 3.2 Floodplain Values

Values associated with floodplain use include recreation, such as hiking and sightseeing, as well as wildlife habitat for a diversity of species. Floodplains also play a necessary function in the overall adjustment of a river system. Floodplains influence the hydrology of a watershed by dissipating floodwater energy, and they serve as a temporary storage component for sediment eroded from the watershed.

### 3.3 Nature of Flooding and Associated Floodplain Processes

Lake Brooks accounts for approximately 20 percent of the total Brooks River watershed area. Flooding along Brooks River can result from rain, snow, and spring breakup. A U.S. Geological Survey (USGS) gauging station is on Brooks River at the outlet of Lake Brooks. The gauging station is a partial record station, with only eight discharge measurements on record. There are also no historical flood data available for Brooks River.

Brooks River is characterized as an alluvial river. Brooks River transitions from a relatively steep, confined boulder and cobble bedded channel to a meandering sand/gravel/cobble river as it flows into Naknek Lake. The hydraulics of the flow is generally slowing from a relatively swift, turbulent flow condition in the upper half of the channel to a lower gradient, slower flow condition near Naknek Lake. Flooding would likely cover a wider area in the lower half of Brooks River because the topographic slope is less steep and wider alluvial valley. The Brooks River response to normal hydrologic and geomorphic forces, such as wind waves from Naknek Lake, includes progression of meandering in the lower reach causing some channel migration and riverbank erosion.




Brooks River Visitor Access
Floodplains Statement of Findings
November 2009

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**FIGURE B-1**

## 3.4 Justification for Floodplain Use

### 3.4.1 Rationale for Location in the Floodplain

The proposed bridge and associated boardwalk, as well as the barge landing site and associated access road would have to be in the floodplain. There are no alternative upland sites associated with the river crossing or barge landing.

### 3.4.2 Investigation of Alternative Sites

All alternative sites investigated would also involve facilities being in the floodplain.

## 3.5 Site-Specific Flood Risk

### 3.5.1 Recurrence Interval

Much of the lower Brooks River valley is in the 100-year floodplain. A 100-year flood is defined as the flood elevation that has a 1 percent chance of being equaled or exceeded in any given year. The rate at which flooding occurs would be related to the rate of precipitation and would also be influenced by the presence or absence of ice in the river channel. Flooding associated with precipitation would likely be attenuated because of the size of Lake Brooks and related storage capacity.

### 3.5.2 Hydraulics of Flooding at the Site

Because of the surface roughness (trees, brush, surface undulations) of the floodplain, it is predicted that floodplain velocities will typically be less than 1 foot per second; however, main channel velocities are likely to be as high as 8 ft/s in the upper portion of the reach to as low as 2 ft/s near Naknek Lake. Channel bottom and banks are likely to erode, altering channel patterns and shapes in some areas.

Water depths near the proposed Brooks River bridge and boardwalk during a 100-year flood would range from about 2 ft to 5 ft. Floodplain water depths in near the proposed road and barge landing site would likely be less than 2 ft. Given the relatively wide area inundated across the lower Brooks River valley during a 100-year event, and the small footprint of the proposed improvements, construction of the proposed improvements would likely not affect the base flood elevation.

### 3.5.3 Time Required for Flooding to Occur

Floods are more likely when the water level of Naknek Lake is at its highest. This usually occurs in August and September from spring snowmelt. Although extended rains lasting three or more weeks in August and September may raise the water level of Naknek Lake and Brooks River, the time required for flooding to occur would be at least 24 hours. This is because Naknek Lake, Lake Brooks, and adjacent wetlands have the capacity to temporary store additional water.

### 3.5.4 Opportunity for Evacuation

Depending upon the rate of rainfall for a given event, it is likely that the natural attenuation effect of Lake Brooks would allow sufficient time for evacuation provided that visitors are near the road and trail system in the Brooks River and Camp area. In the event of a 100-year or larger flood, the lower portion of the road between Lake Brooks and the Brooks River footbridge would likely be under water and closed to vehicular traffic after evacuation for public protection. Evacuation would occur by boat to higher ground in the Brooks River area or by floatplane or boat to communities outside the park.

### 3.5.5 Geomorphic Considerations

Brooks River is characterized as an alluvial river that widens in the lower portion near Naknek Lake. Increased bank erosion and channel migration would likely occur during a 100-year flood. Depending upon the occurrence of debris and/or ice jams during a flood, channel and bank erosion could increase.

### 3.6 Floodplain Mitigation

Construction activities in the estimated 100-year floodplain include a new Brooks River bridge and boardwalk, and a new barge landing site and associated access road (figure B-1). It is not anticipated that these facilities would have an impact on the floodplain base elevation. Mitigation and compliance with regulations and policies to prevent impacts to water quality, floodplains, and loss of property or human life would be adhered to during and after the construction. If required, permits with other federal and cooperating state and local agencies would be obtained prior to construction activities. After construction activities are completed, the sites would be returned as close as possible to natural contours; floodplain fill and grading requirements would be minimized. If a flood notification is issued, people within the affected flood area would be evacuated. The area would be closed until the flood event had subsided and authorities deem the area safe for the public to return. The structures and facilities are designed to be consistent with the intent of the standards and criteria of the National Flood Insurance Program (44 CFR Part 60).

### 3.7 Summary

Based on the preliminary floodplain assessment, the Brooks Camp area improvements are within the 100-year floodplain of the lower Brooks River (figure B-1). The estimated water surface elevations associated with the 100-year recurrence interval should be considered preliminary and approximate. The assessment is based on limited available hydrologic and hydraulic data and does not take into account the influence of Naknek Lake storm surge.

Although the location of proposed structures in the flood zone would result in risks from the possibility of flooding, methods to minimize flood damage would be incorporated into the overall design of the facilities. In addition, efforts to protect vegetation in the floodplain would be undertaken as standard procedure during site preparation and construction. Therefore, floodplains would be protected to the maximum extent possible, and potential flood hazards would be minimized.

In accordance with Executive Order 11988 for the protection of floodplains, mitigation and compliance with regulations and policies to prevent impacts on water quality, floodplains, and loss of property or human life would be strictly adhered to during the design, construction, and operation of the proposed improvements to the Brooks Camp area. The National Park Service finds that no long-term adverse impacts on the 100-year designated floodplain would occur from the preferred alternative.

## 4.0 WETLANDS

### 4.1 Description of Affected Wetlands

Thirteen individual wetlands were delineated in the project vicinity in 2009 and 2012 (figures B-2 and B-3) (URS 2009, NPS 2012). The 2012 wetlands delineation focused on determining the extent of wetlands within the footprint of the proposed road route to a new barge landing facility and turnaround/storage area near Naknek Lake, approximately 0.5 mile south of Brooks Camp (NPS 2012). This survey mapped the wetland boundaries more accurately than the 2009 survey. One small wetland (wetland X) also was identified in the 2012 survey that wasn't included in the 2009 survey.

Nonvegetated wetlands in the project area include (1) Brooks River, which is classified as a riverine, lower perennial, unconsolidated bottom, permanently flooded wetland (R2UBH); (2) Naknek Lake; and (3) the beaver pond, which are classified as a lacustrine, limnetic, unconsolidated bottom, permanently flooded wetlands (L1UBH). These water bodies often have aquatic and/or emergent vegetation along the shorelines.

## Wetland A

This wetland is a wet herbaceous meadow in a long, narrow (22 ft) depression between two forested ridges paralleling the proposed barge landing access road route. The vegetation in this wetland is dominated by bluejoint reedgrass (*Calamagrostis canadensis*), followed by marsh horsetail (*Equisetum palustre*). There were individual balsam poplar (*Populus balsamifera*) and white spruce (*Picea glauca*) in the slightly elevated features in the wetland, and they were not considered representative of the wetland vegetation. The only shrub was Bebb willow (*Salix bebbiana*). Soils consist of a 6-inch horizon of fibrous peat, a 6-inch horizon of fine-grained volcanic ash with redox concentrations, and then 9-inch horizon of fibrous organics below the ash layer. Gravel was encountered at the bottom of the test pit The two surveys found saturated soil at 8 to 12 inches below the surface, and standing water was measured at 8 to 16 inches. All three jurisdictional wetland criteria were met. The area was classified as a palustrine emergent persistent, saturated wetland (PEM1B).

## Wetland B

The second wetland along the barge landing access road route was located in the same long, narrow depression as Wetland A, but it is separated from Wetland A by a stretch of uplands. Dominant species included bluejoint (*Calamagrostis canadensis*) and Northwest Territory sedge (*Carex utriculata*). The criteria for hydrophytic vegetation were met. Soils consist of a 6-inch mat of fibrous peat over a 10-inch horizon of volcanic ash. The upper 6 inches of ash had faint redox concentrations, whereas the lower 4 inches did not, suggesting minimal fluctuation in the water level 12 inches below the surface. The primary indicator of wetlands hydrology was saturation of the soil within 12 inches of the surface. There were also small areas of standing water within the observation point. All three jurisdictional wetland criteria were met. The area was classified as a palustrine emergent persistent, saturated wetland (PEM1B) in the 2009 and 2012 surveys.

## Wetland C

Wetland C is a narrow depression on the south side of the proposed barge landing access road route and near an active eagle nest adjacent to the beaver pond. Vegetation in this depression was dominated by Northwest Territory sedge (*Carex utriculata*) and water hemlock (*Cicuta virosa*). The soil profile shows a 4-inch mat of fibrous organics over a 10-inch horizon of fine-grained volcanic ash. Below the ash, the fibrous organics continued to the bottom of the soil test pit. The primary indicator of wetland hydrology was saturation to the surface. There was also standing water in low areas approximately 0.5 inches deep within the area. All three jurisdictional wetland criteria were met for this site. The area was classified as a palustrine emergent persistent, saturated wetland (PEM1B) in the 2009 and 2012 surveys.

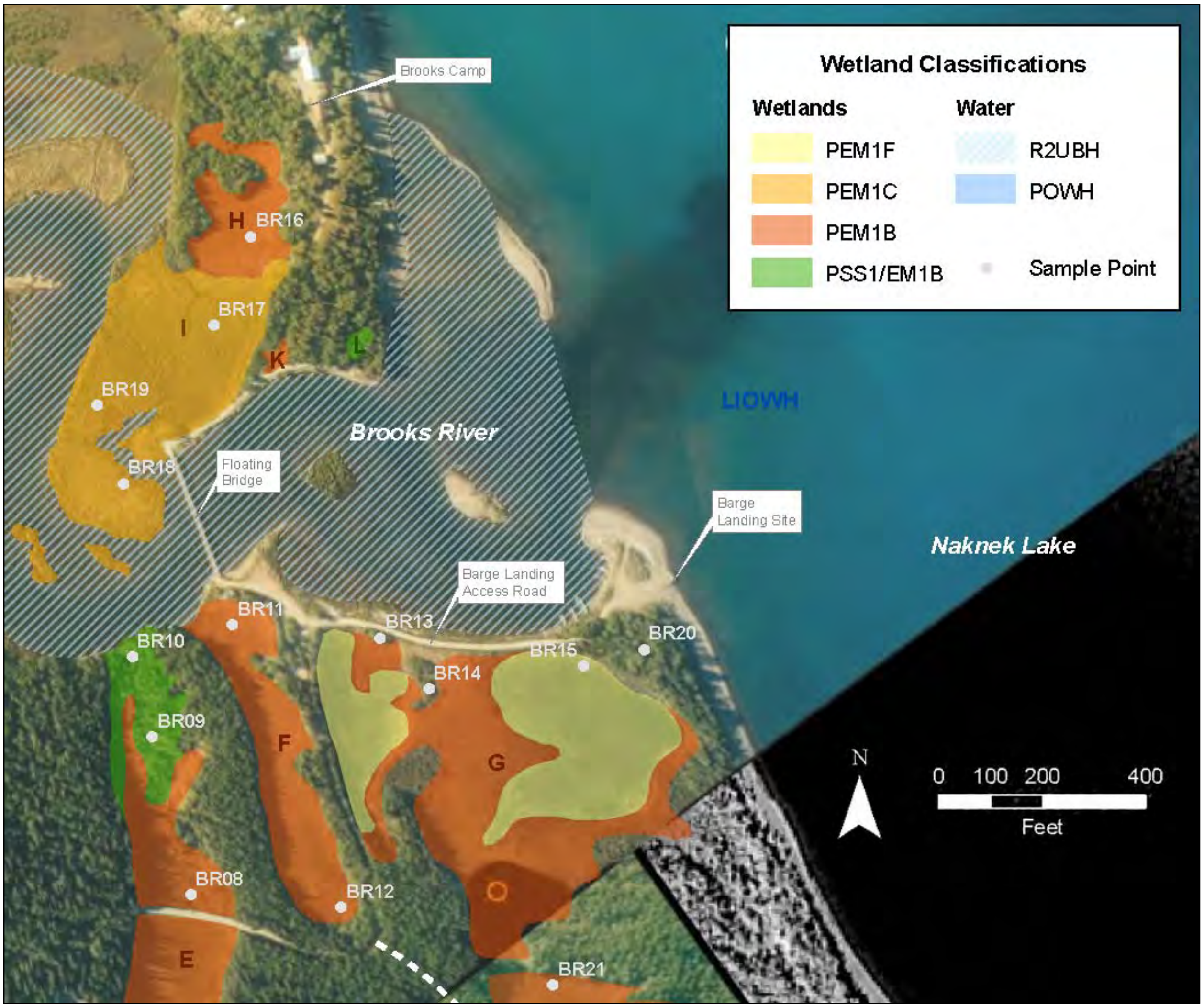
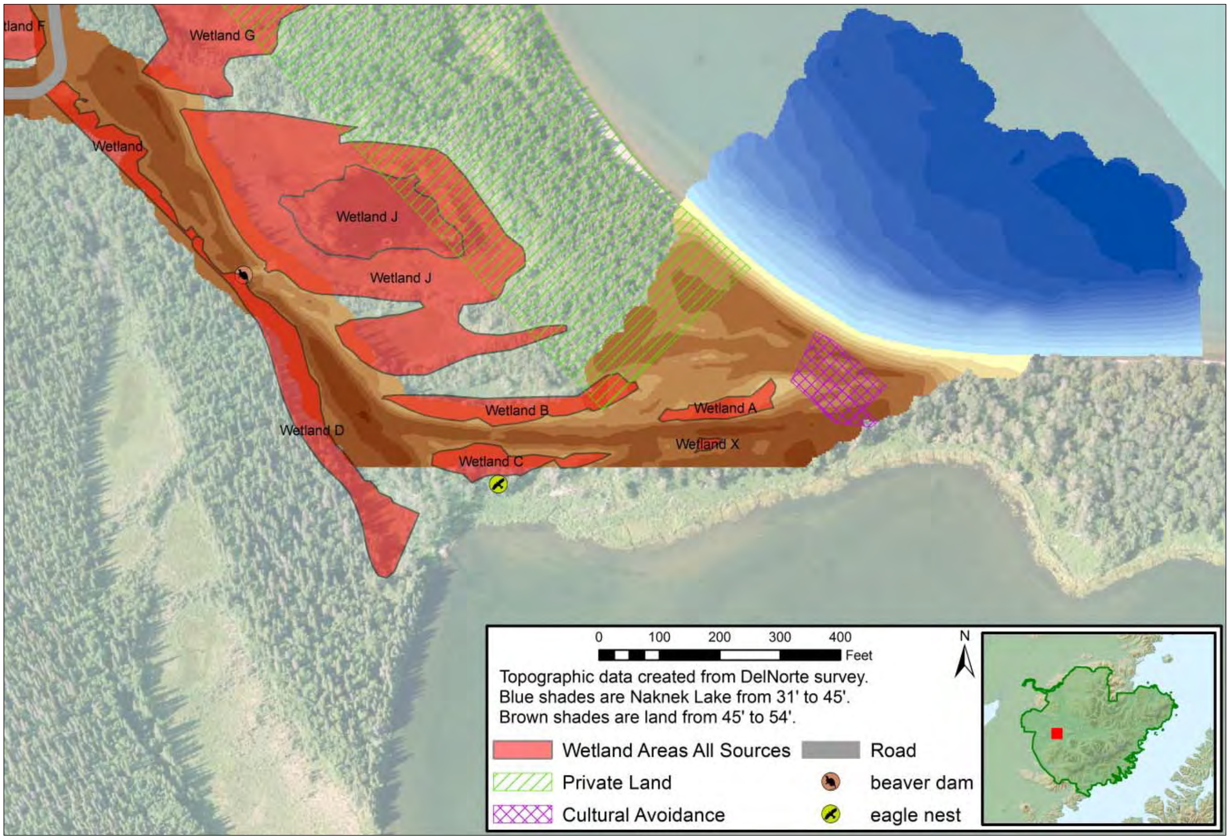



**FIGURE B-2**

Source: URS Group, Inc. 2009b
Note: Aerial photograph was recorded in 2002, before the floating bridge was relocated to its current location; the location of the barge landing access road in this figure is approximate.




Source: NPS 2012

**Figure B-3**

**Wetland D**

This wetland is a long, narrow depression west of the proposed barge landing access road route. This depression did not appear to connect directly with the beaver pond. The perimeter of the wetland had thick emergent vegetation, and there was open water with aquatic vegetation in the center. Standing water occurred in portions of the wetland but was not continuous. Vegetation was dominated by longawn sedge (*Carex macrochaeta*), Northwest Territory sedge (*Carex utriculata*), and marsh fivefinger (*Comarum palustre*). Aquatic vegetation in areas of open water consisted mostly of burreed (*Sparganium angustifolium*). Other species included water horsetail (*Equisetum fluviatile*) and water hemlock (*Cicuta virosa*). At the northern end of the wetland the vegetation is dense bluejoint (*Calamagrostis canadensis*) in the lowest parts of the depression with small amounts of Bebb willow (*Salix bebbiana*) and birch (*Betula spp.*) present. The soil profile shows a 3-inch mat of fibrous organics over an 8-inch horizon of volcanic ash with redox concentrations. Below the ash, soils turn to gravel. Wetland hydrology was evident from the standing water in the center of the depression in several areas along the wetland's length. Saturated soil was also documented at 10 inches below the surface where surface water was not present. All three jurisdictional wetland criteria were met at the southern end of the wetland. The area was classified as a combination of palustrine, emergent persistent, semi-permanently flooded wetland (PEM1F) and saturated wetland (PEM1B). The northern end of the area lacked one or more of the criteria for a jurisdictional wetland due to lack of hydric soils and wetlands hydrology.

**Wetland E**

This wetland is in a low depression extending from the edge of Brooks River; it is west of the bear viewing platform, and south of Valley of Ten Thousand Smokes access road. Bluejoint (*Calamagrostis canadensis*) was the only dominant species. Longawn sedge (*Carex macrochaeta*) made up only 5 percent of the total, and Northwest Territory sedge (*Carex utriculata*) was only 1 percent. Diamondleaf willow (*Salix planifolia*) occurred as a few individual plants. Other shrubs included Bebb willow (*Salix bebbiana*) and Barclay's willow (*Salix barclayi*). Small individual specimens of white spruce (*Picea glauca*) and paper birch (*Betula papyrifera*) were also present in the slightly elevated area but showed signs of stress. Soils have a 3.5- to 4-inch mat of organic material over a 3.5- to 8-inch horizon of volcanic ash. The layer below the ash varies between fibrous peat, silt loam over sand and gravel, or sandy loam. The primary indicator of wetland hydrology was saturation within 7 to 12 inches of the surface. All three jurisdictional wetland criteria were met. The southern portion of the wetland was classified as palustrine emergent persistent, saturated (PEM1B). The northern portion was classified as palustrine scrub-shrub/emergent persistent, saturated (PSS1/EM1B).

**Wetland F**

Wetland F is a large wet meadow in a long, narrow depression that extends south from Brooks River near the elevated bear viewing platform and parallels Valley of Ten Thousand Smokes access road on the west side. There were no sizable areas of standing water in this wetland at the time of the survey. The vegetation in this wetland is mostly all herbaceous. Dominants include longawn sedge (*Carex macrochaeta*) and bluejoint (*Calamagrostis canadensis*). The only other common species is the Northwest Territory sedge (*Carex utriculata*). The soil profile at the northern end of the wetland had a 4-inch surface horizon of fibrous organics over a 7-inch horizon of volcanic ash. Below the ash was a dark brown sandy loam mixed with a high percentage of fibrous organics. Below this layer, the soil transitions to a dark gray sand and gravel matrix. The soil profile at the southern end of the wetland had a 3-inch organic mat over a 7-inch ash horizon with faint redox concentrations. Beneath the ash layer, there was a 1-inch horizon of fibrous peat. The lowest horizon is gravel. Surface water in the northern end of the wetland was about 1 inch deep. Subsurface saturation was observed at a depth of 5 inches. Saturation at the northern end of the wetland was documented at 10 inches below the surface. Standing water was found at 20 inches from the surface. All three jurisdictional wetland criteria were met. The area was classified as a palustrine emergent persistent, saturated wetland (PEM1B) with a small fringe scrub-shrub wetland.

**Wetland G**

This wetlands complex consists of both emergent wetlands and open water areas with aquatic vegetation. Vegetation was heavily dominated by the Northwest Territory sedge (*Carex utriculata*) and bluejoint (*Calamagrostis canadensis*). Other emergent species included pendantgrass (*Arctophila fulva*), water hemlock (*Cicuta virosa*), common mare's-tail (*Hippuris vulgaris*), and longawn sedge (*Carex macrochaeta*). The wetland also contains diamondleaf willow (*Salix planifolia*) (FACW) and Barclay's willow (*Salix barclayi*). Aquatic vegetation was primarily burreed (*Sparganium spp.*). Wetland hydrology was evident from the abundance of standing water. All three jurisdictional wetland criteria were met. The wettest areas with emergent vegetation is classified as a palustrine emergent persistent, semi-permanently flooded (PEM1F). The remainder of the wetland is classified as palustrine emergent persistent, saturated (PEM1B).

**Wetland H**

This large grass/sedge wet meadow is in a depression on an elevated river terrace just west of Brooks Camp. The plant cover is very uniform over most of the wetland and grades into shrub habitats on three sides. The vegetation is heavily dominated by bluejoint (*Calamagrostis canadensis*), with only a small amount of Northwest Territory sedge (*Carex utriculata*). The soil profile showed a 12-inch fibrous peat organic horizon over a 17-inch horizon of volcanic ash. There was only coarse gravel below the ash layer. Saturation was to the surface of the ground. Some small areas within the observation point had standing water up to 1 inch deep. All three jurisdictional wetland criteria were met. The area was classified as a palustrine emergent persistent, saturated wetland (PEM1B).

**Wetland I**

This wetland is a large emergent marsh on the northern shoreline of Brooks River. Much of this wetland is flooded during high water periods, and the lower portions of the marsh were inundated during this survey. A portion of this marsh was filled to create the northern access to the floating bridge on Brooks River. Vegetation in the higher portions of the wetland was dominated by bluejoint (*Calamagrostis canadensis*). Other minor species included water horsetail (*Equisetum fluviatile*), yellow willowherb (*Epilobium luteum*), bog yellowcress (*Rorippa palustris*), Northwest Territory sedge (*Carex utriculata*), and longawn (*Carex macrochaeta*) sedge. Soils contained at least 16 inches of fibrous organic peat. The wetland had saturation to the surface. All three criteria for jurisdictional wetlands were met. The area was classified as a palustrine emergent persistent, seasonally flooded wetland (PEM1C).

**Wetland J**

The wetland consists of a large emergent marsh around the perimeter with an area of open water in the center. This wetland is not directly connected to Wetland G to the north. However, the 2012 survey found a drainage connection between the northern portion of wetland D and wetland J, which the proposed access road would need to cross (see photograph).

**DRAINAGE CONNECTING WETLANDS D AND J; WETLAND J IS IN THE BACKGROUND**

The emergent vegetation around the perimeter of the marsh was dominated by bluejoint reedgrass (*Calamagrostis canadensis*), longawn sedge (*Carex macrochaeta*), and Northwest Territory sedge (*Carex utriculata*). Soil was a 6-inch mat of fibrous organic material over a horizon of volcanic ash. Fibrous organic material continued below the ash horizon. The primary indicator for wetlands hydrology along the perimeter of the wetland was saturation to the surface. Standing water was evident in the center of the wetland. All three jurisdictional wetland criteria were met for this site. The area near the observation point, along the perimeter of the wetland, was classified as a palustrine emergent persistent, saturated wetland (PEM1B), and the pond in the center of the wetlands was classified as palustrine open water permanently flooded (POWH) in the 2009 and 2012 surveys.

**Wetlands K and L**

Two small wetlands were delineated between Brooks Camp and the northern shoreline of Brooks River by NPS employees in 2008 (Rice 2008). All three criteria for jurisdictional wetlands were met for both sites. Wetland K was classified as a palustrine emergent persistent saturated (PEM1B). Wetland L was classified as palustrine scrub-shrub/emergent persistent saturated (PSS1/EM1B).

**Wetland X**

The 2012 survey mapped a very small wetland depression immediately south of wetland A (see figure 3). This area had Balsam poplar, highbush cranberry and fireweed growing along the elevated margins of the site, but the lower portions of the depression had bluejoint reedgrass, marsh horsetail, and Barclay's willow )(*Salix barclayi*). The soil consisted of a 6-inch horizon of fibrous peat, a 6-inch horizon of fine-grained volcanic ash, and then a 14-inch horizon of loamy sand below the ash layer. Gravel was encountered at the bottom of the test pit. A sulfidic odor emanated from the freshly opened soil pit. The soil was determined to have high organic content in the surface layer of a sandy soil, as indicative of a histic epipedon. Saturated soil occurred within 12 inches of the surface and standing water was found within 12 inches of the surface. The area met all three jurisdictional wetland criteria and therefore was classified as a palustrine emergent persistent, saturated wetland (PEM1B).

## 4.2 Functional Assessment of Affected Wetlands

Palustrine wetlands are known to provide a variety of ecological functions depending on the location and type of wetland (Larson 1989). Some of the major ecological functions of wetlands include the following:

- discharge of groundwater
- flood control or moderation
- water quality control and improvement
- stabilization of sediments
- retention, removal, and transformation of nutrients
- fish and wildlife habitat
- biomass production and export

Wetlands in the study area provide several of these functions to some degree, and the major functions are discussed below. However, because of the small size of some of the wetlands in the project area, the ecological functions provided by some of these habitats are limited.

Discharge of groundwater is an important function of wetland habitats; however, because of the location of many of these wetlands, adjacent to Brooks River, the opportunity to provide this function is limited. Wetland G could potentially perform this function to some degree, but the lack of an outlet suggests discharge is not substantial.

Flood control or moderation is a function performed by the large wetlands adjacent to Brooks River—wetlands E, F, G, H, I, and J. This function could be considered one of the more important for these wetlands as a whole. These wetlands provide areas for floodwater storage so the excess water can spread out and moderate the velocity of the floodwaters. Reducing the velocity of the floodwaters in the river can limit scouring of the riverbed.

Wetland I is the only wetland in the surveyed area that provides any substantial functions as habitat for fish. The southern portions of this wetland are within the floodway portion of Brooks River and provide food and cover for small fish in the river. This wetland also provides the function of bank stabilization, which protects habitat in other areas in the river. These riparian wetlands also support insects and aquatic invertebrates that wash down river to Naknek Lake to serve as food for fish in the lake.

All of these wetlands also provide some level of wildlife habitat for waterfowl and shorebirds as well as moose and brown bear and a variety of small mammals. Waterfowl, such as the common merganser, can use open water areas in Wetlands B, D, G, I, and J for feeding and rearing. The early emerging grasses and sedges in the large wetlands along Brooks River and other smaller wetlands can provide spring foraging habitat for brown bear after emerging from their dens. The willow habitats along the perimeters of the wetlands can provide winter forage habitat for moose, nesting habitat for songbirds in the summer, and habitat for small mammals such as snowshoe hare.

Maintenance of water quality is an important function of wetlands, particularly in this area. Runoff from roads and paths can carry sediment into the Brooks River and Naknek Lake. Wetlands E, F, G, and I are in positions for retaining, removing, and transforming nutrients, retaining inorganic sediments, and acting as a filter system and maintaining water quality in the adjacent water bodies.

Wetlands are known for their production of biomass. This biomass is exported to adjacent areas in the form of dissolved or particulate organic carbon from the wetland through leaching, flushing, erosion, and other mechanisms or through the aquatic and terrestrial food webs. All of the wetlands in the area provide this function to some degree.

Wetlands have benefit and provide benefits for humans, such as open space areas and places for recreational activities such as birding, wildlife viewing, photography, general nature appreciation, and esthetics. The wetlands adjacent to Brooks Camp and Brooks River provide the best areas for these functions because of their location and the numbers of visitors that come to enjoy the scenic nature of the river and its wildlife and fish.

Overall, wetlands in the surveyed area provide a wide variety of important ecological functions and enhance the experience of people visiting Brooks Camp and Katmai National Park and Preserve.

## 4.3 Adverse and Beneficial Impacts on Wetlands

Table 1 provides a summary of wetland impacts resulting from the preferred alternative, including acreages affected by wetland type. The preferred alternative would adversely impact less than 0.1 acre of wetlands within the Brooks River area. Impacts would be from the installation of pilings for the elevated bridge and boardwalk and the construction of a new barge access road. Because the boardwalk would be elevated at least 10 ft above the ground, no indirect impacts on wetlands from boardwalk shading would be anticipated.

The preferred alternative would have a beneficial impact on approximately 0.11 acre of wetlands from the restoration of natural wetland functions when the barge road is removed. Overall, the preferred alternative would have a net gain of approximately 0.04 acre of wetlands.

### 4.3.1 Biotic Functions

The preferred alternative would have a negligible adverse impact on wetland biotic functions, such as fish and wildlife habitat, floral and faunal productivity, and native species and habitat diversity. Biotic functions would be adversely affected if wetland areas are modified through the placement of a culvert and fill to accommodate the proposed barge landing access road near the beaver pond (figure 3—Wetlands J and D).

### 4.3.2 Hydrologic Functions

The preferred alternative would likely not adversely impact the hydrologic functions of the wetlands within the surveyed area. Standard erosion and sediment control measures would be used during the installation of the proposed bridge and boardwalk and construction of the proposed barge landing access road.

**SUMMARY OF WETLAND IMPACTS RESULTING FROM THE PREFERRED ALTERNATIVE**

| Wetland (see figures B-2 and B-33) | Code | Total Acres | Wetland Area Impacted | Description |
|---|---|---|---|---|
| A | PEM1B | 0.2 | 0 | No direct loss of wetlands. |
| B | PEM1B | 0.3 | 0 | No direct loss of wetlands. |
| C | PEM1B | 0.3 | 0 | No direct loss of wetlands. |
| D | PEM1B | 0.2 | -150 $ft^2$ | Impacts due to construction of a culvert along the access road |
| | PEM1F | 0.3 | 0 | No direct loss of wetlands. |
| E | PEM1B | 4.1 | –18 $ft^2$ | Impacts from boardwalk pilings (two 8-inch diameter pilings spaced 12 ft apart for a length of approximately 300 ft. |
| | PSS1B/EM1B | 0.6 | 0 | No direct loss of wetlands. |
| F | PEM1B | 1.0 | –8 $ft^2$ | Impacts from boardwalk pilings (two 8-inch diameter pilings spaced 12 ft apart for a length of approximately 130 ft. |
| G | PEM1B | 2.7 | +5,040 $ft^2$ | Restoration of wetland function by removal of barge access road. |
| | PEM1F | 1.3 | | |
| H | PEM1B | 0.7 | –14 $ft^2$ | Impacts from boardwalk pilings (two 8-inch diameter pilings spaced 12 ft apart for a length of approximately 240 ft. |
| I | PEM1C | 2.7 | –14 $ft^2$ | Impacts from boardwalk pilings (two 8-inch diameter pilings spaced 12 ft apart for a length of approximately 240 ft. |
| J | PEM1B | 2.4 | -150 $ft^2$ | Impacts due to construction of a culvert along the access road |
| | POWH | 0.7 | 0 | No direct loss of wetlands. |
| K | PEM1B | 0.1 | 0 | |
| L | PSS1B/EM1B | 0.1 | 0 | |
| X | PEM1B | 0.1 | 0 | No direct loss of wetlands. |
| Brooks River | R2UBH | | –24 $ft^2$ | Impacts from up to 14 sets of bridge piles in river. Bridge piles are estimated to be 12 inches in diameter. |
| Naknek Lake | L1UBH | | –2,600 $ft^2$ | Impacts from the installation of a hardened barge ramp on Naknek Lake |
| | | | | |

| | | |
|---|---|---|
| **Total Negative Wetland Impact** | | –2,978$ft^2$ (-0.07 ac) |
| **Total Positive Wetland Impact** | | +5,040 $ft^2$ (**+0.11 ac.**) |
| **Total Overall Wetland Impact** | | **+2,062 $ft^2$ (+0.04ac)** |

Removal of the barge landing access road on the south side and pedestrian trail on the north side of the Brooks River and restoring the areas' predevelopment elevations could provide additional flood attenuation and detrital export to Wetlands G and I (figure 2) within the lower part of Brooks River. Other hydrologic functions, such as stream flow maintenance, groundwater recharge and discharge, water supply, and water purification would not be adversely affected.

#### 4.3.3 Cultural Functional Resources

The preferred alternative would have a minor to moderate adverse impact on the cultural resources of the Brooks River area. Specifically, the installation of a bridge over Brooks River would affect the historic cultural landscape and archeological/ethnographic resources of the Brooks River and its floodplain in the project area.

The preferred alternative would have a positive impact on visitors experiencing the wetlands in the Brooks River area. Park visitors would be able to experience wetland-specific exhibits and ranger-led programs. The installation of ramps and emergency egress stairs/ladders from the bridge/boardwalk would ensure that recreational access to Brooks River and adjacent wetlands would not be adversely affected.

#### 4.3.5 Research and Scientific Values

Because the wetlands in the project area are not classified as nonimpacted wetland reference sites, the preferred alternative would not adversely impact wetland research and scientific values. The wetlands in the project area have not been used for studies or long-term monitoring, and do not have documented research and scientific values.

#### 4.3.6 Economic Values

The preferred alternative would not have an adverse effect on flood protection for Brooks Camp facilities, on fisheries resources within the river and adjacent Naknek Lake and Lake Brooks, or on tourism.

### 4.4 Investigation of Alternative Sites

The National Park Service investigated alternative elevated bridge and boardwalk alignments in addition to the no-action and preferred alternative.

Alternative 2 would have similar impacts on wetlands as the preferred alternative (alternative 4) (see section 4.3). In this alternative, the north boardwalk would be installed over a wetland between the lodge and Brooks River and the south boardwalk would be installed over two wetlands between the river and the bus parking area.

Alternative 3 would have the least impact on wetlands. In this alternative, the north boardwalk would be installed over the upland trail corridor between the lodge and the river. Approximately six sets of piles would be placed in the Brooks River riverbed to accommodate the bridge span. The south boardwalk would be placed over a previously disturbed upland area. The barge landing site would be relocated to an area approximately 200 ft south of the existing site and would use all but a small portion of the existing access road, which may currently affect a wetland immediately south of the road. A hardened beach landing ramp would be installed at the new landing site within Naknek Lake.

Alternative 5 would have similar impacts on wetlands as alternative 3 with two exceptions: (1) the north boardwalk would be installed over a wetland between the lodge and Brooks River; and (2) the barge landing site and access road would be relocated to a new location approximately 2,000 ft south of the existing site. The construction of the new barge access road and removal of the existing barge access road would have the same impacts on wetlands as the preferred alternative.

The no-action alternative and alternatives 2, 3, and 5 would not fully meet the purpose and need of the project, which is to improve visitor access and resource protection within the Brooks River area. The area contains a high concentration of brown bears during the summer, especially in July and September. To travel between the lodge on the north side of the river and the bus parking area on the south side of the river without being delayed by bears, the boardwalk would need to start/end near Brooks Lodge and the bus parking area. Using several years of bear monitoring data, the National Park Service has learned that the forested upland area between the lodge and the river (this area is commonly called the Corner) provides suitable habitat for bears to rest, away from park visitors. Removing the trail and restoring this upland area would improve bear habitat. In addition, relocating the barge landing site and access road away from the mouth of the river would improve barge operation.

## 4.5 Wetland Mitigation

Construction activities in wetlands would be limited to the minimum area needed to install the boardwalk and bridge pile supports. The installation of the boardwalk supports would occur during the winter season(s) when the ground is frozen to reduce soil compaction and avoid injuring wetland vegetation growth.

Equipment servicing and refueling would not be conducted within wetlands. Equipment leaking fuel, oil, hydraulic fluid, or other pollutants would not be operated within wetlands.

The rehabilitation of former trail and road areas would use local native plants. Discontinued trails and roads would be removed and the areas would be revegetated with local native plant species.

## 4.6 Wetland Compensation

The preferred alternative would result in adverse impacts to 0.07 acre of wetlands. It is anticipated that the removal of the existing barge access road in the preferred alternative would restore wetland function and compensate for any wetland loss from the installation of the elevated bridge and boardwalk and construction of the new barge landing site and access road (Wetland G in figure 2). Removing the road and grading the area to its natural elevation would enable surface water from Brooks River and Naknek Lake to flow into the adjacent wetland during flood events. It is expected that this would increase the size of the wetland by approximately 0.11 acre. The overall wetland gain would be approximately 0.04 acre.

## 5.0 CONCLUSION

The National Park Service finds that the preferred alternative is consistent with the policies and procedures of NPS Special Directive 93-4, "Floodplain Management Guideline" and Director's Order #77-1: *Wetland Protection* including the "no net loss of wetlands" policy.

## 6.0 REFERENCES

Larson, J., P. R. Adamus, and P. R. Clairain
1989 "Functional Assessment of Freshwater Wetlands: A Manual and Training Outline." University of Massachusetts, Amherst, Environmental Institute Publication 87-1.

National Park Service
2009 "Draft Brooks River Visitor Access Floodplains Statement of Findings." On file at park headquarters.

2012 "Preliminary Determination of Waters of the United States, Including Wetlands for Brooks River Access Barge Landing Alternative, NPS, Katmai National Park and Preserve. Prepared by B. Rice, G. Yankus, and W. Rapp. On file at NPS AK Regional Office.

Rice, B.

2008 "Field Trip Report for Wetlands Evaluations at Brooks Camp and Lake Camp, Katmai National Park and Preserve." Memorandum to Joan Darnell and Helen Lons, National Park Service, Anchorage, Alaska.

URS Group

2009 "Preliminary Jurisdictional Determination of Waters of the United States, Including Wetlands: Brooks River Bridge Project. Anchorage, Alaska."

# APPENDIX C: ESSENTIAL FISH HABITAT ANALYSIS AND DETERMINATION

## BACKGROUND

Magnuson-Stevens Fishery Conservation and Management Act, as amended by the Sustainable Fisheries Act of 1996 (PL 104-267), refined the focus of fisheries management by emphasizing the need to protect fish habitat. Specifically, the act requires that fishery management plans identify "essential fish habitat" (EFH), which are areas that are necessary for fish to carry out their basic life functions. Essential fish habitat is defined as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." In this case, *waters* include aquatic areas and their associated physical, chemical, and biological properties that are used by fish. *Substrate* includes sediment, hard bottom, structures underlying the waters, and associated biological communities. The term *necessary* means the habitat required to support a sustainable fishery and the managed species' contributions to a healthy ecosystem. Spawning, breeding, feeding, and growth to maturity cover the full life cycle of fish.

The overall intent of the amended Magnuson-Stevens Fishery Conservation and Management Act is to conserve and enhance essential fish habitat and focus conservation efforts on areas that are important to the life cycles of federally managed fish and shellfish. The act requires federal agencies such as the National Park Service (NPS) to consult with the National Marine Fisheries Service (NMFS) regarding any action they authorize, fund, or undertake that may adversely affect essential fish habitat. The National Marine Fisheries Service must provide conservation recommendations to federal and state agencies regarding any action that would adversely affect essential fish habitat.

In Alaska, the National Marine Fisheries Service uses information from the Alaska Department of Fish & Game (ADF&G) to help identify essential fish habitat in the state. Important anadromous fish habitat areas in Alaska are compiled and described in the ADF&G *Catalog of Waters Important for the Spawning, Rearing, or Migration of Anadromous Fishes*, which is updated on an annual basis. The term *anadromous* refers to fish that migrate from marine aquatic habitat to inland freshwater aquatic habitat during different points of their life cycles.

## ESSENTIAL FISH HABITAT IDENTIFICATIONS

Given the ADF&G's identification of important anadromous fish habitat in the Brooks River, the National Marine Fisheries Service also considers the river as essential fish habitat. According to the ADF&G *Catalog of Waters Important for the Spawning, Rearing, or Migration of Anadromous Fishes* 2010 update, Brooks River provides aquatic habitat for the following species of anadromous fish and their respective life stages:

- Chum salmon: "spawning" (freshwater larvae and juveniles and freshwater adults)
- Coho salmon: "present" (possibility of multiple life stages)
- King salmon: "present" (possibility of multiple life stages)
- Pink salmon: "spawning" (freshwater larvae and juveniles and freshwater adults)
- Sockeye salmon: "spawning" (freshwater larvae and juveniles and freshwater adults)

## PROJECT DESCRIPTION

The National Park Service is proposing to improve visitor access and resource protection within the Brooks River area of Katmai National Park and Preserve. The proposed project would involve replacing the floating bridge and trails with a permanent elevated bridge and elevated boardwalks and relocating the existing barge landing site and access road away from the mouth of the Brooks River. A detailed description of the various action alternatives for the proposed project (including the NPS preferred alternative) is provided in the first five chapters this document.

The proposed bridge would involve the placement of multiple pile system supports in the channel of the Brooks River. Each pile support system would include two piles anchored in the riverbed. The spacing and separation of each pile system varies from alternative to alternative. Under the NPS preferred alternative, each set of piles would be spaced at a minimum of 24 ft.

The proposed bridge would also eliminate the need for the annual placement and removal of a temporary floating bridge across the Brooks River and associated bank stabilization efforts by NPS maintenance staff.

## PROPOSED MITIGATION MEASURES FOR FISH HABITAT

To protect fish populations and habitat in Brooks River, the following mitigations would be followed within the project area:

- Fuel, lubricants, or other hazardous substances would not be stored below the ordinary high water (OHW) of Brooks River or Naknek Lake.
- Equipment servicing and refueling would not be conducted below the OHW level of Brooks River or Naknek Lake.
- Equipment leaking fuel, oil, hydraulic fluid, or other pollutants would not be operated or moved below the OHW level of Brooks River or Naknek Lake.
- Work below the ordinary high water within Brooks River and the shoreline of Naknek Lake would occur during the winter and spring when water levels are low and spawning fish are less likely to be impacted.
- During equipment operation and the construction of the barge ramp and bridge pilings and abutments, displaced riverbed and lakebed materials important for fish spawning habitat would be redistributed to adjacent areas within Brooks River and Naknek Lake. Materials would not be completely removed from the project areas.
- After construction activities have been completed, areas below ordinary high water would be graded to match near preconstruction slopes and contours.
- The use of riprap and nonvegetation bank stabilization methods would be avoided or greatly minimized. Riverbanks would be rehabilitated using native vegetation and natural materials, such as coir logs, willow stakes, and downed trees for stabilization.
- To minimize some of the effects of in-river construction for the bridge, various turbidity and sedimentation mitigation measures would be applied, such as diversion of river flows around work areas, cofferdams, and sediment traps.

## PROJECT EFFECTS ON THE BROOKS RIVER ESSENTIAL FISH HABITAT

Under all action alternatives, the proposed elevated bridge would eliminate the need for the temporary floating bridge, which is an obstacle to fish migration across the full width of the Brooks River. The permanent bridge would also eliminate the riverbed disturbances (e.g., stirring up riverbed sediment, turbidity) each spring and fall from placement and removal of the floating bridge. These effects would result in localized beneficial impacts on essential fish habitat.

Under the various action alternatives, the proposed bridge would have varying span lengths between pile support systems. The bridge for the NPS preferred alternative would have up to 14 sets of pile supports in the channel (at a minimum of 24-foot spans). Although the piles themselves would not pose any substantial threats to spawning fish migration up Brooks River, the piles would (1) affect flow hydraulics, which could lead to some riverbed scouring and downstream sediment deposition; and (2) obstruct the flow and passage of debris in the river, which could directly block fish passage and compound the hydraulic scouring and sediment deposition effect in the river channel. Riverbed scouring and sediment deposition could affect the hatch rate of fish eggs that have been deposited downstream of the bridge by certain fish species. In addition, sandbar development downstream of the bridge could reduce the channel's cross-section area. The shallower water near the sandbars could obstruct some fish migration upstream. However, this sandbar effect would likely be limited. Park staff would mitigate some of these effects by removing debris buildup when staff members are present at Brooks Camp. Overall, these effects of the bridge support piles would have some adverse impacts on essential fish habitat. However, the effect would be localized in the waters immediately upstream and downstream of the proposed bridge.

The construction of the bridge foundation would involve the installation of multiple sets of piles in the river channel (up to 14 sets of piles in the NPS preferred alternative). This construction work would generate disturbance areas in the Brooks River channel during the construction phrase (winter/spring), from pile driving and construction equipment access in the channel. The installation would stir up sediment in the riverbed, which could lead to increases in water turbidity and sedimentation downstream of the bridge. Pile systems would also be installed on each shoreline relatively near the river, which could also generate turbidity and sedimentation in the area. Although the construction would not occur during the times of year when fish migration and spawning occurs in Brooks River, the sedimentation could negatively affect the hatch rate of the fish eggs that were deposited in the spawning beds downstream of the bridge during the previous autumn. Overall, these construction effects would have a temporary, minor effect on essential fish habitat.

**Cumulative Impacts.** Because other present and reasonably foreseeable future projects in and near the project area would have no known effects on essential fish habitat in Brooks River, no cumulative impacts would result.

**Conclusion.** Direct adverse effects on essential fish habitat in Brooks River would be localized and limited to the addition of up to 14 sets of permanent bridge support piles in the river channel (spaced at a minimum of 24 ft) and the associated construction disturbances for these piles in the channel. The support piles, and river debris that catches on them, could obstruct fish passage and alter flow hydraulics, which may result in scouring and sediment deposition in the river. However, these adverse effects on essential fish habitat would be offset by various mitigation measures and the beneficial effects of no longer using the temporary floating bridge every year (i.e., riverbed disturbances every spring and fall, bank erosion, and obstruction in upper flow column during migration periods). As a result of the limited and localized potential effects of this project, the National Park Service concludes there will be only minor adverse impacts on essential fish habitat

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# APPENDIX D: LETTERS FROM AGENCIES, ORGANIZATIONS, AND INDIVIDUALS

**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**
**REGION 10**
1200 Sixth Avenue, Suite 900
Seattle, WA 98101-3140

August 20, 2012

Glen Yankis
National Park Service
240 West 5th Avenue
Anchorage, Alaska 99501

Re: EPA comments on the Draft Environmental Impact Statement for the Katmai National Park and Preserve's Brooks River Visitor Access Plan, EPA Project #12-0033-NPS.

We have reviewed the above-referenced EIS (CEQ No. 20120193) in accordance with our responsibilities under the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act. Section 309, independent of NEPA, specifically directs EPA to review and comment in writing on the environmental impacts associated with all major federal actions. Under our policies and procedures we evaluate the document's adequacy in meeting NEPA requirements.

The EIS analyzes the No Action Alternative and four action Alternatives. The National Park Service has identified Alternative 4, as both its preferred and the environmentally preferred alternative. We support the selection of this alternative as it minimizes the overall impacts to aquatic resources by maximizing the boardwalk and bridge system. Many of the impacts would be short-term as they are associated with construction. This alternative would also provide long-term benefits to the visitor experience by improving viewing and safety. We encourage the National Park Service to consider bridge materials, color and design that will be best suited for the surrounding natural environment, as well as alternative bridge designs that may further reduce the number of piles and/or support members.

We have assigned a rating of LO (Lack of Objections) to the draft EIS. A copy of the rating system used in conducting our review is enclosed for your reference. We believe that the EIS analyzes an adequate range of alternatives that provides for visitor and management needs while minimizing impacts to the bear population and aquatic resources.

Thank you for the opportunity to review this draft EIS. If you would like to discuss these issues, please contact me at (206) 553-1601 or by email at reichgott.christien@epa.gov, or you may contact Jennifer Curtis of my staff in Anchorage at (907) 271-6324 or by email at curtis.jennifer@epa.gov.

Sincerely,

Christine B. Reichgott, Manager
Environmental Review and Sediment Management Unit

Enclosure

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**U.S. Environmental Protection Agency Rating System for Draft Environmental Impact Statements Definitions and Follow-Up Action***

**Environmental Impact of the Action**

**LO – Lack of Objections**

The U.S. Environmental Protection Agency (EPA) review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

**EC – Environmental Concerns**

EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce these impacts.

**EO – Environmental Objections**

EPA review has identified significant environmental impacts that should be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no-action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

**EU – Environmentally Unsatisfactory**

EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the Council on Environmental Quality (CEQ).

**Adequacy of the Impact Statement**

**Category 1 – Adequate**

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis of data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

**Category 2 – Insufficient Information**

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses or discussion should be included in the final EIS.

**Category 3 – Inadequate**

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the National Environmental Policy Act and or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

* From EPA Manual 1640 Policy and Procedures for the Review of Federal Actions Impacting the Environment. February, 1987.

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**Brian Lance**
**<brian.lance@noaa.gov>**
07/10/2012 12:52 PM

To Glen_Yankus@nps.gov
cc
bcc
Subject Brooks River Visitor Access

Hi Glen

NMFS has reviewed the EFH conclusion (page 280 of the EIS) for the Brooks River Visitor Access project. NMFS agrees the adverse impacts of the project to EFH will be minor, offset by mitigation measures. No further EFH consultation is needed. Thank you for the opportunity to comment. Should you have any further questions regarding EFH, pleas contact, Brian Lance at 907 271-1301 or brian.lance@noaa.gov.

cheers
Brian

THE STATE of ALASKA
GOVERNOR SEAN PARNELL

**ANILCA Implementation Program**
OFFICE OF PROJECT MANAGEMENT & PERMITTING
550 West Seventh Avenue, Suite 1430
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August 20, 2012

Mr. Ralph Moore, Superintendent
Katmai National Park & Preserve
National Park Service
P.O. Box 7
King Salmon, AK 99613

Re: Brooks River Visitor Access Draft Environmental Impact Statement

Dear Mr. Moore,

The State of Alaska reviewed the National Park Service (Service) Brooks River Visitor Access Draft Environmental Impact Statement (DEIS) for Katmai National Park and Preserve. The following comments represent the consolidated views of the State's resource agencies.

Consistent with our scoping comments, we strongly support a permanent structure that places the walkway above the floodplain and reduces negative bear/human interactions, minimizes habitat damage to stream banks, and improves visitor access. The construction mitigation measures described in the plan should help minimize impacts to park resources and visitors. In particular, we support the Service's proposal to schedule construction activities to ensure the least possible disturbance to resources and visitor experience. We also endorse the Service's intention to rehabilitate the river banks using native vegetation and natural materials.

**Angler Access**

We emphasize that sport fishing was the original visitor draw to the Brooks River, before the area became a bear viewing destination. As the DEIS states, the Brooks River provides world-class sport fishing opportunities. The State strongly supports continued uninhibited access to the Brooks River for fishing.

Though the DEIS states that angler access would continue to be provided without restriction, it does not describe angler access in detail, nor is angler access easily identified on the diagrams. Other statements in the DEIS suggest that general access, including angler access, will eventually be restricted in the area referred to as "the Corner." For example:

> *". . . the Corner would be rehabilitated and restored and its use would be reserved primarily for bears."* (Page 27)

> *"The elevated bridge and boardwalk system would direct all human traffic away from the Corner."* (Page 46)
>
> *". . . an undisturbed and buffered area for bear resting or movement near the river mouth (i.e., the Corner area)... "* (Page 53)

To alleviate the impression that the new elevated bridge and viewing platforms are the only areas people may travel and that access may be reduced or eliminated from the Corner, we request the final EIS clearly identify angler access.

In addition, the current barge landing, barge landing access road, and the trail to the Corner, which the Service proposes to remove and restore to natural conditions, are areas used by anglers to access the Brooks River. One unintended consequence of restoring these areas to natural conditions may be reduced sight distance for anglers en route to fishing spots. We request the Service consider how best to maintain angler access to these areas while minimizing social trails and the potential for negative human-bear encounters.

Similarly, we encourage the Service to accommodate the traditional red fish fishery during construction, and to consider and minimize impacts to the fishery. According to the *Actions Common to All Action Alternatives*, the work is largely scheduled for late fall, when the red fish fishery takes place, and early spring to avoid peak bear and visitor periods. We suggest contacting participants to discuss ways to reduce impacts to the fishery well in advance of construction.

While we recognize the Service does not consider this a subsistence fishery under Title VIII of ANILCA, the authorized red fish fishery takes place at the mouth of the Brooks River within the project area. The final EIS should specifically describe the anticipated effects, both during and after construction, of the viewing platforms, elevated bridge, and relocation of the barge access road on the red fish fishery. Currently, the draft EIS only makes generic statements about subsistence in general within the preserve, while briefly mentioning that the red fish fishery occurs.

**Brooks Camp Relocation**

While we are aware the alternatives in this plan were "*developed through an interdisciplinary team process that included tiering from earlier plans, including the 1996 Brooks River Area Development Concept Plan* [*DCP*]," and the scope of the project is limited to the barge landing and associated access road along with an elevated bridge and boardwalk system, these proposals significantly modify the decisions reached in the 1996 DCP, and raise new issues that are not sufficiently addressed in this EIS. For example, the visitor's center and day use facilities on the north side of the river would be retained, and visitors would continue to disembark from floatplanes at the current northern location. The preferred alternative would establish additional permanent infrastructure on both sides of the Brooks River mouth. Therefore we are

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commenting on the effects this plan, if enacted, would have on the proposed long-term relocation of Brooks Camp.

First and foremost, the area north of the river is already disturbed and would be permanently connected to the south side via the proposed elevated walkway and bridge. Moving the camp while maintaining the visitor contact station at its current location, and building the new infrastructure would result in a sprawling complex over a mile long, as well as necessitate a vehicle shuttle system for visitors. Currently, visitors walk easily between Brooks Camp and the viewing platforms, whereas if the Camp is relocated, pedestrians would share the road with frequent vehicle shuttles, or be forced to ride in a vehicle to access the viewing platforms, which would significantly alter the visitor experience. Secondly, we question the wisdom of spending millions of dollars to relocate a functional lodge and cabins, especially given the current federal budgetary deficit.

More specifically, we request the Service leave the campground in its existing location. The campground's proximity to Naknek Lake provides a breezier, less buggy, more enjoyable camping experience. The campground's separation from the lodge buildings and its setting along a smaller trail add to the camper's rustic experience. Additionally, its location adjacent to the start of the Dumpling Mountain trail is especially convenient considering campers often must relocate from the campground to camp along the trail if the campground is at capacity. The campground does not require significant infrastructure, and what infrastructure is needed is already in place.

**Fish Habitat Permits**

We request the Service contact the Alaska Department of Fish and Game, Anchorage Regional Habitat Biologist, Mike Daigneault, for assistance acquiring the required fish habitat permit for work below ordinary high water within Brooks River and Naknek Lake. Please note fish habitat permits may also be needed for water withdrawal and winter activities on ice, such as winter roads or fords.

**PAGE SPECIFIC COMMENTS**

Page 5, Map 1. Please note that all islands within 5 miles of the mainland are included in the park. The water and submerged lands seaward of the coasts, beyond the mean high tide line, are not included. We request this be depicted on the map.

Page 24, Alternative 1 (No Action). We note that the Service could improve the streambank conditions near the floating bridge and the Corner regardless of the alternative chosen. It would be possible to retain the floating bridge while also rehabilitating the streambank.

Page 36, Barge Landing and Access Road. We request the final EIS include a smaller scale map depicting the proposed barge landing site and elevated bridge/walkway in relation to the current Brooks Camp site, Beaver Pond, the Beaver Pond terrace proposed development site, and the mouth of the Brooks River.

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Page 66 and 67, brown bear activity. While we agree that brown bear activity has increased in the vicinity, we disagree with the characterization of this increase. Specifically, bear hunting did not end due to "*increased NPS presence*" – it was Congress that ended brown bear hunting in Katmai National Park. Additionally, we request modification of the last sentence. As currently written, this conclusion implies that the increasing trend in brown bear activity may be due to protections from hunting. Based on the list of potential factors discussed in this paragraph, the final EIS should at least acknowledge that this increase may be due to a combination of factors. In fact, a case could be made that the brown bear population has been high for well over the last decade, and that any recent increases in brown bear densities at Brook's Camp are attributed to a change in bear distribution resulting from a change in the strength of fish runs and habituation to people.

Page 209, Ethnographic Resources, Alternative 4. Alternative 4 includes a barge landing and access road which would surround the parcel owned by the heirs of Palakia Melgenak on two sides. The EIS states the "*Service would consult with the heirs to identify their concerns about the project work and to seek ways to avoid affecting their land rights.*" We suggest this consultation be conducted as early in the planning stage as possible, in order to be a good neighbor as well as to assure ANILCA section 1110(b) access rights during and after construction.

Thank you for the opportunity to comment. If you have questions, please contact me at (907) 334-2563.

Sincerely,

Nina Brudie

Nina Brudie
ANILCA Project Coordinator

cc: Susan Magee, ANILCA Program Coordinator
Glen Yankus, NPS

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# Alaska State Legislature

## House of Representatives

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## Representative Les Gara

August 20, 2012

Glen Yankus
National Park Service
240 W. 5th Ave
Anchorage, AK 99501

Subject: Public Comment on "Visitor Access" Proposal and EIS: Adverse Impact on Sportfishing Community by Proposal to Move Campground and Lodge; Park Services Admits New Bridge Just A First Step Towards Dislocating These Facilities.

Dear Mr. Yankus:

I am writing because I am familiar with something many outside Park officials are not familiar with. The EIS proposal to build a bridge states explicitly that it will then be followed by a move of the public campground and historic lodge, both of which have been used by Alaskan fishermen and women for decades. The campground move and lodge move are referenced as next steps if a bridge is built on page 4.

The bridge would facilitate these ill-conceived plans, and the cost, at a time of scarce federal money, seems unjustified. The cost could be limited with an "Alternative" that allows building of a bridge, but no expensive camp and lodge relocation following bridge construction. That is an "Alternative" that hasn't been included in the Draft EIS, and should be added.

The building of a bridge, to be followed by the millions of dollars in moving a camp that has had significant recent funds invested in it (new food storage building; new electric fence; new day shelters), and a lodge that has been maintained through significant expense, would be unjustified from a public interest and fiscal perspective.

**The Current Camp Allows For Inexpensive, Convenient, Public Access to Wilderness Fishing For Alaskans and Non-Alaskans, and Is In the Public's Interest**

Alaska's wilderness can be expensive to access - too expensive for most people. However, a community of trout and other fishermen has developed over the past many decades at Brooks Camp. For very little money, these fishermen/women can cash in 20,000 frequent flier miles to get to King Salmon, and then spend a week at Brooks Camp for less than $300. By doing so,

*E-mail: Representative_Les_Gara@legis.state.ak.us*

thousands have found a way to find wilderness fishing, before the bears reach Brooks Camp, in the two and three weeks after the June 8 trout opener. Other trout fishermen come in August and September, also, not peak bear viewing times.

It is a chance for Alaskans to fish for wild trout, and in the 30 or so years since this has become popular, there have been no fatalities at all.

**Spending Millions on a Bridge, Followed by Millions in Moving the Lodge and Campground Would Threaten the Public's Fishing Experience and Not Be Worth the Significant Money That Is Required**

The current camp is located in an ideal place. Fishermen who camp and lodge users can congregate together, and camp or overnight at a lodge, which leaves them within ideal walking distance for a day of fishing. Fishermen normally walk the roughly 3/4 mile from camp to the river in the morning, go back for lunch and maybe again for dinner, and travel to the river two or three times from camp and the lodge each day. Since bringing food to the river is prohibited, and cooking on the river is prohibited, these multiple trips are required. The most popular part of the river for trout and lake fishing is the lower river, and that part of the river can handle the most fishermen traffic - it is not ethical, in the kind of fast moving water in the upper river, where NPS proposes to move the camp, for large number of people to fish in close proximity to each other. So, moving the lodge to cluster fishermen to a part of the river that cannot handle large amounts of fishing traffic would ruin the fishing experience.

Also, moving the lodge and campground to a different area, further from the river, just like moving it to the upper river, would make multiple trips to the river too hard on people who are physically limited, who are elderly (many of the visitors who fish are elderly), or not in great physical shape.

There has been talk of moving the camp into the woods, off the river, which would make camping miserable. The current site is the windiest possible site, which is good because the bugs at Brooks Camp are thick (mosquitoes and white socks). The Naknek Lake wind keeps camping comfortable and enjoyable. Brooks Lake, or worse, a camp in the woods away from either lake, are both less windy, and would be very uncomfortable for visitors.

Finally the campers (I have been one) and lodge users have become a community of fishermen during these June, August and September trout seasons. Moving these facilities threatens to destroy that decades old community of park users.

One stated reason for building an elevated bridge is to avoid bear conflict. There have been no fatalities at this camp, ever. And while bear travel along the river can make things "inconvenient" for visitors, the Park Service has done a good job setting rules that have prevented injury. The bridge is not needed.

Finally, moving the camp and lodge would have negligible impact on safety matters. If there is going to be bear conflict, the likely place for that will be along the river during salmon season. No matter where the lodge and camp are moved, that danger will remain the same.

On behalf of the thousands who have and will fish the Brooks River, especially at non-peak bear viewing times, I ask that you either reject the bridge proposal, or condition it on making no additional expenditures to move the camp and lodge.

Sincerely,

Rep. Les Gara

cc: Sen. Mark Begich
Pat Pourchot, U.S. Department of the Interior
Jennifer Caldwell, Alaska Fly Fishers
Sonny Peterse, Katmailand
Jim Albert, Katmailand
Troy Letherman, Fish Alaska Magazine

August 21, 2012

Glen Yankus
National Park Service
240 West 5th Avenue
Anchorage, Alaska 99515

Dear Mr. Yankus:

This letter responds to the Brooks River Visitor Access Draft Environmental Impact Statement (DEIS) for proposed improvements at Brooks Camp in Katmai National Park and Preserve (Katmai). I am writing on behalf of Bristol Bay Native Corporation (BBNC), the Alaska Native Claims Settlement Act regional corporation for the Bristol Bay region. BBNC holds title to three million acres of lands in the Bristol Bay region and has over 9,000 Eskimo, Aleut, and Athabascan shareholders who have ancestral ties to the area.

BBNC commends the Park Service for the many years of stewardship invested in maintaining and improving the Brooks Camp experience. During several recent trips, I have experienced first-hand the bears, the fishing, the lodge, the Valley of Ten Thousand Smokes and other elements that make this such a unique destination. The Park Service and the concessioner have been good managers of this unique environment.

Katmai and Brooks River are of great cultural significance to many of BBNC's shareholders. Our people have lived in the area and utilized its vast resources from thousands of years. That use continues today. It follows that our shareholders and therefore this corporation have strong views on the continued development and evolution of Brooks River and its facilities.

BBNC understands that the access improvements discussed in the DEIS are a part of implementing the 1996 Development Concept Plan (DCP). While BBNC appreciates the Park Service's work in developing the DCP and current DEIS, we are not convinced that these documents present the best or most feasible alternatives for Brooks Camp. Several considerations lead us to question the decision to build, in the near-term, the extensive boardwalk and bridge improvements described in the DEIS. Even the modest improvements contemplated in the DEIS would be costly. The DEIS estimates the construction costs for any changes to the existing boardwalk and bridge system to be between 3.1 and 5.3 million dollars. Given the limited funding for improvements in Katmai, we believe there are likely other, higher-priority improvements that could be undertaken. There is also not much evidence that the existing lodge location or the crowding that results from bridge closings create adverse impacts for the bears or visitor experience. Bear populations have tripled in July in the last 20 years (DEIS p. 66). Visitor levels have increased since 2001 and now appear stable at 12,000-14,000 visitors per year (DEIS p.102). And many visitors report that crowding from bear jams added to their experience because it provided a safe yet intimate bear encounter (DEIS p. 103). Finally, the DEIS notes that several of the existing buildings are historic structures and may have to remain standing even if no longer in-use (DEIS p. 129). Given these factors, we question whether or not the short-term plan to invest significant funding into bridge and boardwalk improvements is practical.

We are also of the opinion that the Park Service could do more to deter bears near Brooks Camp from lingering near areas visitors use to traverse the Camp. Both the DCP and DEIS are premised on the belief that all bear-human interactions are detrimental to bears and should be minimized. This is, in fact, one of the rationales given for constructing a new bridge and boardwalk – these improvements are the best option to reduce bear-human interactions and facilitate safe and timely the movement of people across the river. We agree the Park Service should do its utmost to deter adverse bear-human encounters, but believe it could be doing more to manage the bears.

Our own experience suggests that bear-human interactions are woven into the fabric of the Brooks experience, will continue into the future and are creating minimal adverse impacts. In 2006 the National Park Service Regional Office assembled a Bear Management Review Team consisting of State and Federal bear biologists from several areas and departments. This group concluded that the Park Service should "actively implement aversive conditioning to discourage bears from loitering, resting or sleeping around housing areas, on limited stretches of beach where planes and boats routinely land and tie up, and on constructed paths, in particular the paths between the bridge, lodge, and campground and perhaps on the Falls Trail." And if that didn't work, they suggested that the NPS "rapidly escalate deterrence for repeat offenders if they ignore initial hazing during subsequent events." The DEIS currently rejects the idea of more intensive bear management (DEIS p. 49). Given the bridge and associated boardwalks are likely to cost several million dollars, and that bear-human interactions will inevitably continue to occur in and around Brooks Camp, we believe the option of more intensive bear management should be more actively considered and implemented.

We do not summarily reject the concept of building a better bridge and boardwalk. A new bridge and boardwalk could reduce congestion at the river, provide new bear viewing locations, help limit river-crossing related bear human interactions, and potentially reduce ongoing NPS management costs. We are also pleased to see that all the alternatives (other than the no action alternative) include a septic tank pump-out line that should alleviate some of the septic tank/leach field issues that have occurred over the last few years. Nevertheless, we believe there is a need to re-assess the benefits of alternative facility and programmatic approaches for Brooks Camp as a whole before committing significant funds to these incremental yet expensive improvements.

We share with the Park Service the goal of improving facilities at Brooks Camp for visitors, the Park Service, the concessioner, and the bears. We would like to work with the Park Service and other stakeholders to develop a better vision for the future of the Park. This vision would encompass the following characteristics:

- Revisit key DCP-proposed facility changes.
- Utilize improved bear management techniques to minimize adverse human-bear interactions. Accept that occasional delays while walking through Brooks Camp are part of the experience of the place, and not necessarily entirely negative.
- Work with the Council of Katmai Descendants, BBNC and other local Native entities to develop a new, more active program to tell the story of the thousands of years of native life along the river. We recognize that cultural resources will likely always be secondary to bears and fish as a reason to travel to Katmai. But we believe the cultural dimensions of the Brooks River experience are grossly underdeveloped. Brooks River is one of the most important, concentrated cultural sites in Bristol Bay if not in all of Alaska. Much more could and should be done to share and celebrate these traditions.

Bristol Bay Native Corporation is very interested in the future of Katmai National Park and Brooks Camp in particular. This interest reflects our broad goals for Bristol Bay: to help grow a more robust regional economy, to preserve and celebrate our cultural history, and to protect the long-term health of our region's natural resources. All three of these goals come into play when decisions are made about the Brooks Camp area, which is arguably the region's single most important tourism destination, cultural site, and natural phenomenon. I have an additional personal interest in Katmai as my great-grandfather, Walter Metrokin Sr., aided a National Geographic scientific expedition to the Valley of 10,000 Smokes in 1916 and 1917.

This is difficult time for villages in Bristol Bay and around rural Alaska. We see many individuals and communities facing serious challenges, including limited jobs and business opportunities, high and rising energy costs, school closures and declining external support. These challenges bring extra importance to decisions at Brooks Camp. Given our broad goals for the region and the importance of Brooks Camp, our corporation wants to see the best possible use of finite resources are utilized.

BBNC would like to be an active supportive partner to work with the Park Service and other stakeholders to chart the best future course for Brooks Camp in particular and Katmai National Park and Preserve as a whole. We would likewise be pleased to work with NPS, our congressional delegation and others to secure funding to implement that shared vision. Thank you for the opportunity to share these views. Please feel free to call or write if you have questions or wish to discuss our perspectives.

Sincerely,

Jason Metrokin
President & CEO

Cc: Ralph Moore, Superintendent Katmai National Park

10 August 2012

Glen Yankus
National Park Service
240 West 5th Ave.
Anchorage, AK 99501

Re: Katmai/Brooks River Visitor Access Draft EIS

Dear Glen,

The National Parks Conservation Association (NPCA) appreciates the opportunity to comment in plans for improving visitor access and resource protection at Brooks Camp. NPCA is America's only private nonprofit advocacy organization dedicated solely to protecting, preserving, and enhancing the U.S. National Park System for present and future generations. Founded in 1919, NPCA has more than 650,000 members and supporters of which 1,300 reside in Alaska.

NPCA has a long history of interest in this area having been a very active participant in the discussions that led to the 1996 Brooks River Area DCP. We have maintained our interest in seeing that DCP implemented and have spent time on the ground at Brooks understanding the implications and impediments to fully implementing that plan. We endorse and appreciate the commitment of the Park Service to implementing as much of that DCP as budgetary conditions will allow and we continue to support moving most of the facilities to the south side.

We support the preferred alternative (#4) as the one that is both the most environmentally preferred and best meets the purpose and needs. The purpose is to facilitate the phased relocation of Brooks Camp facilities to the south side of Brooks River and the need is to protect park resources, and improve both visitor safety and the visitor experience. We think alternative #4 does just that.

Alternative #2 does not meet the purpose and need because it drops vehicles back to ground level as soon as the river mouth has been crossed. This places motorized vehicles into a known bear corridor along the south side of the river and negates the opportunity to remove that section of road north of the Y. Similarly, Alternative #3 puts both motorized vehicles and people in the same location as Alternative #2, the bear corridor along the south side of the river, and it doesn't move the barge facility away from the river mouth. This is the worst of the four action alternatives as far as meeting the purpose and need. Alternative #5 isn't much better than #3, but at least it moves the barge facility away from the river mouth. Still it doesn't meet the purpose and need of this project.

We also support several of the changes to the 1996 DCP proposed in this Draft EIS. We have been on-site at the Naknek Lake floatplane and boat dock proposed in the DCP (3,000 feet southeast of the mouth of Brooks River) and agree that this is not a good place for landing floatplanes and we are glad to see that no breakwater will need to be constructed. We agree that a new floatplane landing area is not needed as either Brooks Lake or Naknek Lake, depending on the prevailing wind, provides existing and safe floatplane landing beaches without any new construction.

A key ingredient of the 1996 GMP was to reduce landings on Naknek Lake in a high bear traffic area and that can be done by encouraging increased landings on Brooks Lake. But for both landing sites to be efficiently used, the park has identified the need to cross back and forth over Brooks River with more certainty than now exists. Everyone recognizes and understands that bears have priority, so bear jams are a reality. However, bear jams hamper movement of both visitors and staff and so require a certain level of facilities on both sides of the river. The proposed elevated walkway will alleviate those concerns and facilitate the removal of facilities on the north side and help NPS meet the intent of the DCP. It will also facilitate the location of all utilities on the south side by including a utility connection to the north side as part of the walkway design. We recognize that some minimal NPS facilities will be needed on the north side to facilitate visitor orientation when that beach is used for access. But the eventual removal of utilities, staff housing, and maintenance buildings is a positive move for protecting both cultural and natural resources.

Similarly we understand that removing the floating bridge will negate the need to stabilize the riverbank on the north side. With the floating bridge removed, the riverbank will return to a more natural condition. We didn't see this benefit expressed in any of the alternatives discussions and suggest that it might be included.

We support moving the barge loading facility away from the mouth of the river. As one of the primary benefits of this plan is improved protection of natural resources by removing human use from the actual river corridor, this action is welcomed and fits well with the overall purpose and need of this project.

We feel that elevating the walkway across the mouth of the river will provide increased opportunity for conflict free bear viewing by park visitors. As with the existing walkway to and at the falls, separating humans from critical and heavily used bear habitat is good for both bears and people.

We are glad to see that this EIS changes the plans in the 1996 GMP for a new access road and shuttle bus system to the Beaver Pond Terrace and they will now not be constructed. We do have a question, however, about a potential conflict between the decision not to construct that new access road and a statement on page 11 that reads, subject to available funding, the lodge and campground would be relocated to the Beaver Pond Terrace in 15+ years. If this EIS makes the decision that no road or shuttle system will be built to support the Beaver Pond Terrace site, why is it still listed as something that could happen 15+ years from now? And if the Beaver Pond Terrace is not the location for those facilities, when will the decision be made on where those facilities should/could be relocated?

We assume those decisions will be addressed in a future planning effort and when that process commences, we strongly encourage NPS to include a serious discussion of carrying capacity for the visitor facilities at Brooks. Identifying the need for eventual carrying capacity decisions also dictates that the park be gathering the data now for the eventual carrying capacity discussion. Recent work on the Denali Road Vehicle Management Plan could provide some guidance on how to prepare for limiting visitor use in order to both protect natural and cultural resources and ensure a quality visitor experience.

Viewing bears at Brooks Camp is one of the most accessible and amazing bear viewing opportunities in Alaska and the Park Service is to be applauded for this proposal to improve that experience by elevating people above the bears and ensuring smooth movement of staff and visitors across the river in both directions.

Thank you for the opportunity to comment.

Sincerely,

Jim Stratton
Alaska Regional Director

Sierra Club Alaska Chapter
750 W. 5th Avenue, #100
Anchorage, AK 99501
August 17, 2012

Mr. Glen Yankus
National Park Service
240 W. 5th Avenue
Anchorage, Alaska 99515

Via electronic mail

Re: Draft Environmental Impact Statement (DEIS) Brooks River Visitor Access

Dear Mr. Yankus:

Thank you for inviting comment on the National Park Service's (NPS) proposal to amend the1996 Brooks River Area—Final Development Concept Plan and Environmental Impact Statement (DCP).

We have a long-standing interest in securing the highest degree of protection for Katmai National Park and Preserve, one of the world's finest national parks and wildlife sanctuaries. We strongly supported the NPS's 1971 wilderness proposal for the former Katmai National Monument. During the lengthy campaign for the Alaska National Interest Lands Conservation Act of 1980 (ANILCA), we urged Congress to expand the monument, designate the expanded unit a national park/preserve, and add most of the expanded unit to the National Wilderness Preservation System. These goals were accomplished in the Act.

Over the years since ANILCA we have commented on various park/preserve proposals, including the draft DCP, and on environmental assessments of proposals for implementing specific components of that plan.

It is against this background that we offer the following observations and recommendations.

The DCP

The Final DCP calls for removing the existing Brooks Lodge/NPS facilities complex on the north side of Brooks River. Floatplanes and boats would no longer have access to the Naknek Lake beach next to Brooks Lodge. The Brooks River floating bridge, which is put in and taken out each summer, would be permanently retired. The existing barge landing and access road at the mouth of the river would be removed and the site restored to a natural condition.

To replace the existing north side facilities, a new lodge/NPS facilities complex would be constructed on the south side and a new floatplane/boat/NPS barge docking

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facility/access road would be built on the Naknek Lake shore well south of Brooks River. A new Brooks River bridge is not part of the plan.

These measures are intended to benefit the park bears and promote visitor safety by restoring the north side to a natural, undeveloped condition with minimal human activity. Currently, bears traveling to Brooks River to fish for salmon, and otherwise occupying the north side, have to contend with what amounts to a community: structures and activities of the Brooks Lodge facilities; buildings and activities of the adjacent NPS visitor, maintenance, and employee housing complex; motorized vehicles used by lodge and NPS personnel; visitor traffic on the campground trail the bears also use; and with the constant arrival, departure, and noise of floatplanes, boats, and visitors at the Naknek Lake beach.

Alternative 4

Alternative 4, the proposed amendment to the DCP and both the NPS's Preferred Alternative and its Environmentally Preferable Alternative, makes major changes to the DCP:

- A new permanent multi-million dollar elevated bridge/boardwalk across Brooks River;
- Continued floatplane and boat use of the Naknek Lake beach; and
- Deletion of a new floatplane and boat docking facility on the south shore of Naknek Lake in favor of continued use of the north side beach. The new barge landing/access road would be retained.

Estimated construction cost of Alternative 4—the bridge/boardwalk, and new barge landing/access road—is $7,409,000, with a low estimate of $5,186,300, and a high estimate of $11,113,500.

According to the NPS, "The proposed 2012 plan [Alternative 4, the amendment to the DCP] is consistent with the overall intent of the 1996 plan [DCP] and continues implementation by proposing visitor access improvements as the next step." This statement is misleading. Alternative 4's permanent new Brooks River bridge coupled with continuing floatplane/boat boat use of the Naknek Lake beach as the park/preserve's primary visitor access point would conflict with the DCP's "people free" zone on the north side.

The DEIS downplays the subversive impact of Alternative 4 on the DCP. Under the alternative, "...remaining facilities and activities [on the north side] would be a ranger/visitor contact station, minimal day use facilities (vault toilet and picnic area), and limited emergency equipment such as a rescue skiff and medical supplies." Activities would apparently be limited to picnicking, and visits to a ranger/visitor contact station.

However, remaining activities would be those now occurring. Private float planes, commercial air taxis, and boats would load and unload visitors and anglers on the beach throughout the lengthy summer day. Brooks Lodge and the campground would

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continue operating for "15+ years." Four-wheelers from the lodge would pick up guests' baggage on the beach, and NPS vehicles would move packages and other supplies to the NPS facilities. Until the campground was relocated 15+ years in the future, campers would come and go along the beach to the distant campground. "Elite anglers" (the NPS's term) staying in the lodge or flying in for some brief fly-fishing would take the "social" (i.e., unauthorized) trails to the north bank fishing spots to fish for catch-and-release trophy rainbows and compete with the bears for sockeyes.

As they do now, armed park rangers would be on hand to monitor and protect arriving and departing anglers and visitors, and other visitors who may be in the general north side area or strolling along the beach. Bears traveling to and from the river via the beach, the campground/bear trail, or the bridge/boardwalk north entrance area would have their way cleared for them by rangers herding people away from the bears, including onto the boardwalk behind closed gates.

If the animals too closely approached visitors, anglers, pilots, boaters, Brooks Lodge personnel, or NPS employees, the rangers would, as they do now, "haze" the bears (NPS's term for using various non-lethal methods to run off bears).

Thus even after the planned relocation of major facilities to the south side, Alternative 4 would ensure that visitor activity on the north side would continue and probably increase, since the NPS anticipates an increase in visits to Brooks River. A key goal of the DCP—a "people free" zone for bears on the north side—would be abandoned.

Alternative 4 could also jeopardize the DCP's intent to replace Brooks Lodge with a new lodge on the south side. Congressional funding for a new lodge is not assured, since a far less costly environmentally preferable day use alternative is available. In the absence of funding, KatmaiLand, the Brooks Lodge concessionaire, could be expected to vigorously lobby for keeping its lodge operation—now enhanced by an elaborate new bridge/boardwalk/vehicle-accessible/bear-viewing platform a few steps away from the main lodge—at its present location.

Congress's directive and the DCP

In ANILCA of 1980 Congress provided specific guidance on the location of facilities designed to serve park visitors. "The primary overnight use facility [i.e., a lodge or hotel and related facilities] at the park/preserve will be at the west end[1] of Naknek Lake. Secondary facilities may be located elsewhere." Senate Report No. 96-413, p. 165.

By specifying a west end location for the primary overnight use facilities, Congress in effect told the NPS to plan for a day use visitor program for the Brooks River area.

Congress's guidance followed the NPS's own thinking in the agency's 1971 wilderness proposal for the former Katmai National monument. By then the agency was worried about visitor safety at Brooks River as bear viewing and angling steadily increased.

[1] Although the Report did not specify west end locations, they include the community of King Salmon, Lake Camp on the Naknek River, and Alaska Native corporation land adjacent to King Salmon.

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Concluding that Brooks Lodge and associated NPS lodge support facilities should be relocated, the agency considered a site on the northwestern side of Naknek Lake. Although the move was not made, had it been a day use program would be in place at Brooks Camp today.

Beginning in 1989 the NPS quietly brushed aside Congress's mandate and embarked on a lengthy planning process that culminated in the 1996 DCP. Instead of planning for primary overnight accommodations and related NPS facilities in the King Salmon area, the agency devised the current elaborate plan for a new south side visitor complex consisting of a new federally funded lodge and related facilities, NPS administrative facilities, NPS and lodge employee housing, new visitor access roads and bus shuttle system, campground, and floatplane/boat/barge landing facility.

During this same planning period the NPS also ignored former Interior Secretary Bruce Babbitt's gateway community policy that called for NPS overnight accommodations inside park system units to be relocated to communities at or near entrances to the units. The economies of gateway communities would benefit, and park managers, relieved of innkeeper support responsibilities, would be able to focus on more important management tasks. Had the NPS complied with the Secretary's policy, the DCP would today be a day use plan.

The DCP's new south side complex would be located in prime bear habitat, as evidenced by the concentration of bears on the south side, numerous heavily used bear trails and associated resting areas (day beds) linking the Brooks River area to Brooks Lake, Margot Creek to the south (a major salmon stream favored by bears), Savonoski River to the east, and salmon streams north of Iliuk Arm via the moraine separating Iliuk Arm and Naknek Lake.

If a new south side complex is constructed, bears traveling back and forth between Brooks River and the salmon streams would have to contend with structures and activities on a much greater scale than they now encounter on the south side. This could result in behavioral changes and disruption of their travel and feeding patterns. There would likely be an increase in human-bear encounters over what now is occurring.

In contrast to the ambitious and very costly south side development envisioned in the DCP, a far less costly day use program would have a limited facilities and activities "footprint" similar to what exists today. Existing development on the south side consists of the bear viewing platforms and trail, some NPS administrative facilities, and the road to the Valley of Ten Thousand Smokes.

Limited development associated with a day use program would benefit bears traveling to and from the river, as they would not have to deal with a new visitor complex. Better visitor and NPS staff safety could also be expected, as there would be fewer bear-human encounters compared with the DCP complex, and hence less potential unnatural "hazing" of bears by park rangers and other NPS personnel.

In summary, the DCP is a flawed half-measure that merely replaces the existing north side complex with a new one on the south side. Alternative 4 would make matters worse by maintaining permanent visitor and commercial activity on the north side.

Recommendation

We recommend the adoption of Alternative 1, No Action, revised to eliminate the $1.54 million hardened ramp at the current site at the mouth of Brooks River. We agree with the NPS's plan in Alternatives 2, 4, and 5 of the DEIS to move the existing barge landing out of the prime bear habitat and salmon feeding area at the mouth of the river.

The modified No Action alternative we recommend would avoid the folly of Alternative 4 —a very costly permanent visitor access facility that would perpetuate the current visitor-bear management problems and headaches on the north side that work to the detriment of both bears and people.

Most importantly, a modified No Action would preserve the option of a day use program for Brooks River. This option, which was one of the alternatives in the Draft DCP, is viable because implementation of the DCP is in the early stages. The "largely completed" maintenance facilities and the utility infrastructure "underway" on the south side would be part of a day use program.

Day use is the true "Environmentally Preferable Alternative" for Brooks River management because it is the alternative most consistent with the purposes and values of this magnificent national park and preserve. If we remember correctly, this was also the conclusion of the DCP environmental analysis. We urge the National Park Service to withdraw the DCP in favor of a day use plan for Brooks River as ordered by Congress.

Thank you for considering our views.

Jack Hession
Executive Committee
Alaska Chapter Sierra Club

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Brooks River Access, Draft Environmental Impact Statement 2012

Comments and thoughts along with some history
By Raymond F. (Sonny) Petersen
Katmailand Inc., president

In order to understand why this project is even being considered, a person needs to know the history that led up to it. As you may know, I have been around Katmai, and Brooks Camp in particular, all of my life and I have worked there in one form or another for the last forty four years.

While the 1996 Brooks Camp Development Concept Plan (DCP) did not call for a bridge, it did call for the removal of all facilities including the lodge on the north side of the river, to be replaced by new facilities in several areas on the south side of the river and the Beaver Pond Terrace. The National Park Service (NPS) preferred alternative in this EIS also leads to the eventual replacement of all north side facilities to the south side of the river, while maintaining only a boat and aircraft landing and parking area on the north side. So as I see it this EIS is a way for the NPS to implement the 1996 DCP.

The reason there was a DCP in the first place is because it was called for in a General Management Plan (GMP) for Katmai that was developed back in 1986. The GMP had concluded that the current Brooks Camp facilities on the north side of the river "represents and intrusion on prime bear habitat and feeding patterns", and that the camps continued existence there actually threatened the survival of the bear population.

These GMP conclusions were primarily based on a bear study that was done by a biologist named Barry Gilbert. Gilbert went about documenting any time something a human did affected a bear's behavior in any way, even so much as if a bear turned to look. When a bear was distracted even for just a second, it was assumed to be detrimental and disruptive of his natural behavior. Gilbert's study was never peer reviewed, however a biologist from the U.S.G.S. named Tom Smith, did find and document flaws in the data and he also disagreed with the assumption that when humans affected bear behavior it was unnatural and therefore bad. Recent history and the archeological record of the Brooks Camp area prove that Gilbert was wrong.

The archeological record of the area suggests that Brooks River actually never was "bear habitat". A paper written by NPS archeologist Ted Birkedal titled Ancient Hunters in the Alaska Wilderness: Human Predators and Their Role and Effect on wildlife Populations and the Implications for Resource Management, describes how since 4,000 years ago... "All evidence attests to an intense and continuous occupation of the river margins by Native Alaskans that extends well into the historic period". His paper goes on to describe the human activities and how their survival would have depended on keeping bears out of the river corridor. He also describes a personal communication with a Dena'ina elder and bear hunter where he learned that the natives in the Kijik area north of Katmai at one time actually managed lesser streams for use by bears, so that they could hunt them when they needed to. This is contrary to Gilbert's notion that human's effecting bear behavior is disruptive of natural behavior patterns.

When the Brooks Lodge was first established in 1950, there were very few bears on the river and native salmon drying racks still existed at the river mouth, though they were no longer used. In fact there is notation in an early 1950' log and register on a July date that bear tracks were seen on the beach. Of course on today's Brooks River a minute doesn't go by on any July day without dozens of bears cavorting all over the river and on the beach in front of the lodge.

By the time of Gilbert's study there were far fewer bears than there are now, and there were also far fewer visitors. So during that short span of time, in spite of increased human use of the area, the bear population has increased as well. This is contrary to the Gilbert conclusion that the bear population was threatened. And this flawed bear study is the main reason we are even here today talking about this EIS. The study led to the DCP which led to this EIS. Millions of dollars have already been spent. And the NPS continues to want to go down this road with out looking back at why we are here in the first place, which is because of bad science done years ago.

A protégé of Gilbert during his bear study was a woman named Tammy Olson. Ms. Olson eventually became resource manager for Katmai. She held Gilbert's view that anything a human does that affects a bear in any way is unnatural and bad for the bears. Since then the NPS in Katmai quit bear management all together and has focused entirely on managing people. This "bear management" policy (or lack thereof) has been passed on and is still in affect today. In 2006 I along with Brooks Camp Manager Jim Albert approached then NPS regional director Marsha Blaszac to complain about it. There was a vacancy in the Katmai Superintendent position at the time and we were concerned with Ms. Olson's influence on operations at the camp. The Regional Office assembled a Bear Management Review Team consisting of State and Federal bear biologists from several areas and departments. It was no surprise to me that the review team concluded that yes, there should be management of bears.

Among other things they recommended "Increase the number of people involved in the actual management of bear behavior (currently there are two bear techs involved in management at Brooks, with very little hazing beyond noisemaking). Actively implement aversive conditioning to discourage bears from loitering, resting or sleeping around housing areas, on limited stretches of beach where planes and boats routinely land and tie up, and on constructed paths, in particular the paths between the bridge, lodge, and campground and perhaps on the Falls Trail." And if that didn't work right away they suggested that the NPS "Rapidly escalate deterrence for repeat offenders if they ignore initial hazing during subsequent events."

Needless to say these policies were never implemented. When the new Superintendent asked Olson for a plan to implement them her response was a list of reasons why she shouldn't, couldn't or wouldn't. Olson is gone, but her mentality lives on at Brooks Camp. Instead of implementing the recommendations, the NPS actually puts out signs and guards in order to keep bears from being disturbed when they lay down to sleep on the beach less than ten yards from the visitor center. Hence the need for an elevated bridge; it really just comes down to that, a lack of bear management. Otherwise a floating bridge would work just fine.

Meanwhile the NPS has created several huge gashes in the trees on the south side of the river. If you fly over the Brooks Camp area today you barely notice the original Brooks Lodge and other facilities on the north side of the river. Your eyes are drawn to the developments on the south side, which if you were to draw a circle around them all, cover an area much larger than what is on the north side. And as I understand it, those projects are beset with problems and cost overruns.

So the question I ask today is this; when is someone with the authority to do something going to stand up and say, "Enough is enough. Let's cut this nonsense right now. Let's get off this DCP road and do the right thing".

I suppose exactly what the right thing is can be debated. But whatever it is, it shouldn't be an expensive unnecessary plan with roots in a flawed premise. I remember this whole bridge thing started at a planning meeting that Brooks Lodge Manager Jim Albert and I attended a few years ago. That meeting was about the leach field failing and the sub-standard NPS employee housing. The plan was to get some money to move some NPS employees to the south side and they asked us if we would be willing to move some also. This would put less stress on the leach field thus extending the life of the leach field and solve their problem with housing. We agreed to move a few employees, but we also brought up the access issue.

The answer the NPS had to the access issue was to build a bridge, not manage bears which would be a lot cheaper. Why not go ahead and build some housing on the south side for a couple of extra people to manage bears. That is much cheaper than building bridge. How about some fiscal responsibility here!

The bridge would have advantages even if bears were properly managed, I'm not totally against it, but it is unnecessary and expensive. And again let's stop this DCP nonsense about moving the lodge and everything to the south side of the river. Let's not tear up the landscape over there beyond what's already been done.

Thank you for this opportunity to comment and for your consideration.

Please consider the following comments for the Brooks River Access Draft Environmental Impact Statement.

The NPS preferred alternative (alternative 4) is fiscally irresponsible and will likely degrade the sensitive resources of Brooks Camp and the Brooks River more than the no-action alternative. I do not support any alternative that includes the construction of a permanent elevated bridge across the Brooks River.
The Draft EIS states several reasons for the need for this plan. However, except for the utilities connections, most of the needs listed on pg. 7 of Draft EIS can easily be met with reasonable modification of policy and a modest increase in staffing levels for bear technicians, interpretive rangers, and law enforcement rangers. For example,

•Dependable access could be provided through a combination of increased staffing levels and by modifying existing policy to allow both visitors and employees more reliably access to work and bear viewing areas during July and September when bears most often impede human traffic flow across the floating bridge. It is not necessary to build a multi-million dollar bridge to provide more reliable access. For example, currently many Brooks Lodge employees have early work shifts that, in September, start well before sunrise. The bridge is not necessary to provide concession staff (who will in the near future presumably be living in the new housing areas near the Valley Road Administrative Area) access to work. This is just one situation where an increase of park staffing, policy modification, and proper behavior by concession staff could resolve the issue.
•The visitor experience at Brooks Camp is remarkably high, and the park's annual visitor surveys support this fact. I agree that the current barge landing area can degrade the visitor experience, and that the barge landing should be moved. However, can the NPS provide any evidence that the visitor experience suffers because of delays to visitors' movements that bears cause? If so, it should be included in the EIS and the park should provide justification that the bridge would substantially improve the experience in a way that increase staffing levels and policy modification cannot.
•The raised bridge may improve visitor safety in some ways. However, it will not prevent conflicts between bears and anglers in the river nor will it prevent conflicts between people and bears in Brooks Camp around the lodge, lodge cabins, campground, on the Naknek Lake Beach, Brooks Camp employee housing, and along the Brooks Falls Trail. The Brooks Falls Trail, in fact, is statistically the most dangerous place to travel in Brooks Camp if one considers the amount of human injuries caused by bears. The permanent raised bridge, as proposed in all of the action alternatives, will only perpetuate bear-human conflicts on the north side of the river. It will not substantially reduce them.

Beyond my disagreements for the project's need, another main reason for my disapproval of the preferred alternative is that its cost is exorbitantly high. The preferred alternative will cost taxpayers millions of dollars. This bridge will only provide greater access across the river for a few weeks each summer and fall, and therefore it is not worth the money. Delays caused by bears across the current floating bridge, in some instances, are long in duration, but the vast majority of these delays are short even during peak times of bear use along the lower Brooks River in July and September. The park has been gathering some statistics on the length of bridge closures. Does this data support the need for an elevated bridge? If so, why is not included in the EIS?

I am also concerned that the raised bridge will inhibit the relocation of Brooks Lodge to the south side of the river. In the comments to the 1996 DCP for Brooks Camp, both Ray Peterson and his son Sonny, owners of KatmaiLand, Inc., expressed their disapproval of the relocation of Brooks Camp. A permanent raised bridge across the Brooks River may provide less motivation for KatmaiLand, Inc. to cooperate with the NPS to relocate Brooks Camp. This scenario has already played out in the past when KatmaiLand influenced the late senator Ted Stevens to oppose any appropriations that could be used to move Brooks Camp from its current location. If the current ownership of KatmaiLand does not support the phased relocation of Brooks Camp, then the plan will likely meet with more political opposition which will inhibit and/or prevent the relocation of Brooks Camp.

Additionally, this EIS states on pg. 4, "After the phased relocation is complete only a ranger/visitor contact station, minimal day use facilities (vault toilet and picnic area), and limited emergency rescue equipment would be maintained on the north side of the river. The bridge and boardwalk system would allow access from floatplane/boat point of entry across Brooks River to the relocated Brooks Camp on the south side of the river..." This will fail to achieve the goals of the 1996 DCP since permanent facilities will be located north of the river, and could potentially lead to long term, adverse impacts to bears.

Overall, the NPS's preferred alternative is a poor choice and it should not be implemented. There are far better and inexpensive ways to solve the access, resource protection, visitor experience, and relocation issues of Brooks Camp. No action should be taken until the park can guarantee the relocation of Brooks Camp to the south side of the river. Increases in staffing levels combined with changes in policy and creative thinking can easily resolve most of the issues associated with the current situation. If the NPS thinks that building an elevated bridge across the Brooks River is the best solution for the current challenges of the site, then the NPS is not thinking creatively enough.

Anonymous

Gisonia, PA 15044

I wish to remain anonymous.
I really wish things could stay as they are. I am worried about the affect of the construction on the wildlife that visits the area. Not just the bears. Will the construction crews keep a clean camp? What months will this happen?
If I have to chose....I pick alternate #3. It provides the least new construction.

Please....use the least amount of construction if you have to do new work. The sounds of construction do NOT blend well with nature. PLEASE do this at a time well before JUNE when all the bears start to show back up. It's such a critical time for them..... Also...PLEASE don't start until November. if then.
please please do NOT disturb the bears....this river and fish provided is such a HUGE staple for these bears to survive. NO construction during critical times.
PLEASE work along side your wildlife biologist to assure all is good on "natures" side.
Thank you for your consideration......
A regular....someone who cares

Anonymous

King Salmon, AK 99613

I respectfully request that the NPS extend or reopen the comment period on the Brooks River Visitor Access Draft EIS for an additional 30 days. The 60-day comment period is not sufficient to fully analyze the draft EIS and provide useful information to the NPS. Importantly, the comment period overlapped with much of the field season in Alaska, which for many potential commenters, severely reduced the effective time period for preparing meaningful comments. Thank you for your attention to this request.

Anonymous

Anchorage, AK 99507

1. The comment period for the draft EIS coincided with the primary portion of the Alaska field season, and thus many potential commenters likely did not have nearly the 60 days to provide meaningful comments on the lengthy and complex document. My comments here on the draft EIS are therefore necessarily quite draft and incomplete (apologies for the draft nature of my comments). I am therefore requesting an extension or reopening of the public comment period for 30 days to provide a more adequate period for meaningful public review and comment.

2. The application of the concept of "tiering" in the new draft EIS is not consistent with NPS guidance:

While the NPS identifies vague time frames in the draft EIS for some elements involved in potentially relocating the camp to the Beaver Pond Terrace (the preferred alternative in the existing EIS), there is in reality no time frame identified for the actual camp move-only a non-specific reference to 15+ years. Thus, the draft EIS is actually contemplating an indefinite period of an expanded footprint with much of the camp and the campground remaining in its present location, and additional development near the VTTS road intersection interconnected by an elevated bridge that will also expand human traffic presence on and immediately adjacent to the river (by providing essentially open access to the bridge by human foot and vehicle traffic). The 1996 EIS analyzed an alternative (Alternative 1) that more closely resembles the scenario describe in the new draft EIS – most notably, this alternative included an elevated bridge while leaving the camp in its current location. While a tiered EIS to evaluate elevated bridge options might arguably be appropriately addressed for Alternative 1 of the 1996 EIS, Alternative 1 was not identified as the preferred alternative in that EIS.
The DO-12 handbook indicates tiering from an existing EIS is applicable only when doing so from " . . . a large scale plan that determines broad direction, such as the GMP, [when] information can be less detailed and site-specific, because decisions are made on a gross scale (NPS, DO-12 Handbook; 73 CFR 61292, October 15, 2008). Even if one were to argue that this guidance could apply to specific elements of a large project, this argument clearly does not apply in the case of this draft EIS. The elevated bridge and indefinite period of camp operation on the north side (among other elements) are outside the scope of the preferred alternative identified in the 1996 EIS. Indeed, these elements were specifically included in other alternatives that were rejected in that EIS. It is also important to note that the draft EIS concludes that an elevated bridge with an indefinite period of continued operation of most of the camp on the north side of the river is environmentally preferable. However, the 1996 EIS did not find that Alternative 1, with camp on the north side and an elevated bridge was the environmentally preferred alternative (it should also be noted that moving some employee housing to near the VTTS road intersection in a theoretical time frame of 15 years will not substantially reduce the camp operation on the north side and cannot be claimed to be a significant change from Alternative 1 of the 1996 EIS).

I also note that the NPS has previously claimed that it only considered projects in line for funding as reasonably foreseeable for the purposes of preparing NEPA analyses. In fact, in responding to public comments on the Brooks Lake Maintenance Facility EA (FONSI, 2007) that expressed concern about a likely future proposal to construct an elevated bridge, the NPS stated that "There are no current plans to construct a new bridge across the Brooks River, so this speculation was left out of the EA section on reasonably foreseeable future actions and is considered beyond the scope of the EA." The rationale provided at the time for this claim was that no funding had yet been obtained for a bridge and it thus not foreseeable. It is clearly inconsistent, at the least, for the NPS to claim in a previous NEPA document that unfunded projects are outside the scope of a NEPA analysis, but then claim in this draft EIS that moving the camp in an unspecified time frame is a foreseeable future action within the scope of the EIS (i.e., per the NPS's approach in other recent NEPA documents, the move should be considered not foreseeable at this time). Also, see my additional related comments on inappropriate segmenting of clearly connected projects under Comment 2 below.

In addition, there are other changes in the new draft EIS from the preferred alternative identified in the 1996 EIS that are quite substantial and warrant more comprehensive analysis. Specifically, the draft EIS indicates that the NPS is now proposing to continue aircraft and boat access on the north side of the river long-term rather than managing the north side as an area predominantly for bear use only.
If the NPS continues to contemplate an elevated bridge and indefinite time frame for operation of a substantial portion of the camp in its current location, then the Service must prepare an EIS that fully evaluates this action, along with a reasonable range of alternatives (versus just a new elevated bridge not previously contemplated in the preferred alternative of the 1996 EIS).

3. The NPS has inappropriately segmented connected projects into several separate EAs and this draft EIS.

The DO-12 handbook and the underlying NEPA regulations indicate that connected actions are those that are: "'closely related' to the proposal and alternatives. Connected actions automatically trigger other actions, they cannot or will not proceed unless other actions have been taken previously or simultaneously, or they are interdependent parts of a larger action and depend on the larger action for their justification." (NPS, DO-12 Handbook; 73 CFR 61292, October 15, 2008). Clearly, the bridge proposed in the draft EIS is connected to other actions that the NPA has already inappropriately analyzed in separate EAs (i.e., Lake Brooks Maintenance Facility EA and Brooks Utilities EA). For example, the draft EIS discusses that the proposed bridge and boardwalk "... would serve to provide an electric connection between Brooks Camp and the Valley Road Administrative Area." and that "... some of the utility systems on the north side of the river need to be connected until the phased relocation is complete." By inappropriately segmenting aspects of the larger overall action into smaller pieces that were and continue to be analyzed in separate NEPA documents, the potential impacts have not been adequately assessed. As the DO-12 handbook notes: "... Agencies are specifically prohibited from segmenting projects, also known as piecemealing. 'Proposals or parts of proposals which are related to each other closely enough to be, in effect, a single course of action" are to be evaluated in a single NEPA document.' ..."

The draft EIS is clearly another case of inappropriate segmenting of connected projects, rather than a tiered NEPA analysis as the NPS claims. Also see my related comments under Comment 1 above regarding the related issue of purported "tiering" of the analysis. If the NPS believes that conditions have changed such that the preferred alternative identified in the 1996 is no longer viable, then the NPS must prepare a single EIS that analyzes the Service's preferred action for future development and management at Brooks River along with a reasonable range of alternatives (rather than a number of piecemeal connected NEPA analyses of limited components of an overall and changing larger action).

4. The purpose of and need for the preferred alternative, in particular the need, are largely not supported sufficiently by the background information and analysis of environmental consequences. They also are not in some respects reflected by the current approach to managing bear-human interactions. For example:

The draft EIS states that one of the needs for the preferred alternative is to "... improve visitor and employee safety, reducing the risk of human-bear conflicts." However, no data are presented in the draft EIS that clearly demonstrate this need. Statements about suggested increases in human-bear interactions in the lower river near the bridge, for example, are not adequately supported with actual data. References to personal communications are insufficient with regard to demonstrating the purpose and need. The draft EIS analysis also inaccurately represents certain information related to human-bear interactions. For example, it is suggested that "... the hazing policy is particular important for the area near Brooks Camp in the fall . . ." and that "In recent years, the number of times hazing is used near the camp . . . has increased." The document referenced for this information does not actually discuss this information in these terms. The draft EIS implies that there has been some sort of need for increased hazing of bears near camp in the fall and that this approach is somehow an important aspect to managing the area. The report referenced for this information actually discusses concerns related to park management' relatively recent push to haze bears outside of the camp for human convenience. Also, the implied trend of increased hazing of bears near the camp is clearly primarily a reflection of a shift in management policy versus an actual change in bear use and/or human-bear interactions there.

The affected environment section reads like an unfocused literature review and it is unclear how much of the information relates to the analysis of consequences of the alternatives and to the purpose and needs identified in the draft EIS. For example, it is unclear how many of the details included regarding research on bear behavior at Brooks relate to assessing the consequences of the alternatives considered.
The park currently takes a lax approach to implementing and enforcing the existing distance regulations at Brooks River – for example, management has recently elected to limit enforcement of a 50 m minimum distance standard between people and bears only to the very narrow subset of situations involving a bear actively eating a fish. Failure to enforce a more broad distance requirement clearly contradicts the suggestion in the purpose and needs section of the Draft EIS that there is a need to improve visitor and employee safety.

The increase in visitor use suggested in Fig. 13 of the draft EIS beginning in 2003 is not adequately explained and appears to be likely an artifact of data collection, management, and analysis. In fact, the "increase" beginning in 2003 coincided with a change in supervision of the interpretive division at Brooks River, which maintains records of visitor days associated with contacts through the visitor center and campground stays. Also, the EIS should be revised to refer to "visitor days" versus "visitors", as this is the actual metric that has been documented.

There is a lack of precision with the summary of information regarding bear use of Brooks River. For example, the information on bear numbers appears to refer specifically to independent bears rather than all bear including dependent offspring. This information should be revised to represent the referenced reports and data accurately.

5. Significant components of the preferred alternative (and common to all the alternatives) in the 1996 EIS, such as seasonal closures on the river and visitor use limits, are missing in the new draft EIS (with the exception of general reference to the limits), including with regard to time frames to address them.

6. There is a lack of a thorough discussion of the relationship of the preferred alternative to the Park's Bear-Human Conflict Management Plan, which is a step-down plan from the Park's General Management Plan.

7. A number of the short- and long-term mitigation components of the alternatives discussed in the draft EIS, such as work time limits, construction noise restrictions, use of quieter vehicles, etc., have not been integrated adequately into many previous projects at Brooks (and despite the fact that they have been cited in NEPA documents as mitigations that would be addressed for other past projects). Therefore, these components should be more specifically described and specifically identified as fundamentally required.

8. The draft EIS does not include a reasonable range of alternatives (but also see comments 1 and 2 regarding segmentation and tiering). Clearly an alternative that should be considered would be existing conditions, but with incorporation of aspects of the 1996 EIS that could address the

stated purpose and need, such as visitor use limits, as well as the relocation of the barge dock discussed in the draft EIS.
Also, none of the alternatives considered seeks to minimize the potential impacts of a potential elevated bridge. For example, none of the alternatives seeks to minimize the size of the structure and components that could result in increased human presence and potential impacts due to presence of people and vehicles overhead (for example minimizing turnouts/potential "viewing" sites along the proposed bridge).

Anonymous

Anchorage, AK 99507

Brooks River Visitor Access Draft Environmental Impact Statement Comments
8/21/12

First I would like to request an extension on the comment period for the Brooks River Visitor Access Draft Environmental Impact Statement (EIS) based on the timing of the EIS comment period relative to the busy Alaska field season and also because of the length and complexity of the document. I do not feel that I had adequate time to fully address all my concerns and submit complete comments. Below is a partial list of my comments.

I. Overview Comments

This plan appears to be a significant deviation from the 1996 Brooks River Area Development Concept Plan (DCP) and I feel there should be more planning, research and data to support the proposed amendments and actions to the DCP. The proposed EIS creates a much larger footprint in Brooks Camp, not a smaller one. The DCP called for the removal of everything on the north side, including the bridge. The impacts of planes continuing to land on the beach and visitors debarking there is significant. Also, the vehicle and human use on the road that goes from the lower river to the Valley Road Administrative Area will likely increase significantly and I saw no mention of this in the EIS. Finally, building a large permanent bridge and boardwalk structure was not included in the DCP.

I think the proposed boardwalk/bridge is an extensive and costly project for a limited time period and a relatively low number of visitors. The time period is at most the month of July and 2 weeks in September. Also, bridge data does not support the repeated, long closures that are perceived by many people and as is suggested in this document. I would like to see further exploration of alternatives and possible solutions. For example, the lodge closing date was changed from Sept 10 to Sept 17 in 1992. There is no consideration in this document for an alternative operating period for the lodge and the length of the visitor season in reducing delays at the bridge at a time when bears are predominantly feeding in the lower river.

Also, there are connected actions referred to in this EIS, specifically the EA for the utilities and housing development that were previously completed and were inappropriately analyzed as if they were separate actions. The current bridge/boardwalk proposal was not identified as a foreseeable action in the EA for the utilities and housing.

Also, the suggestion that the EIS is tiered from the existing EIS does not appear consistent with NEPA guidance. Tiering is referred to as : "When preparing a largescale plan that determines broad direction, such as the GMP, information can be less detailed and site-specific, because decision are made on a gross scale. When land identified as potentially suitable for development is planned for a set of visitor-related facilities, the decision to develop the area is not revisited. Instead, the NEPA document prepared in conjunction with the development plan proposal is "tiered," or procedurally connected to the large-scale plan NEPA document." The previous EIS was quite specific -- not a gross-scale type EIS – and even included an alternative that resembles the one identified in the current draft as the NPS preferred alternative. The current EIS therefore does not appear consistent with NPS guidance with regards to "tiering.".

The barge landing and the bridge/boardwalk projects should have been separate alternatives. It limited our options of supporting one without the other and according to NEPA; there should be a reasonable range of alternatives. There is no alternative with a relocated barge landing and no elevated bridge.

A. Human safety

In the purpose and need for action section (P. 7) and throughout the EIS, it states "visitor and employee safety needs to be improved to reduce the risk of human-bear conflicts", specifically in the area near the mouth of the river.

First, the EIS states on P. 123 "Very few incidents have historically occurred at Brooks Camp." Also, I have not seen park management reflect this same concern for human safety in management decisions.
-There has been a significant and continued dillution of the wildlife distance regulations and how they are interpreted and enforeced in the last several years.
-Bear management changes include bridge guide situations where rangers now escort people less than 50 yards past sedentary bears and staff is required to haze sedentary bears in certain situations. How does this contribute to human safety?
-Through 2006, there was a stipulation included in the Commercial Use (CUA) stipulations that "Landing, taking off or taxiing within 100 yards of visible bears, moose or caribou is not permitted" and this was removed in 2007 and so aircraft on Naknek Beach frequently start up 50 yards or less from bears travelling on the beach which often sends bears running through camp and in close proximity to people.
-The campground trail, P. 70 "is quite problematic because both people and bears are trying to use the same north to south corridor along the shore of Naknek Lake in the fall (Olson et. al. 2009)." It was proposed that this trail get rerouted further inland away from the beach to help minimize human-bear interactions, and yet nothing has changed.

B. Bridge specifics
I do not support the multiple viewing areas along the bridge. I think there is a larger impact on bears to have so many areas with concentrated human use, especially near the river and on both sides of the river. I am in favor of keeping one larger viewing platform that is not part of an access corridor. Personally, I would not want to view bears in a national park with a stream of people and vehicles passing by and all the noise associated with that. I would find that to be a very unpleasant and distracting experience.
Since the bridge will be above the area where bears feed in the fall, will the structure then have a closing period like 10pm to allow bears less habituated to people access to the food source, like the falls platform currently has.

C. Impact on bears
I am concerned about the long term visual and noise impact of such a large structure along the river corridor and across the river, especially the alternatives that run the north boardwalk west of the corner area and through the previously undisturbed area on the south side. This would be a significant impact and potential disturbance to bears feeding, resting, and travelling primarily in the lower river in the fall, as well as the bears that utilize that area in July.
I am also concerned about the level of habituation of bears to noise that will likely occur with an elevated structure, especially with vehicles travelling 10 feet over bears, and the consequence of this on bear management. On P. 72, it states that "Hazing these bears with noise has proven to be important and effective in providing negative reinforcement for such behavior (Olson et. al. 2009)". If bears are frequently exposed to noise and become habituated to high levels of noise, then that becomes an ineffective tool in bear management scenarios. These points are by no means representative of all of the potential impacts I think this project may have, I was unable to complete my comments.

D. Corner area implications
The document repeatedly implies that the "Corner would be rehabilitated and restored and its use would be reserved primarily for bears" and it will be a "undisturbed and buffered area for bear resting or movement near the river mouth"
In my opinion, the area around the "corner" will not compensate for the area that will be impacted on the south side of the river. The area that is gained is 330 feet from fish freezer to the

river as opposed to 630 feet long boardwalk through a section of undisturbed forest on the southern end. This is a previously undisturbed area which is used by bears for resting and travelling to the river. It is also an area that provides cover for bears to travel as opposed to the marsh and wetlands nearby.
I think if there was an elevated platform on the same trail that is used now to the corner, the bears who generally used that area would continue to use it and pass under the platform. I think the impact of putting the boardwalk out into the marsh has a far greater impact on a larger number of bears especially since all the feeding is in the lower river in the fall and there will be bears that are not habituated to that level of human activity.
P. 27 "A secondary purpose of these ramps would be to provide anglers and other visitors access to Brooks River." This contradicts the implication that the "corner" area will become an "undisturbed and buffered area for bear resting or movement near the river mouth"
P. 27, last par., states "the Corner would be rehabilitated and restored and its use would be reserved primarily for bears" and yet in other parts of the document, its states that there will be emergency ladders to provide anglers and other visitors access to the Brooks River in this same area. This "corner" area is currently a popular fishing area for both visitors and employees and its proximity to Brooks camp also means people frequently walk down the beach towards the point and corner area so I do not see how it will be reserved primarily for bears unless it is closed to human traffic.

II. Comments by Section
p. vi states that "Other decisions made in the 1996 plan … would remain valid. These decisions include the following: - visitor use limits as proposed in the 1996 plan" yet limiting visitor is not included in the analysis of the alternatives and the potential impacts of that on the alternatives. Visitor use limits could be useful in addressing some of the purpose and needs of this proposed project.
P.3 Intro: "Supplies for the concession operation and park administrative facilities arrive via barge or boat to a landing site at the mouth of Brooks River, on the south shore just 750 ft. along a riverside access route from the bridge." This statement implies that boats and barges can only land on the south side. The NPS barge lands on the north shore when needed, as do many other boats. Also, I have seen the concession bring in supplies predominantly by plane.
p. 3 "Human-bear interactions in the Brooks River area result in numerous visitor safety issues." Where is the data to support this? The entire Brooks Camp Developed Area has a high concentration of brown bears and that area doesn't have significantly more human bear interactions than other areas and I would say that those interactions are on a whole safer because that area is managed by rangers that are enforcing the "50 yard rule" and therefore people are often not as close to bears and they might be when they are on their own elsewhere in the area.
p. 3 "The NPS Brooks Camp policy requires people maintain a distance of 50 yards from brown bears" This is incorrect, the 50 yards comes from a regulation that applies to the entire park and is not specific to Brooks Camp. It also states that people cannot approach a bear within 50 yards. The regulation reads:
36 CFR
§ 13.1206 Wildlife distance conditions.
(a) Approaching a bear or any large mammal within 50 yards is prohibited.
(b) Continuing to occupy a position within 50 yards of a bear that is using a concentrated food source, including, but not limited to, animal carcasses, spawning salmon, and other feeding areas is prohibited.
(c) Continuing to engage in fishing within 50 yards of a bear is prohibited.
(d) The prohibitions in this section do not apply to persons-
(1) Engaged in a legal hunt;
(2) On a designated bear viewing structure;
(3) In compliance with a written protocol approved by the Superintendent; or

(4) Who are otherwise directed by a park employee.

On P. 7 under Need and then Improve safety, it states that "Visitor and employee safety needs to be improved to reduce the risk of human-bear conflicts where brown bears concentrate near the mouth of Brooks River-the center of bear viewing activity. Bears often swim along and climb onto the floating bridge, barge road, and docking area. The human-bear conflicts with visitors accessing the floating bridge, landing the barge, and trucking materials along the barge road are numerous, dangerous, and time consuming for NPS and lodge employees, contractors, and the public."

This statement contain things that not accurate. Bears do not "often" climb onto the floating bridge, it has occurred but very infrequently. The lower river is the center of bear viewing activity in the fall and the Falls in July. I would disagree that the human-bear conflicts are more numerous in the lower river than elsewhere in the area, especially between anglers and bears in the river. The "corner" area may have more documented cases merely because that is where the rangers are and are able to see and document such things. There is much less ranger presence on the river, on the falls trail, on the roads and at Brooks Lake so that human-bear incidents may not be recorded or reported in those areas. I would also disagree that the area is any more dangerous than any other area in the Brooks River corridor. The entire area has a high density of brown bears and I have seen much closer encounters between bears and humans on the falls trail, with anglers in the river, on Naknek beach and people are less likely to abide by the distance regulation in areas with a lower presence of rangers. Whereas the area around the bridge is managed by rangers and so people are generally further away from bears and also in larger groups (arguably safer). Also I do not see how trucking materials along the barge road are dangerous, perhaps for bears, but not for humans.

P. 7 Improve visitor experience states that it can be improved by reducing access delays whereas later in the document it states that visitor experience is actually improved by these delays.

P. 17 par. 1 Do you mean "by designing and installing the minimum level of light sources needed for staff safety" that there will be lighting on the bridge and boardwalk? Is this included in the impact analysis on wildlife? I disagree with putting lights on a structure over an area where bears feed especially since I have observed bears that are not habituated to humans come to the river late in the evening. Having lights could potentially alter the behavior of bears and limit their access to the food source.

P. 26 There is not enough information in the construction schedule or anywhere in the EA on how long each phase of the construction projects will take, what equipment will be needed and utilized, number of crew and timing of projects (late fall is not specific) to fully evaluate the impacts of each alternative.

Specifically "Any work that needs to occur during the summer season would be scheduled for the periods of lowest bear and visitor activity" does not give sufficient information to evaluate the environmental impacts of the construction activity. Does this imply that no construction will take place in July and September to mid Oct? Also, p. 26 par. 3 states "Much of the construction is scheduled for late fall and early spring to avoid periods of peak bear numbers, (peak bear use in the fall is generally September to mid-October) and then prior to that in par. 2 it states "construction of the barge landing, road, and parking area would most likely start in fall (September)". These are contradictory statements.

P. 32 Figure 3. The "Potential Barge Landing Zone" indicated on Fig. 3 in pink is not described anywhere and it is unclear what this means. If that zone is fenced, I recommend that a travel corridor for wildlife should be maintained to facilitate wildlife movement through that area and avoid human-bear interactions. Bears use the lake shoreline in that area and travel along the beaver pond.

P. 36 Bridge par. When it states that the "bridge would be built using techniques similar to the boardwalk system" there are not very specific details about the boardwalk system. How many piles are needed to support the boardwalk? Are there wires going into the ground to support the boardwalk and bridge similar to the current boardwalk to the falls platform?

P. 53 "However, when compared to alternative 1, brown bears would benefit from the removal of the floating bridge, a reduced potential for ground level human-bear interactions along the Brooks River corridor…" This statement is misleading and implies that this will reduce ground level interactions along the Brooks River corridor and in fact this only applies to a small section of lower river where the bridge is. There is and will continue to be ground level human bear interactions in the rest of the river corridor and Brooks camp area.
P. 56 Alternative 1. Please provide evidence/ data that "the no action alternative would perpetuate visitor safety concerns and frequent unwanted human bear interactions" and how that area is any different than any area in the Brooks Camp.
P. 56 Alternative 4. "delays in emergency response time associated with the storage of emergency boat access further from the camp area" This is not entirely true as there has been a zodiac boat stored in brooks camp for emergency response for the last couple of years.
P. 67 "Over recent years, the frequency of ground level human-bear interaction incidents has increased when compared to incident records from past decades" These changes can also be attributed to changes in bear management policies i.e. escorting people less than 50 yards from bears and not necessarily activity levels . Also, Bear Management Report Form (BMRF) data is collected opportunistically and effort varies from year to year.
P. 67 "Ground survey results of heavy concentration of bear trails and bedding sites existing in the proposed elevated bridge and boardwalk" This seems largely overlooked and is not mentioned when evaluating the impacts of the boardwalks into these areas.

P. 68 par. 5 and 6. It states the fall feeding pattern of bears in the lower river and that "the autumn bears generally had a low tolerance for human activity" so I think that the north boardwalk along the outside of the treed area would create a significant visual and noise disturbance that would impact all part of the lower river, thus impacting most of the bears in the fall.
P. 71 par. 1 "When bears cause substantial delays along pedestrian travel routes, NPS staff resorts to the use of hazing techniques…e.g.…rubber bullets "This in inaccurate, bear management staff most commonly hazes bears in the corner area and rubber bullets are not used and this is also a relatively new policy change.
P. 71 par. 3 "Like all other visitors, anglers too must maintain the 50-yard separation from bears." This is incorrect, (see comments P. 3)
P. 72. "To help minimize such impacts, all floatplane pilots are prohibited from inadvertently disturbing bears within 50 yards." This statement is incorrect, there is no regulation prohibiting this. As mentioned previously, through 2006, there was a stipulation included in the Commercial Use (CUA) stipulations that "Landing, taking off or taxiing within 100 yards of visible bears, moose or caribou is not permitted" and this was removed in 2007. The distance regulation can be applied but again only to approaching bears, so planes can technically taxi away from the beach with a bear behind them.
P. 99 par. 4 "The Corner is a site of high bear activity, and consequently "bear jams" occur frequently in this area." This is a very general statement, where is the data to support this?
P. 103 "The fact that the floating bridge is at ground level also contributes to higher opportunities for human-bear interactions." I do not see how this contributes to higher opportunities for human bear interaction that is different than any other areas where people are on the ground like the falls trail, the river itself. I think there are far more dangerous and close interactions between bears and anglers on the river as mentioned on P. 104 "Another major safety concern involves recreational anglers coming into contact with bears in the waters of Brooks River or on its banks." The rest of the river is also an "important feeding ground for bears"
P. 103 -104 Under visitor safety it states "visitors are frequently prevented from crossing the river…. As a result, NPS staff has posted an advisory notice on its website informing visitors to take these delays into consideration when planning their daily itinerary. Another major safety concern involves recreational anglers…" The way this is written implies that delays are a safety concern rather than an inconvenience much like weather delays or other delays due to natural phenomena that one cannot control.

P. 104 Last par. I would disagree that "successfully protecting visitors from bears is contingent on an intensive visitor use and bear management program. " Currently, there are only two full time bear management staff at Brooks Camp so at any given time there is only one on duty except for an overlap of 2.5 hours, three times a week. "Under current conditions, this program relies on significant staff time, proactive education and information efforts, and strict enforcement and monitoring." I think that the proactive education and information efforts would still continue regardless and would also disagree with the "strict enforcement", very few citations have been written at Brooks Camp in the last several years.
P. 105 Visual resources/scenery. Why is there is no mention of float planes and boats that affect visual resources? Float planes, sometimes 15 or more, line Naknek beach and there are several boats (predominantly NPS) in the boat cove. The large NPS barge, the Q'tirvik is also stored in the current barge landing site over winter and is moved, dependent on lake levels, in the spring/summer.
P. 128 "This layout incorporates long sweeping curves to enhance visibility for potential bear encounters. The loop maintains its role as an infrastructure corridor, minimizing the impact of development on the forest vegetation" It was suggested that this be a single road rather than a loop to minimize bear-human interactions as the loop creates a wooded, low visibility area in the middle of the housing development and a potential area for bears. I question the parks intention to minimize bear-human interactions and improve human safety.
Thank you for the opportunity to comment of this document.

Anonymous

Healy, AK 99743

The Draft EIS states:
"The environmentally preferable alternative is "the alternative that causes the least damage to the biological and physical environment; it also means the alternative that best protects, preserves, and enhances historic, cultural, and natural resources." Alternative 4 is the environmentally preferable alternative."

However, a major alternative is being disregarded given that the 1996 DCP and current NPS guidance states that Brooks Lodge & all NPS/visitor operations will move to the South side of the River .

The most environmentally preferable alternative would be simply to move everything en masse in the near future, without building a new bridge. Once (or, more likely, if) the move accross the river occurs we will be left with a somewhat imposing and permanent structure left across the river. If the DCP's people free zone is implemented it will be a proverbial "Bridge to nowhere, in the middle of nowhere".

Additionally, the availability of a permanent structure that improves the operations for Katmailand & helps the experience of visitors at the Brooks Lodge will likely result in making it LESS likely that the concession operation moves across the Brooks River. With disruptions removed from anglers & bus riders crossing the river, the incentive to move operations is greatly reduced.

The crux of this project, and that of the ongoing barge landing improvements & VRAA utilities are all based on a promise that operations will all be moved across the Brooks River and removed from the current location. Further development of large and expensive permanent structures across the river DO NOT further that goal. It appears that $8,000,000 could (& should) move or demolish/rebuild quite a few structures to the new locations, making the bridge an afterthought.

Anonymous

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This is money that could be spent on more needy prodjects, why would you ruin a people setting that you have now? this a private lodge mainly. Once again government spending money on a good thing and will ruin a beautiful area.

Anonymous

Sterling, AK 99672

COMMENTS ON BROOKS RIVER VISITOR ACCESS DRAFT EIS
BY CARLTON IMES VAUGHN
AUGUST 21, 2012

First I would like to respectfully submit my comments and concerns and ask that they be addressed individually and in detail without simply stating, comment noted. I would like the reader to keep in mind that my ultimate goal is to help park managers make better decisions.

My education credentials include a BS in Wildlife and Fisheries Management and a MS in Biology with emphasis on fisheries.

My relevant work experience would include almost 11 seasons in Bear Management, including extensive experience in bear/human interactions and facilitating movement of people, supplies and equipment in close proximity to brown bears.
I have intricate knowledge of Brooks Camp and would be considered one of the foremost experts in the challenges associated with the unusual situation involving movement of people, supplies and equipment around its brown bears.

I have well versed myself with the Development Concept Plan DCP, The National Policy Act (NEPA) and, the Council on Environmental Quality (CEQ) regulations, which govern the compliance of NEPA.

Doesn't this EIS essentially amend the DCP? Doesn't this EIS state that it does? Aren't the changes proposed by the Action Alternatives essentially 1) leaves the float plane access on Naknek Lake on the beach in front of the present Brooks Camp on the North side of the river, and in so doing changing the north side of the river from essentially a person free area to the area that is the main access point for most visitors. 2) Change the barge landing and access road from the location in the DCP, 3) build elevated boardwalks and bridge in place of removing bridge access to the north side of the river, including removing the floating bridge, 4) move from a one-step approach to a phased approach of relocation of Brook Camp?

In light of the above facts shouldn't the No-Action Alternative be analyzed as an action that implements the Preferred Alternative of the DCP? Isn't the No-Action Alternative in this EIS being analyzed as if 1) the floating bridge remains, 2) float plane access continues on the north side of the river (this element is common to all Action Alternatives as well as the No-Action Alternative of this EIS, 3) the barge landing/access road is essentially in its same location, 4) and the movement of Brooks Camp is phased over a long period of time instead of in a one-step manner as stated in the DCP?

In the Introduction part of the Environmental Consequences this EIS states " The analysis of the no-action alternative (the continuation of current management) identifies the future conditions in the Brooks River area if no major changes to facilities or NPS management occurred." Under the current management isn't the process of implementation of the DCP proceeding? Hasn't the NPS built or in the process of building new maintenance facilities, utilities, and housing area off the valley road? Aren't these facilities part of the implementation of the DCP? Is this EIS stating that if an Action Alternative does not become implemented that the continued implementation of the DCP (implementation of the DCP is ongoing by the construction of the valley road maintenance, utilities, and housing area) will not proceed? Is this EIS stating that under the No-Action Alternative continued implantation of the DCP would not proceed?

If my above argument is dismissed (that implementation of DCP is a continuation of current management) then wouldn't the sections on the Need that says "Provide dependable access.." (in other words dependable access for NPS and lodge employees from the new housing area on the valley road) and "Operations -connect infrastructure utilities" be a violation of CEQ regulation 1502.2 (f) "Agencies shall not commit resources prejudicing selection of alternatives before making a final decision (1506.1)." Wouldn't since all Action Alternatives include an elevated boardwalks and bridge wouldn't there be prejudice in selection of an Action Alternative?

Isn't retention of floatplane and boat access on the north side of Brooks River common to all Action Alternatives, the No-Action Alternative and even both alternatives considered but rejected? As such doesn't it violate CEQ regulation 1502.2 (g) "Environmental impact statements shall serve as a means of assessing the environmental impacts of proposed agencies actions rather than justifying decisions already made."? Doesn't the fact that all Action Alternatives include an elevated boardwalks and bridge (only the design and alignments are different) indicate that CEQ regulation 1502.2 (g) is being violated?

If my argument for implementing the Preferred Alternative of the DCP as the No-Action Alternative is dismissed, then doesn't it need to be analyzed as a reasonable alternative as required by CEQ regulations 1500.2 (c), 1502.14 (a), 1508.25 (a) (1)(iii), (a) (2), (a)(3), (c) (2)? Wouldn't including implementation of the DCP Preferred Alternative as the No-Action Alternative or as a reasonable alternative be the best way to analysis the environmental consequences of the proposed action and is required due to CEQ regulation 1502.16 (c)? In fact the Environmental Consequences section of this EIS doesn't include a discussion of the possible conflicts between the proposed action and the objectives of Federal land use plans (DCP) as required by CEQ regulation 1502.16 (c). Those conflicts would include making the north side of Brooks River essentially a person free area to being the main entry point of Brook Camp and there being no bridge access to the north side of the river compared to retaining bridge access to the north side of Brooks River.

Then if implementation of the Preferred Alternative of the DCP was analyzed as the No Action Alternative or as an Action Alternative wouldn't, 1) the"... long-term, moderate, adverse, and primarily localized impacts on brown bears..." be less than this EIS,s Preferred Alternative, since the north side of the river would be essentially people free, 2) could avoid the adverse effects of "...construction and future use of a new barge landing area and access road near an eagle nest..." that the Preferred Alternative of this EIS has, 3) have long term positive impacts to salmon, rainbow trout, and arctic grayling since there would not be a floating bridge or elevated bridge and much less than the "...short- to long-term moderate adverse localized impacts..." associated with this EIS's Preferred Alternative, 4) have long-term positive impacts to wetlands and upland vegetation relative to the "...short- to long-term moderate adverse localized impacts..." associated with this EIS's Preferred Alternative, 5) have long-term positive effects to the hydrology and floodplains since there would be no floating bridge or elevated boardwalks and bridge, and much less that the "...short- to long-term, moderate adverse effects..." of this EIS's Preferred Alternative, 6) reduce the "short- and long-term, moderate, adverse, and localized impacts on the natural soundscape." relative to this EIS's Preferred Alternative by having less construction noise and the duration of that construction would be less since the elevated boardwalks and bridge would not be built, also construction would be away from the river, also there would be reduced noise level associated with continued access to the north side of the river by way of the elevated boardwalks and bridge, 7) would avoid the NPS's conclusion that the preferred alternative "...would result in an adverse effect on the Brooks Camp cultural landscape because of the bridge and boardwalk construction.", 8) have positive effects on the visual/scenic resources relative to this EIS's Preferred Alternative since it would not have "...a major increase in the development footprint, adding extensive boardwalks on either side of the river. The bridge design itself would produce a highly visible profile against the riparian landscape."?

Wouldn't a reasonable alternative be simply move the Barge landing/access road from the site in the DCP to the site proposed in the Preferred Alternative of this EIS, and retain all other aspects of the DCP with or without a phased relocation (CEQ regulations 1500.2 (e), 1502.14 (a), 1508.25 (a) (1) (iii))? Wouldn't with this alternative there be many of the positive effects stated in Implementing the Preferred Alternative of the DCP above compared to the Preferred Alternative of this EIS but also 1) cost much less by not having to expend resources on building the elevated boardwalks and bridge (between $8,948,500 and $4,244,000, differences between building the elevated boardwalks and bridge and not building the bridge), and also save money compared to building the access road identified in the DCP, then the cost savings could be put toward finishing the new housing area and/or building a new lodge complex and access road from the Valley road 2) reduce the time needed to relocate Brooks Camp since 3 years would not be needed to build the elevated boardwalks and bridge?

In the Purpose Statement it incorrectly says "This project is intended to facilitate the phased relocation of Brooks Camp facilities and operations to the south side of Brooks River as called for in the 1996 Brooks River Area-Final Development Concept Plan and Environmental Impact Statement (NPS 1996). In fact the DCP states in Table A-6: Alternative 5: Proposed Action "...that most of the construction would occur in one phase..."

Throughout this EIS it refers to NPS policy that requires people to maintain a distance of 50 yards from brown bears. Doesn't this EIS use this statement to in part justify the proposed actions? Doesn't in fact NPS regulations allow people to allow brown bears to approach within 0 yards as long as the person isn't fishing or the bear not utilizing a concentrated food source?

In the Need Statement and throughout this EIS it states that dependable access is needed to provide for continued operations during the relocation of Brooks Camp to the south side of the Brook River. What analytical or scientific data do you have that would indicate that continued operations would not be possible if elevated walkways and bridge were not built? As a foremost expert in this matter I would disagree. Isn't it in fact just a degree of convenience instead of necessity? What is this need? Is it so that supplies and equipment can be transported from the barge landing on the south side of the river to Brooks Camp side? This EIS makes the assumption that barge landings only occur on the south side of the river but isn't it a fact and a common practice to land the barge and associated supplies and equipment on the north side of the river? Just today (August 15, 2012) those activities on the north side of the river occurred including pumping out outhouses at the Visitor Center into a tank for transportation to the disposal pit on the valley road. So isn't it possible and environmentally safer to pump and transport sewage at the end of the season in this manner and avoid having it pumped across the proposed boardwalks and bridge or hauling it across the river mouth at the beginning of the season? Doesn't this EIS incorrectly state that lodge supplies arrive by boat or barge when in fact doesn't almost all lodge supplies arrive by plane? Is the Need so NPS and concession employees can access the north side of the river from the new housing area being constructed on the valley road? Couldn't the movement of the housing be done in a manner that would allow enough housing be left on the north side of the river till the majority of facilities are functional on the south side of the river? Isn't access across the river for the most part only impacted for the month of July and the last 7-10 days of the lodge's season in September? Doesn't this EIS in fact state that "... a 2011 study found that the bridge was open more often than closed in July." (page103)? So isn't this EIS in part justifying the building of a $4.2 to $8.9 million elevated boardwalks and bridge to allow for access of employees and visitors for a period of at most six weeks and in reality mostly 7-10 days? Couldn't other means be used to allow for dependable access? Couldn't a combination of boat transport and management of the bridge allow for sufficient crossings? Aren't they for a large part being utilized at the present including the use of bridge escorts? This EIS state that bears often climb onto the floating bridge, but in fact isn't it true that this is a very rare occurrence (Katmai Bear Management Report Forms)?

In the Cumulative Impact Analysis section of this EIS it states "For the cumulative impact analysis it is expected that visitation at Brooks Camp would not substantially change over the time frame being analyzed." What is this time frame? How can this statement be justified since for 1) the proposed elevated boardwalks and bridge would most likely encourage visitation due to ease of access,2) during 2012 season a web cam was installed and its web site has had remarkable visitation and interest by the public, 3) during the 2012 season the British Broadcasting Corporation (BBC) has been producing a production about the brown bears of Katmai, and in particular at Brooks Camp with a release date within the next year, 4) this EIS's own statements about the increased visitation since the passing of the DCP and its statements that increased commercial operations are likely to occur? Doesn't the "...time frame being analyzed" have to include an expanded time frame to include the implementation of the DCP or its amended form and not just the period of construction due to CEQ regulations 1508.7, 1508.8 (b), 1508.25 (a) (iii), 1508.27 and in particular 1508.27 (7)? Even if this statement is justified by the purported implementation of visitor use limits (hasn't there been and likely will continue to be political difficulties in implementation of visitor use limits due to commercial interest and their political connections, as well as NPS's lack of ability to implement visitor use limits?) wouldn't there be at least short-term impacts due to increased visitation until visitor use limits are implemented? When will visitor use limits be implemented and why haven't they been implemented already? Wouldn't they go a long way toward addressing some of the purposes and needs associated with this proposal?

Isn't this EIS in part justifying this proposal on health and safety concerns and in particular those associated with accessing the floating bridge as it relates to bears. What is the significant overriding need to improve visitor safety from brown bears as it relates to the corner and accessing the floating bridge? What scientific or analytical data do you have that would indicate that this process needs improving? Has there ever been an injury from a bear that is related to the corner or accessing the floating bridge? Hasn't the present system been remarkably safe? By what measure is it considered less safe than going to the campground on the campground trail, walking to Brooks Falls on the falls trail, or fishing on Brooks River? Haven't all those activities been remarkably safe? Wouldn't by most measures the above activities be less safe than accessing the floating bridge because 1) the management of that area by NPS employees, 2) larger groups of people? Doesn't this EIS conclude (page 103) "Bear jams add to visitor experience by providing an intimate yet SAFE encounter". How can it be argued that there is significant overriding need to improve safety in relationship to accessing the floating bridge and its closely managed system when the NPS has been willing to lessening distance regulations over the last 10 years (from the requirement people had to keep a 50 yard distance from bears at all times and 100 yards from sows with cubs to the present requirement that you just not approach any bear within 50 yards, but allowed to let any bear approach you to any distance as long as you are not fishing or the bear is not utilizing a concentrated food source)? Isn't the accessing of the floating bridge through the corner area managed in line with the previous more restricted requirement making it what should be one of the safest areas in Brooks Camp? How can a $4.2 to $8.9 million dollar elevated boardwalks and bridge (that is essentially needed only for at best six weeks and mostly just 7-10 days a year) be justified on safety concerns in light of the above facts?

Isn't this EIS in part justifying this proposal by improving visitor experience? Didn't Brooks Camp get an unprecedented 100% visitor satisfaction rating from its visitor survey last year? What is the significant overriding need to improve visitor experience in light of this fact? How can a $4.2 to $8.9 million dollar elevated boardwalks and bridge be justified to improve visitor experience when the visitor experience can be considered exceptional? Isn't overcrowding by far the element that impacts visitor experience most? Doesn't this EIS's own data indicate this to be so with 56% of visitors rating overcrowding as moderate, very or, extreme (page 103)? Wouldn't implementing the DCP's visitor use limits go much further to improving visitor experience than an elevated boardwalks and bridge and the cost be much less?

How can a $4.2 to $8.9 million dollar elevated boardwalks and bridge be justified for a visiting season of about three and a half months (June, July, August, and to September 18) and for only at most 12,000 to 14,000 visitors a year?

In the Summary of Impacts of the Alternatives the comparison of impact topics between the No-Action Alternative (alternative1) and the Preferred Alternative (alternative 4) show the impacts to brown bears, Hydrology, Archeological Resources, Ethnographic Resources, Visual/Scenic Resources, are virtually the same. The summary shows that alternative 1 has less adverse impacts compared to alternative 4 in, 1) Salmon, Rainbow trout and Arctic Grayling (short- to long-term minor adverse and localized impacts compared to, short- to long-term moderate adverse and localized impacts), 2) Bald Eagles (long-term minor adverse and localized impacts compared to, short- and long-term moderate adverse and localized impacts), 3) Wetlands (long-term minor adverse and localized impacts compared to, short-to long-term moderate adverse and localized impacts), 4) Soundscape (long-term minor adverse and localized impacts compared to, short- and long-term moderate adverse and localized impacts), 5) Historic Structures and Cultural Landscapes (long-term localized minor adverse impacts compared to, long-term localized moderate adverse impacts). Only in the Visitor Experience (localized moderate long-term beneficial impacts compared to localized major long-term beneficial impacts), and Socioeconomic Environment (minor long-term beneficial impacts compared to, short- and long-term minor beneficial impacts) topic does alternative 4 have more beneficial impacts than alternative 1. In comparison doesn't alternative 4 have adverse impacts greater than alternative 1 in 5 of 12 impact topics. Only in 2 impact topics does alternative 4 have added beneficial impacts and in one of those (Socioeconomic Environment) it is only by adding short-term minor beneficial impacts. In the Visitor Experience topic it states that alternative 1 would have localized major long-term adverse impacts on safety. What analytical or scientific evidence do you have to support this statement? Isn't this a major overstatement of facts? And isn't this supported by my statements and questions in the paragraph on safety above? Wouldn't long-term localized minor adverse impacts be better supported by the facts stated in my safety discussion? Isn't it an overstatement to say alternative 4 would have localized long-term moderate beneficial impacts on safety? Wouldn't the objective facts support only at best localized minor beneficial impacts and in reality because of the stated localized minor long-term adverse impacts associated with the elevated boardwalks and bridge, have no impacts beneficial or adverse? In the Brown Bears impact topic it states in part that alternative 4 when compared to alternative 1 would benefit brown bears from the removal of the floating bridge and a reduced potential for ground level human-bear interaction. In this case shouldn't it be stated that alternative 1 when compared to alternative 4 would benefit brown bears because there would be no elevated boardwalks and bridge, and no impact from notable distance reduction of overhead human activity above bears and bear habitat, no increase in visual and audio exposure of human activities, and no disturbance to bear habitat in the project area with construction related activities and noise? Shouldn't there be mention of the impacts on bears from alternative 4 that would result from all the viewing pullouts on the elevated boardwalks and bridge that would not occur in alternative 1? Shouldn't there be mention of the impacts on bears from alternative 4 that would occur due to more or less continual crossings when bears are present close by compared to the very structured controlled crossings of the floating bridge when bears are close by? Because of these adverse impacts related to alternative 4 compared to alternative 1 wouldn't the adverse impacts associated with alternative 4 compared to alternative 1 be greater or at least equal? Shouldn't alternative 1 be considered the Preferred Alternative in light of the above facts and if not why?

Couldn't the benefits of relocation of the barge landing approximately 2000 ft. to the south be realized if an alternative had it and included all the aspects of alternative 1. Wouldn't this be a reasonable alternative as required by CEQ regulation 1500.2 (e), 1502.14 (a)?

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August 12, 2012

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Glen Yankus

National Park Service

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The following comments and questions concern the National Park Service (NPS), Brooks River Visitor Access, Draft Environmental Impact Statement (DEIS). I favor the no-action alternative (Alternative 1). I oppose Alternatives 2, 3, 5, and the preferred Alternative 4 that advocate an elevated bridge to be installed in the lower Brooks River. My reasons for opposition to an elevated bridge are outlined below.

**Visual/Auditory Impacts.** The floating bridge that is presently in place and used seasonally does have some limitations during July when bear and human visitor densities are at their peak. Specifically, travel of humans is sometimes delayed because of the proximity of bears close to the bridge access points. However, in my experience, the existing bridge does provide adequate and safe passage for park guests, NPS staff, Brooks Lodge personnel, and the movement of supplies across the stream during June, August, and September. This floating bridge is a relatively low profile structure in contrast to the described elevated bridge in Alternative 4 that would be approximately 10 feet above the river and supported by 14 sets of pilings. Clearly, the structure proposed in Alternative 4 (as well as Alternatives 2, 3, and 5) would be much more visible than the existing floating bridge and would have a negative impact on the landscape and scenic beauty of the lower river. And, the certain noise pollution that will emanate from bridge traffic, both humans and vehicles, will be audible at greater distances from the structure than the current floating bridge. While the DEIS acknowledges visual and noise pollution (pp. 141-142) as potential negative impacts associated with an elevated bridge, I believe that these detrimental effects would be much more significant than described. I feel that the NPS already has introduced enough infrastructure (i.e., viewing platforms at the falls and opposite the floating bridge) along the river corridor. A permanent bridge and connecting walkways will further compromise the natural landscape of this unique place.

**Human-Bear Interactions.** Part of the NPS justification for erecting an elevated bridge is to reduce human-bear interactions and to allow bears to move freely through the area where the current floating bridge is located (p. 45 DEIS). The DEIS states (pp. 140, 143) that an elevated bridge will make bear movements easier than with the floating bridge. However, the NPS presents no objective scientific data to support their hypothesis that a 10-foot elevated bridge will "decrease adverse effects on brown bears due to elimination of the floating bridge" (p. 45 in DEIS). Importantly, there is at least some published information from research conducted by DeBruyn et al. (2004; Wildlife Society Bulletin 32:1132-1140;

cited in the DEIS on p. 140) that showed negative responses by Brooks River bears to the elevated structures near the falls. The DEIS cites no experimental studies that examine bear behavior and /or quantifies bear movements when confronted with a bridge. Therefore, I suggest that the NPS contention that bears will move more freely with an elevated bridge is mere speculation, and that the opposite bear response may occur as indicated in the work of DeBruyn et al. (2004).

**Fish Migration**. The DEIS (pp.148-157) characterizes the existing floating bridge as a "surface obstacle from May through September to salmon, rainbow trout, and arctic grayling migrating up Brooks River to spawn" (p. 148). Further, the DEIS states that the floating bridge "has been known to slow some migrating salmon and other fish at times" (p. 148). Exactly who has "known" that fish migration has been slowed and where are these results presented? Significantly, the DEIS offers no objective scientific evidence that any of these species of fish have been negatively affected by the existing floating bridge. Equally perplexing is the NPS contention that a permanent, elevated bridge as proposed in Alternatives 2—5 "would eliminate...the associated impacts to fish migration and spawning (e.g., impeded passage and spring riverbed disturbances, turbidity, and sedimentation)." If the NPS has not documented any impacts of the existing floating bridge on fish migration behavior and spawning habitats through experimental research, then how can there be an improved situation with an elevated bridge? This whole section of the DEIS (pp.148-157) is little more than anecdotal and apparently intended only to enhance the argument in favor of constructing a bridge.

**Stream Hydrology and Dynamics**. The geomorphology of the lower stretches of Brooks River are very dynamic, as is acknowledged in the DEIS. Over a 30-year time span I have observed many changes in the river, especially from the oxbow downstream to the confluence with Naknek Lake. Significant bank erosion has occurred, new channels have formed, and some stretches have filled with gravel and become shallow. Clearly, these changes are a result of natural stream hydraulics. The conclusion in the DEIS (p. 176) that Alternative 1 (retention of the floating bridge) "would continue to have a long-term, moderate, adverse and localized effect on hydrology and floodplains" is not supported by any quantitative evidence presented in the DEIS. Further, the DEIS (p. 181) concludes under Alternative 4 that "the hydrology would benefit from the removal of the floating bridge (that alters river flow hydraulics and flooding, and contributes to bank erosion near its anchors)..." Again, there is no meaningful documentation of negative impacts of the floating bridge, just conjecture. Equally troublesome is the very casual evaluation of potential impacts associated with placement of piles in the river bed. I see no evidence in the DEIS of a rigorous hydraulic assessment of the proposed action, nor is it evident that fisheries ecologists have been consulted in determining potential impacts of the pilings on fish habitats.

**Relocation of Brooks Camp**. As noted on page 3 of the DEIS the purpose of the elevated bridge "is to facilitate the phased relocation of the Brooks Camp facilities and operations to the south side of Brooks River" as outlined in the Final Development Concept Plan and Environmental Impact Statement (NPS 1996). I have visited Brooks River 32 times between 1976 and 2012 to participate in catch-and-release fishing, observe and photograph birds and mammals, and simply enjoy this magnificent river and adjacent lands and waters. I enjoyed staying in the NPS campground adjacent to Naknek Lake during my first 20 visits, and over the last decade I have been a guest at Brooks Lodge. I used the river before there was even a floating bridge when crossing was accommodated by rowboat or wading. My experience at Brooks Camp has given me, I believe, useful background for offering commentary regarding the ambition of the NPS to move the entire facility to the south side of the river near Lake Brooks and make the north side of Brooks River a "people free zone" (EIS 1996). The current campsite, NPS buildings and facilities, and Brooks Lodge have been in place for decades with modest and, for the most part, appropriate upgrades to accommodate visitors. According to the DEIS, the estimated cost of the elevated bridge described in Alternative 4 will be $7.4M, which is considerable, even for a federal agency. However, the cost of the proposed bridge is a tiny fraction of the funding that would be necessary to move all of the existing facilities. I feel that the predicted major disturbances and massive costs associated with relocation of virtually all facilities are unreasonable, counterproductive, and will result in still more impacts at the proposed new site. All-in-all, this action is a waste of federal money.

Finally, although there is no mention of any changes in areas open to catch-and-release fishing on Brooks River in either the EIS (1996) or the DEIS (2012), I recommend that this historic use activity be retained and unaffected by any future developments as long as healthy populations of rainbow trout, Dolly Varden, and Arctic grayling are assured. Indeed, this fishery and these fish species, as well as the all-important sockeye salmon run, have been sustained since sport fishing began on the Brooks River in the 1950's.

Sincerely,

Dirk V. Derksen

Comments on Brooks River DEIS

I have had the privilege of fishing the Brooks River for over thirty years. On my first visit there was no bridge at all.

I wish to raise two points.

- We live in an era of fiscal restraint. Building a large bridge at a cost of millions of dollars in the middle of the Alaskan wilderness might appear to some to be frivolous spending by a government agency that has too much money to start with.
- Bears are a part of the whole Katmai experience. I admit that having the bridge closed for hours due to the proximity of bears is an inconvenience to the visitors, the concessionaire and the Park Service. But how many visitors get to go home and proclaim "We were held up for two hours by a bear smack in the middle of the only way out of there"?

I support Alternative #1, the "Do Nothing" option.

Don Fleming

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National Park Service August 19, 2012
Comments to the Brooks River DEIS

Over the past 10 years, I have had the pleasure of visiting the Brooks River in Katmai National Park on six different occasions. The primary focus of my visits has been catch-and-release fishing, bear watching and hiking the many beautiful trails. I have always enjoyed the quaint and generous hospitality of the Brooks Lodge during my stays.

I am your typical tourist/visitor; the exact person that the National Park Service strives to serve with their efforts of protection and preservation of our natural parklands. I live in the lower forty-eight, I visit Alaska a couple of times every year and I have a deep appreciation for the great outdoors.

I am an adamant fly-fisher that is actively involved with related conservancy groups such as the Nature Conservancy, Trout Unlimited and California Trout. I am also proud to be a member of the Yosemite Conservancy.

When I heard of the proposed plan to build the permanent bridge and walkways on the Brooks River, I was very disappointed that such a plan would even be considered by the NPS. It is unwarranted and unnecessary. The current facilities serve the visitors purpose and provide a unique outdoor experience with minimal environmental impact. Besides, isn't the charter of the NPS to "preserve and protect?"

What's really scary is the disruption and destruction of the river and surrounding area that will occur with construction. Does the NPS have any data on how the stream hydrology, and the fish and animal behavior will be affected during this period? Driving 14 pilings into the riverbed can't be good for the ecology.

Besides, the existing floating bridge is unique, low profile, fun to cross while looking at the fish, and has minimal impact on the river. It's certainly not an obstacle to the migration of the fish or the passage of the bears. Both have figured it out quite easily. Again, I could not find any quantifiable scientific data in the NPS report that would substantiate the need for a permanent structure.

As for the relocation of the float plane access and the Brooks lodge, another bad idea. Why would the NPS want to incur such an expense? The existing lodge serves its purpose, has minimal environmental impact and visitors find it charming and very accommodating.

Then there is the expense. The current study proposes a $7.4 million budget. As with any project, this figure will expand to include all unexpected contingencies currently not included in the plan. Certainly the NPS has more worthwhile projects that could better serve these funds and benefit a much larger constituency base of the public.

I have read comments that have been posted by members of the scientific community. People who have dedicated their life to the study, conservation and management of our wild habitats. They cite the lack of scientific data to substantiate any changes to the Brooks River and identify what will be unavoidable short-term and long-term consequences. The NPS needs to take notice and heed the advice of these experts.

Over the years, Mother Nature has adapted to man's intrusion on this wonderful place and we should continue to nurture this adaptation instead of trying to force our will upon it. Should we decide to do so; a very unique place will be lost.

Finally, the NPS should not submit to the pressure that bear watching on the Brooks should be open to everyone and that they need to build a "showcase" of public access. They do not. Only limited access will be best for those who matter the most, the fish and animals of Katmai.

Don't try and turn the Brooks River into another Yosemite Valley. It does not need be such.

I support the no-action option of the DEIS.

Sincerely,
Jim Hirzel

164 Parkhaven Drive
Danville, CA 94506

have been coming to Brooks Camp every year since 1994, sometimes more than once per year, to recreate, primarily to fly fish. Like most long-time angler visitors to Brooks, I am not necessarily opposed to improving the bridge and making certain transportaton and utility improvements at Brooks. However, I do not support moving Brooks Camp or the Brooks campground (currently at the base of Dumpling Mountain) to the south side of the Brooks River. Any alternative selected by NPS should factor in the possibility, if not probability, that Brooks Lodge and the current campground are never moved. Brooks Lodge is an important landmark in the history of Alaska sportfishing. It adds immeasurably to the experience of anglers and other recreationists who treasure the area. The current campground is a top-notch facility, and is in an excellent location, far superior to the bug-infested "Beaver Pond." Many, many public users of Brooks Camp and the Brooks River such as myself will become opponents of NPS's plans if the agency continues to pursue moving the lodge and the campground. The current plan to include a sewage line to run under the new bridge removes the necessity to relocate Brooks Lodge due to alleged problems with the existing septic field. I do not have a problem relieving "bear jams" at the corner for bear-viewing tourists, or with improving bear access from the Naknek River beach to and along the north side of the Brooks River. I would oppose any attempt to limit angler access to the north side of the river, including from the corner, and I CANNOT IMAGINE THAT RELOCATING BROOKS LODGE OR THE CURRENT CAMPGROUND WOULD BE WORTH THE EXPENSE IN TAX DOLLARS, let alone the cost to the concessionairre, Katmailand, Inc. In light of the fact that NPS will continue to be squeezed in its funding, it would be a misallocation of resources to spend funds to relocate either Brooks Lodge or the Brooks Campground at the base of Dumplng Mountain after the current project phase is completed. Once the bridge and associated utility and transportation improvements are completed, NPS should declare victory and move on to address more pressing needs in other national park units.

John T. Baker

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Surely there are other projects that funds could be spent on. This is unnecessary. If NPS is worried about human/bear interactions, close the area completely. The US spends far too much money frivously and is already way too far in debt.

Julie Cisco

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Palmer, AK 99645

August 2, 2012

I oppose the bridge across the Brooks River, alternative 4 of the Brooks River Visitor Access Draft Environmental Statement, primarily for the following reasons:

1. A 350-foot-long permanent bridge that rests on 14 sets of piles is a significant project that will unavoidably cause short-term and long-term consequences. During construction in the stream channel, some aquatic habitat will be immediately and permanently destroyed, some siltation will occur in and below the site, most fish will avoid the immediate area, any fish spawning activity or incubating eggs in the gravel in, or immediately below, will be detrimentally impacted, fish movements could be disrupted, bears and other wildlife will likely avoid the construction area and visitor use will probably be restricted for safety purposes. Over the longer term, it must be considered that permanent piles in the stream channel or flood plain will modify the natural flow of water, sediment movement and dynamics of channel change. In some cases this can have detrimental impacts, but, even in the best case scenario, will result in subtle changes to this irreplaceable natural system

Rivers are dynamic and change over time by natural processes. Old channels of the Brooks River are obvious and these changes continue. These are most noticeable in the section of the river from the falls to the delta were it empties into Naknek Lake. The Brooks River, with its adjacent rich habitat for bears and other wildlife, along with its outstanding sport fishing is the foremost reason, and the only reason, many visitors come to the Katmai. I believe that the general public, whether they visit the park or not, would prefer a natural system operating freely and unaffected by any structure deliberately placed across this focal point of Katmai National Park. Just let nature work by itself as it has for thousands of years.

2. One of the most important reasons for a national park is to preserve the natural beauty of an area. This 350-foot-long bridge 10 feet above the water would be a highly visible man-made scar. The Park should be a place where people can view the beauty of a natural area, not the work of man's engineering abilities. Katmai National Park has a different basic purpose than does the Washington Monument.

Many of the buildings already built in the Park are low profile, have been in place for many years and provide substantial public use for visitors. Any significant additions to this, or the almost unbelievable idea to move Brooks Camp, attempt the impossible task of restoring the area to predevelopment conditions, then disturb an alternative site with costly new facilities, is contrary to National Park purposes and a waste of money. Brooks Camp at the existing site constitute "historic" use and visual expectations in the minds of most reasonable people who have enjoyed this area over the last 60 years or so.

Please do not drastically change the location or the classic appearance of the long-established Brooks Camp or mar the Brooks River which was the reason why the camp was built where it is in the first place.

3. New public use facilities generally result in new rules for their use. The Brooks River is a world-class stream well known for high quality fly fishing for rainbow trout, Arctic grayling and Arctic char/Dolly Varden. Anglers come from all over the world just to fish the relatively short Brooks River specifically or as part of a package that includes several quality waters of the famed Bristol Bay Trophy Trout Area that was put under restrictive fishing regulations by the Alaska Department of Fish and Game over 50 years ago. Catch-and-release fly fishing only has proven effective to sustain healthy populations of native rainbow trout over the long-term while supporting quality angling and an industry that provides for the legitimate non-consumptive use of this valuable natural resource.

I have fished the Brooks River many times over the years since 1970 and have many good memories of outstanding fishing and enjoyment of the beauty of the surrounding natural area. I plead that, regardless of the alternative selected and implemented, that the National Park Service not close this fantastic river to catch-and-release fly fishing as long as healthy viable populations of rainbow trout are maintained.

My comments are based on a lifetime of sport fishing, a Masters Degree in Fisheries and over 30 years of professional fisheries and environmental protection experience with 3 state and 1 Federal agency. This includes over 17 years (15 of which were in Alaska) with the U.S. Fish and Wildlife Service where my work included fishery studies, drafting portions of the EIS, serving on the Joint Fish and Wildlife Advisory Team to minimize detrimental impacts of construction of the Trans-Alaska Pipeline, and evaluating its effects on aquatic resources; serving as Chief of the Fisheries Division of USFWS in the Alaska Region; and over 6 ½ years as Director of the Sport Fish Division of the Alaska Department of Fish and Game.

I hope that my comments will be considered, and useful, as the National Park Service makes decisions related to the protection and use of the beautiful Brooks River and surrounding area.

Thank you.

Sincerely,

Norval Netsch
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Windsor, MO 65360

# SELECTED REFERENCES


Agli, Andria

2006 "Traditional Cultural Property Inventory, Kittiwick *(Brooks River Area), Katmai National Park and Preserve (draft)*." National Register of Historic Places nomination form prepared for the Council of Katmai Descendants, Anchorage Alaska.

Alaska Bureau of Commercial Fisheries Biological Laboratory and Fisheries Biological Laboratory and Fisheries Research Institute, University of Washington

1964 "Summary Report of Studies on the Optimum Escapement of Sockeye Salmon in Southwestern Alaska, 1961-62." Auke Bay, Alaska: Bureau of Commercial Fisheries Biological Laboratory. Manuscript Report 64-2.

Alaska Department of Commerce, Community and Economic Development, Division of Community and Regional Affairs, Research and Analysis Section

2010 Alaska Community Database. Community Information Summaries. N.d.; accessed March 2010. www.commerce.state.ak.us/dca/commdb/CF_CIS.htm

Alaska Department of Fish and Game (ADF&G)

1985 "Alaska Habitat Management Guide, Southcentral Region, Volume 1: Life Histories and Habitat Requirements of Fish and Wildlife." Division of Habitat, Juneau, Alaska.

1994 "Wildlife Notebook Series: Whitefish." Text by Kenneth Alt. http://www.adfg.state.ak.us/pubs/notebook/fish/whitfish.php

2007 "Wildlife Notebook Series: Arctic Grayling." Text by Rocky Holmes (1994), revised by Andy Gryska and reprinted in 2007. http://www.adfg.state.ak.us/pubs/notebook/fish/grayling.php

2008a "Wildlife Notebook Series: Rainbow Trout." Text by Kevin Delaney (1994). Revised and reprinted 2008. http://www.adfg.state.ak.us/pubs/notebook/fish/rainbow.php

2008b "Wildlife Notebook Series: Bald Eagle." Text by David W. Daum. Revised by Matt Kirchhoff and reprinted in 2008. http://www.adfg.state.ak.us/pubs/notebook/bird/eagles.php.

2011 "Bridge and Culvert – Construction and Maintenance." Available on the internet at: http://www.adfg.alaska.gov/index.cfm?adfg=uselicense.culverts, accessed on 4/14/2011.

Alaska Department of Fish and Game, Division of Commercial Fisheries

2007 "Commercial Fishing Seasons in Alaska." Published April 2007.

Alaska Department of Labor and Workforce Development

2010a "Workforce Information Alaska Local and Regional Information," accessed August 2011, http://labor.alaska.gov/research/alari/6_5_298.htm.

2010b Workforce Info. Quarterly Census of Employment & Wages, accessed March 2010, http://labor.alaska.gov/research/qcew/qcew.htm

2010c Workforce Info. Unemployment Rate. Accessed March 2010. http://laborstats.alaska.gov/cgi/databrowsing/?PAGEID=4&SUBID=188 (n.d., accessed March 2010)

Bams, R. A.
1969 "Life History of Sockeye Salmon." In: *Pacific Salmon Life Histories*. Edited by C. Groot and L. Margolis. UBC Press, Vancouver.

Bartz, K. K.
2002 "Impacts of Salmon-borne Nutrients on Riparian Soils and Vegetation in Southwest Alaska." M.S. Thesis. University of Washington, School of Aquatic and Fishery Science.

BasePoint Design Corporation, Inc.
2007 *Trip Report: Brooks River Hydrology Site Visit, Katmai National Park and Preserve*. Prepared for the National Park Service by BasePoint Design Corporation, Inc., Aurora, CO.

Bentley, E. K., T. L. Olson, and I. C. Vaughn
2007 "Bear Management at Brooks River, Katmai National Park, 2002." Alaska Region Natural Resources Technical Report NPS/AR/NRTR-2007-62, Katmai National Park and Preserve, King Salmon, Alaska. Also available at http://www.arlis.org/docs/vol1/220969154.pdf

Braaten, A. M. and B. Gilbert
1987 "Profile Analysis of Human-Bear Relationships in Katmai National Park and Preserve. Final Report for USDI." Prepared for National Park Service. Utah State Univ., Logan, UT.

Brannon, E. L.
1972 "Life History of Sockeye Salmon." *In*: *Pacific Salmon Life Histories*. Edited by C. Groot and L. Margolis. UBC Press, Vancouver.

Bristol Bay Borough
2010 Bristol Bay Area. Home Page. Accessed March 2010. www.theborough.com/area.html (n.d., accessed March 2010)

Buck, E. H., C. Bowden, J. Baldridge, and W. J. Wilson
1978 "Bibliography, Synthesis, and Modeling of Naknek River Aquatic System Information." Report for U.S. Department of the Interior, National Park Service, Pacific Northwest Region, Seattle, Washington. Arctic Environmental Information and Data Center, University of Alaska, Anchorage, AK. 244 pp.

Burgner, R. L., C. J. Di Costanzo, R. J. Ellis, G. Y. Harry, Jr., W. L. Hartman, O. E. Kerns, Jr., O. E. Mathisen, and W. F. Royce
1969 "Biological Studies and Estimates of Optimum Escapements of Sockeye Salmon in the Major River Systems in Southwestern Alaska." Fishery Bulletin 67(2):405-459.

Burgner, R.L.
1991 "Life History of Sockeye Salmon." In: *Pacific Salmon Life Histories*. Edited by C. Groot and L. Margolis. UBC Press, Vancouver.

Cain, S.L.
n.d. "Time Budgets and Behavior of Nesting Bald Eagles" In: Bald Eagles in Alaska. On the Internet at: http://raptors.hancockwildlife.org/index.php?topic=BEIA-Sect12. Accessed on 4-20-2011.

Cederholm, C. J., D. H. Johnson, R. E. Bilby, L. G. Dominguez, A. M. Garrett, W. H. Graeber, E. L. Greda, M. D. Kunze, B. G. Marcot, J. F. Palmisano, R. W. Plotnikoff, W. G. Pearcy, C. A. Simenstad, and P. C. Trotter

2000 "Pacific Salmon and Wildlife — Ecological Contexts, Relationships, and Implications for Management." Special Edition Technical Report. Prepared for D. H. Johnson and T. A. O'Niel (managing directors), Wildlife Habitat Relationships in Oregon and Washington. Washington Dept. of Fish and Wildlife, Olympia, Washington.

Coffman Engineers

2009 "Katmai National Park and Preserve, Alaska — Schematic Design Alternatives — 100% Submittal: Replace Failing Infrastructure at Brooks Camp."

2012a "Draft. Geotechnical Investigation, Foundation Recommendations and Risk Assessment,Replace Floating Bridge and Access Trail, Brooks Camp. Katmai National Park and Preserve. Anchorage, AK.

2012b "100% Draft Schematic Design Alternatives, Improve Safety and Resources at Brooks Camp by Replacing Road, Barge Landing and Boat Launch." Prepared for Katmai National Park and Preserve. Anchorage, AK.

Cowardin, L. M., V. Carter, F. C. Golet, and E. T. LaRoe

1979 "Classification of Wetlands and Deepwater Habitats of the United Sates." Office of Biological Services, Fish and Wildlife Service, U.S. Department of the Interior, FWS 1035-79-81.

DeBruyn, T. D.

1999 "A Review of Bear/Human Interactions over Time and the Overall Implications to Management of the Brooks River Area, Katmai National Park and Preserve." Katmai National Park and Preserve, National Park Service.

DeBruyn, T. D., T. S. Smith, K. Proffitt, S. Partridge, and T.D . Drummer

2004 "Brown Bear Response to Elevated Viewing Structures at Brooks River, Alaska." *Wildlife Society Bulletin*, vol. 32, No. 4.

Dumond, Don E.

1981 "Archaeology on the Alaska Peninsula: The Naknek Region, 1960-1975." University of Oregon, Anthropological Papers, No. 21.

Fay, Ginny and Neal Christensen

2010 "Katmai National Park and Preserve Economic Significance Analysis and Model Documentation." Prepared for: National Parks Conservation Association and National Park Service, Katmai National Park and Preserve.

Flemming, G.A., Gregg G., A. Rapoza, C. Lee.

1995 "Development of National Reference Energy Mean Emission Levels for the FHWA Traffic Noise Model." Report No. FHWA-PD-96-008 and DOT-VNTSC-96-2. John A. Volpe National Transportation Systems Center, Acoustics Facility, Cambridge MA.

Hall, J. V. and W. E. Frayer

1994 "Status of Alaska Wetlands." U.S. Fish and Wildlife Service.

Hartman, W. L. and R. L. Burgner
1972 "Limnology and Fish Ecology of Sockeye Salmon Nursery Lakes of the World." *J. Fish. Res. Board Can.* 29:699-715.

Healy, M. C.
1991 "Life History of Chinook Salmon." *Pacific Salmon Life Histories*. Edited by C. Groot and L. Margolis. UBC Press, Vancouver.

Heard, W. R.
1966 "Observations of Lampreys in the Naknek River System of Southwest Alaska." *Copeia* 2: 332-339.

Helfield, J. M.
2001 "Interactions of Salmon, Bear and Riparian Vegetation in Alaska." PhD Dissertation, University of Washington, College of Forest Resources.

Helfield, J. M. and Robert J. Naiman
2001 "Effects of Salmon Derived Nitrogen on Riparian Forest Growth and Implications for Stream Productivity. *Ecology* 82(9):2403-2409.
2002 "Salmon and Alder as Nitrogen Sources to Riparian Forests in a Boreal Alaskan Watershed. *Oecologia* (2002) 133:573-582.

Herrero, S.
1985 "Bear Attacks: Their Causes and Avoidance." Lyons & Burford, Publishers, New York, NY.

Herrero, S., T. Smith, T. D. DeBruyn, K. Gunther, and C. A. Matt
2005 "Brown Bear Habituation to People: Safety, Risks, and Benefits." *Wildlife Society Bulletin*, vol. 33, no. 1, pp. 362-373.

Itami, R M.
2002 "Estimating Capacities for Pedestrian Walkways and Viewing Platforms." A report to Parks Victoria. Geodimensions Pty Ltd. Brunswick, Victoria, Australia.

Jope, K. L.
1985 "Brown Bear Population Survey, Katmai National Park and Preserve". AR-85/05.

Jope, K. L. and L. A. Welp
1987 "Monitoring Resource Conditions Related to Commercial Use on American Creek." National Park Service, Katmai National Park and Preserve, King Salmon, AK.

Kline, T. C., J. J. Goering, O. A. Mathisen, and P. H. Hoe
1990 "Recycling of Elements Transported Upstream by Runs of Pacific Salmon. 15N and 13C Evidence in Sashin Creek, Southeastern Alaska." *Can. Jour. Fish. Aquatic. Sci.* 47:136-144.

Kozlowski, J.
2007 "Katmai National Park, Water Resources Information and Issues Overview." National Park Service, Alaska Region. Anchorage, AK.

LaRoche and Associates
2007 "Lake & Peninsula Borough Coastal Management Program. Final Plan Amendment, November 2007." Available on the Internet at: http://dnr.alaska.gov/coastal/acmp//District/DistrictPlans_Final/LakeandPen/final_plan.pdf

Larson, J., P. R. Adamus, and P. R. Clairain
1989 "Functional Assessment of Freshwater Wetlands: A Manual and Training Outline." University of Massachusetts, Amherst, Environmental Institute Publication 87-1, Amherst, MA.

Littlejohn, Margaret and Steven Hollenhorst
2007 "Katmai National Park and Preserve Visitor Study." Park Studies Unit, University of Idaho, Moscow.

Meka, J. M.
2004 "The Influence of Hook Type, Angler Experience, and Fish Size on Injury Rates and the Duration of Capture in an Alaskan Catch-and-Release Rainbow Trout Fishery." *North American Journal of Fisheries Management* 24: 1309-1321.

Meka, J. M. and S. D. McCormick
2005 Physiological Response of Wild Rainbow Trout to Angling: Impact of Angling Duration, Fish Size, Body Condition, and Temperature. *Fisheries Research* 72:311-322.

Miller, J. L.
2003 Freshwater Fish Inventory of the Alagnak Watershed, Alagnak Wild River, Southwest Alaska Inventory and Monitoring Network. National Park Service, Anchorage, AK.

Naiman, R. J.
2002 Pacific Salmon, Nutrients and the Dynamics of Freshwater and Riparian Ecosystems: Summery of Research Results and Primary Publications 1998-2002."

National Park Service (NPS), Department of the Interior
1992 "Brooks River Archeological District." National Historic Landmark nomination form. Prepared by Patricia L. McClenahan, archeologist, Katmai National Park and Preserve. King Salmon, Alaska.
1996a Brooks River Area—*Final Development Concept Plan / Environmental Impact Statement*. Katmai National Park and Preserve. King Salmon, AK.
1996b "Record of Decision. Final Environmental Impact Statement. Development Concept Plan. Brooks River Area, Katmai National Park and Preserve, Alaska." On file at NPS Alaska Regional Office.
1997 "Environmental Assessment for the Corrective Action Plan for Underground Fuel Contamination at Brooks Camp, Katmai National Park and Preserve, Alaska."
1998 "NPS-28. Cultural Resource Management Guideline." On the Internet at: http://www.nps.gov/history/history/online_books/nps28/28contents.htm
1999a "Building in an Ashen Land: Katmai National Park and Preserve Historic Resource Study," by Janet Clemens and Frank Norris. Alaska Support Office, Anchorage, Alaska.
1999b "Katmai Natural Resource Management Plan." Katmai National Park and Preserve.
2003 "Procedural Manual 77-2: Floodplain Management." On the Internet at: http://www.nature.nps.gov/rm77/floodplain.cfm
2006 NPS *Management Policies 2006*. Washington, D.C.

2006b “Bear-Human Conflict Management Plan. Katmai National Park and Preserve, Aniakchak National Monument and Preserve, Alagnak Wild River.” On file at park headquarters.

2007a “Brooks Camp Developed Area Bear Management Administrative Review,” NPS/AR/NRTR-2007-60

2007b “Brooks Lake Maintenance Facility Environmental Assessment.” On the Internet at: http://parkplanning.nps.gov/document.cfm?parkID=13&projectID=11376&documentID=19460

2008a “National Park Service Procedural Manual #77-1: Wetland Protection.” On the Internet at: http://www.nature.nps.gov/water/wetlands/DO%2077-1%20PROC%20MANUAL%20FEB%202008%20-%20FINAL.pdf

2008b Story of a House by Don Dumond, Katmai National Park and Preserve.

2009a Brooks Camp Fuel-Contaminated Sand Remediation Environmental Assessment. On file at park headquarters

2009b “Katmai National Park and Preserve Alaska. Brooks River Visitor Access Environmental Impact Statement. Scoping Report.” Prepared by URS. Project No. 26219984. On file at park headquarters.

2009c “Draft Brooks River Visitor Access Floodplains Statement of Findings.” On file at park headquarters.

2009d “Katmai National Park and Preserve Foundation Statement.” On file at park headquarters.

2009e Brooks River Utilities Replacement and Housing Relocation Environmental Assessment. Katmai National Park and Preserve. King Salmon, AK.

2009f “Brown Bear Technical Meeting. Draft Summary of Comments.” Prepared by B. Winfree. Unpublished document, on file at park headquarters.

2009g Bear Management at Brooks River, Katmai National Park, 2003–2006. Alaska Region Technical Report Series Natural Resources Technical Report NPS/AR/NRTR-2009-73.

2009h “Bear Management Report Forms Summary”. Summary tables of bear management report form data. Brooks Camp, Katmai National Park. 1989-2009. Unpublished.

2009i “Visitor Use Reports: Summary of User Days by Location and Activity Report from Commercial Use Authorization (CUA) Reports.” 2005-2009. Office of Concession Operations. Alaska Region

2010a “Brooks River Geotechnical Survey Bore Installation.” Report of archeological survey and testing, July 27-28, 2010. By Dale Vinson, Katmai National Park and Preserve.

2010b “Construct a New Brooks Camp Barge Landing and Access Road.” Report of archeological survey and testing, July 21-26, 2010. By Dale Vinson, Katmai National Park and Preserve.

2010c Southwest Alaska Network Inventory and Monitoring Program (SWAN). N.d., website accessed September 2010: http://science.nature.nps.gov/im/units/swan/index.cfm

2010d “Draft Value Analysis Study Report. Replace Floating Bridge and Access Trails. Brooks Camp. Katmai National Park and Preserve.” Alaska Regional Office, Anchorage, AK.

2010e “Katmai National Park and Preserve. Soundscape Inventory Report. Brooks Camp . Summer 2010.” Unpub. draft report. On file at park headquarters.

2010f “Visitor Use at Katmai National Park 2005-2009.” Unpub. preliminary summary report.

2010g “Brooks Camp Visitor Center Visitation Data.” Unpub. raw data.

2011a “Cultural Landscape Inventory: Brooks Camp.” Prepared by Samson L. Ferreira. NPS Cultural Landscape Program, Anchorage, AK.

2011b “Bridge Survey Results”. Summer 2011. Unpub. report prepared by Sherri Anderson, Carissa Turner, and Troy Hamon.

2012 "Preliminary Determination of Waters of the United States, Including Wetlands for Brooks River Access Barge Landing Alternative, NPS, Katmai National Park and Preserve. Prepared by B. Rice, G. Yankus, and W. Rapp. On file at NPS Alaska Regional Office.

NPS Public Use Statistics Office, Department of the Interior
n.d. www. www.nature.nps.gov/stats.

Olson, T. L., R. C. Squibb, and B. K. Gilbert
1998 "Brown Bear Diurnal Activity and Human Use: A Comparison of Two Salmon Streams." *Ursus*. 10:547-555.

Olson, T. L.
1993 Resource Partitioning among Brown Bears at Brooks River in Katmai National Park and Preserve." Thesis, Utah State University, Logan, Utah.
2009 Submittal to Brooks River Brown Bear Technical Meeting Participants. Katmai National Park and Preserve, National Park Service. Memo dated August 28, 2009.

Olson, T. L. and B. K. Gilbert
1994 "Variable Impacts of People on Brown Bear Use of an Alaskan River." International Conference on Bear Research and Management 9:97–106.

Olson, T. L., E. M. Groth, K. W. Mocnik, and C. I. Vaughn
2009 "Bear Management at Brooks River, Katmai National Park, 2003-2006." Katmai National Park and Preserve, National Park Service. Alaska Region Natural Resources Technical Report, NPS/SR/NRTR-2009-73.

Olson, T. L., B. K. Gilbert, and R. C. Squibb
1997 "The Effects of Increasing Human Activity on Brown Bear Use of an Alaskan River." *Bio. Cons*. 79:1-5.

Olson, T. L., and J. A. Putera
2007 "Refining Monitoring Protocols to Survey Brown Bear Populations in Katmai National Park and Preserve and Lake Clark National Park and Preserve." National Park Service. Alaska Region Natural Resources Technical Report NPS/AR/NRTR/2007-66.

Resource Development Council for Alaska, Inc.
2010 Fisheries. Industry Overview. Facts and Economic Impact. N.d., accessed March 2010. www.akrdc.org/issues/fisheries/overview.html#Anchor-Background -49575

Rice, B.
2008 "Field Trip Report for Wetlands Evaluations at Brooks Camp and Lake Camp, KATM." Memorandum to Joan Darnell and Helen Lons, National Park Service, Anchorage, Alaska.

Schwanke, C. J. and W. A. Hubert
2003 "Structure, Abundance, and Movements of an Allacustrine Population of Rainbow Trout in the Naknek River, Southwest Alaska." *Northwest Science*: 77; 340-348.

Sellers, R. and M. McNay
1984 "Population Status and Management Considerations of Brown Bear, Caribou, Moose, and Wolves on the Alaska Peninsula." Report to Board of Game. Alaska Dept. Fish and Game, King Salmon, AK.

Sherwonit, Bill
1996 "Katmai at a Crossroads." *National Parks Magazine*.

Smith, T. S.
2002 "Effects of Human Activity on Brown Bear Use of the Kulik River, Alaska." *Ursus*, v. 13, p. 257-267.

Squibb, R. C. and B. R. Holmes
1992 "Analysis of Bears Involved in Undesirable Interactions with Humans at Brooks River, Alaska." Poster presented at the Ninth International Conference on Bear Research and Management, Missoula, Montana, by Katmai National Park and Preserve, King Salmon, Alaska.

Troyer, W. A.
1980 "Distribution and Densities of Brown Bears on Various Streams in Katmai National Monument." Alaska Area Office. Report. USDI–NPS–ARO.

URS Group, Inc. (URS)
2009a *Brooks River Area Utilities Replacement and Housing Relocation, Environmental Assessment, Katmai National Park and Preserve*. Prepared for the National Park Service by URS Group, Inc., Anchorage, Alaska, with contributions by NPS staff of the Alaska Regional Office and Katmai National Park and Preserve. On the Internet at http://parkplanning.nps.gov/document.cfm?parkID=13&projectID=25406&documentID=31040
2009b *Preliminary Jurisdictional Determination of Water of the United States, including Wetlands, Brooks River Bridge Project*. Prepared for the National Park Service by URS Group, Inc., Anchorage, Alaska.

U.S. Army Corps of Engineers (USACE)
1987 *Corps of Engineers Wetlands Delineation Manual*. Department of the Army, Waterways Experiment Station, Vicksburg, MS.
2007 Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Alaska Region, U.S. Army Engineer Research and Development Center Vicksburg, MS.

U.S. Census Bureau
2005 "2002 Census of Governments. Volume 1, Number 2, Individual State Descriptions." Issued July 2005
1990a American Fact Finder. 1990 Census of Population and Housing.
1990b Population Finder. 1990 Census, Summary File 1 (SF 1) and Summary File 3 (SF 3)
2000 2000 Census, Summary File 1 (SF 1) and Summary File 3 (SF 3)
2008 Population Estimates. American Community Survey

U.S. Fish and Wildlife Service (USFWS)
1964 "Ecological Studies of Sockeye Salmon and Related Limnological and Climatological Investigations, Brooks Lake, Alaska, 1957, by T. R. Merrell Jr. USFWS. Special Scientific Report-Fisheries 456.

2007a Bald Eagle Fact Sheet.
2007b Brown Bear Fact Sheet.
2007c "National Bald Eagle Management Guidelines." Available on the internet at: www.fws.gov/.../eagle/NationalBaldEagleManagementGuidelines.pdf. Accessed on 4/15/2011.

U.S. Fish and Wildlife Service (USFWS) and Alaska Department of Fish and Game
1986 "A Radio Tagging Study of Naknek Drainage Rainbow Trout, Final Report."

U.S. Geological Survey (USGS), Department of the Interior
1999 "Alagnak Rainbow Trout Investigations at the Alaska Biological Science Center," Biological Resources Division, www.absc.usgs.gov.

Viereck, L.A., CT. Dyrness, A.R. Batten, and K.J. Wenzlick
1992 "The Alaska Vegetation Classification." Pacific Northwest Research Station. General Technical Report PNW-GTR-286.

Wetzel, R.G.
2001 *Limnology: Lake and River Ecosystems.* Third edition. Academic Press.

Whittaker, D. and R. L. Knight
1998 "Understanding Wildlife Responses to Humans." *Wildl. Soc. Bull.* 26(2):312-317.

Wilson, M.F. and K.C. Halupka
1995 "Anadromous Fish as Keystone Species in Vertebrate Communities". Conservation Biology 9:489-497. In: Cederholm, C.J., H. Michael, Jr., and N. Pittman. 2001. *Considerations in Establishing Ecologically Based Salmon Spawning Escapement Goals for Selected Washington Rivers.* Paper presented for the Wild Salmon Center at the Wild Salmon and Steelhead Conference, Portland Oregon. November 5–6, 2001.

Womble, Peter and Stacy Studebaker
1981 "Crowding in a National Park Campground: Katmai National Monument in Alaska." *Environment and Behavior*, 13(5).

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# INDEX

As the nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural and cultural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to assure that their development is in the best interests of all. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under United States (U.S.) administration.

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Katmai National Park & Preserve
King Salmon, Alaska

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