

Figure 2-6. Site plan for the McCarthy West Side Development

## 2.2.1 NPS Housing

Tables 2-1a, 2-1b, and 2-1c above show current and potential housing in the NHL. The NPS would continue to identify and quantify housing needs, and would make future adjustments in accordance with the NPS housing needs protocol. To respond to these housing needs, under this alternative, WRST proposes to construct more permanent housing units at the Interim Operations Support Complex west of the Kennicott River, in addition to the six units currently available there (described in Section 1.5.7 and listed in Table 2-1c). There are approximately six privately owned historic houses remaining in the NHL; if any of the owners offered to sell their house to the NPS, the NPS would consider purchasing and rehabilitating it to provide additional employee housing. NPS would seek rental of local privately-owned housing if needed.

This plan is addressing “more permanent housing units,” meaning additional modern “Single Family Housing” (SFH) or “Dormitory” categories depending on future need. The estimated current need is to house 15 employees with an anticipated need in 2010 to house 32 employees. The potential additional beds identified in Tables 2-1a, 2-1b, and 2-1c would accommodate this number of expected employees. It is expected that the future need would include extended season use as well as potentially family requirements. Therefore, SFH and/or Dorm-style units are anticipated. To meet the anticipated need for SFH, one of the Silk Stocking Row houses may be rehabilitated to make it habitable for children. On the west side, the location for potential additional housing development is generally south of the existing NPS Operations Support Complex, within the 700 feet of the well and on federal lands. Utilities would be provided by existing water, sewer and power (with necessary modification) currently on this site.



Figure 2-7. Bulk storage area within the newly constructed NPS Support Complex in West McCarthy

## 2.2.2 Construction Materials Storage

Under the Proposed Action, bulk storage would continue at the Interim Park Operations Support Complex. This would serve both as a contractor storage camp and mobilization site in addition to providing NPS storage. All bulk fuel storage would also occur at the support complex; *no* bulk fuel storage would be permitted in the NHL.

Within the NHL, limited project materials storage – in addition to equipment storage, equipment parking and employee parking – would continue to occur at the Dairy Barn; however, the following types of actions

would be implemented to ensure storage is visually unobtrusive: fencing, vegetative management (e.g., allowing alders to grow and shield the view), and constructing sheds and other weatherproof structures that blend with the NHL’s historic character. Assuming continued access via the freight bridge, the NPS would bury the propane tanks that service the NPS buildings in the NHL. Figure 2-8 is a site plan illustrating the major elements of the proposed Kennecott NHL maintenance yard, including storage buildings, sheds and a lumberyard.

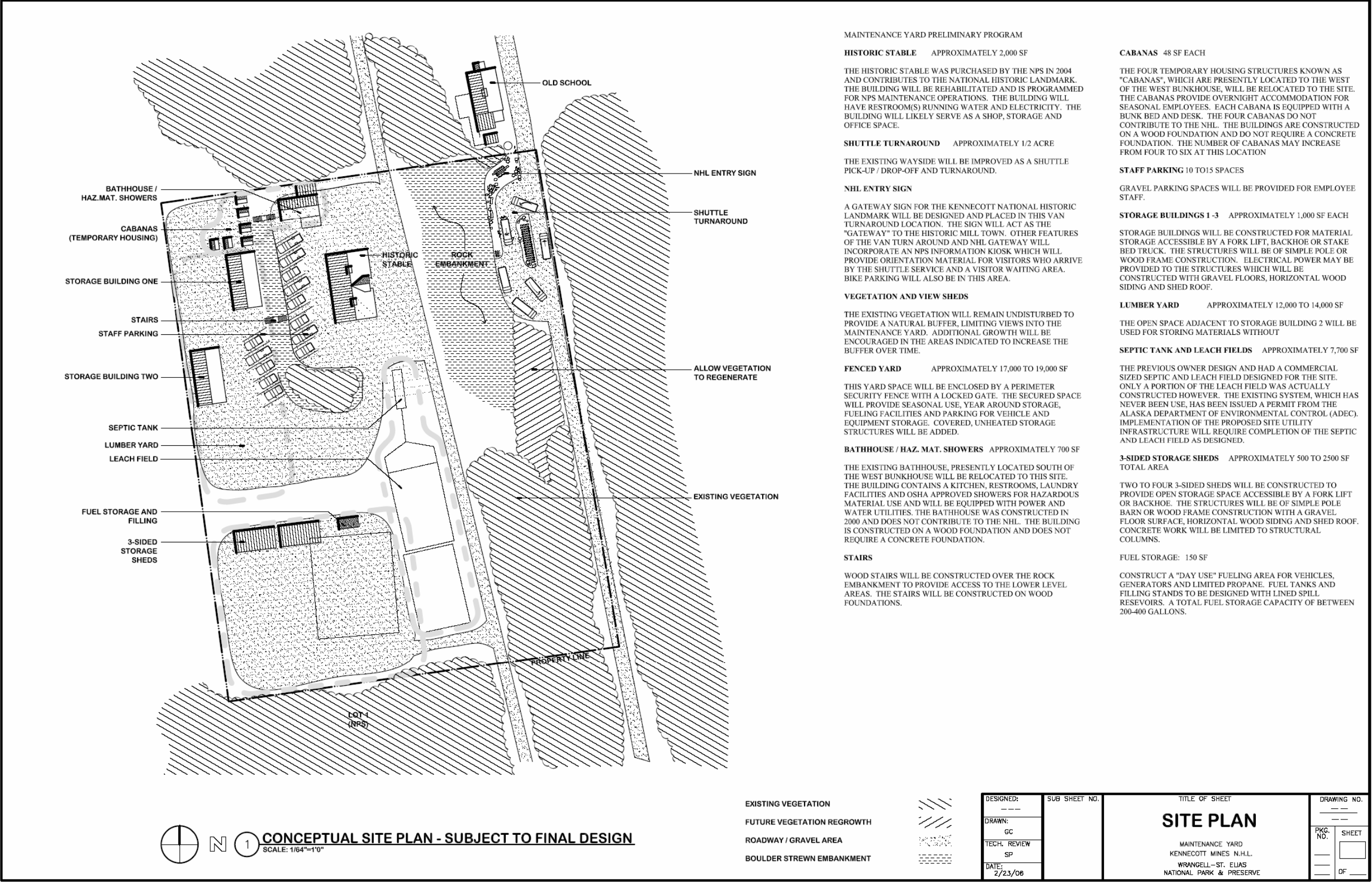


Figure 2-8. Proposed maintenance yard in Kennecott NHL

### **2.2.3 Power Generation and Distribution**

A combination of hydroelectric power generation and propane power generation would accommodate power needs in West McCarthy and Kennecott. Having both power sources available would provide the redundancy needed during times of low stream flow, during start-up and shut down, and while maintenance is being performed on hydroelectric assets. The proposed action for power generation is consistent with the 2005 Value Analysis for Kennecott which considered several energy generation scenarios with varying combinations of fuel-fired generator sets and hydroelectric power. The following actions are elements of the proposed action.

#### *2.2.3.1 Power Generation*

About 800-2000 lineal feet of water line for hydroelectric power generation would be constructed between the water storage tank and a new Pelton wheel situated at the historic Power Plant building. The water line would either be on grade, or buried at a depth of 4-6 feet. Clearing and grading to a width of 12-16 feet would be required for 350-450 lineal feet of the line route between the storage tank and Pelton wheel. About 450-1550 feet of the water line would be placed in trenching along Bonanza Road and the rail road alley way. A pathway for construction equipment and line maintenance would be constructed parallel to the pipeline. Recurring maintenance would use all-terrain vehicles and the final path width would be 6-9 feet. Site restoration would be achieved with passive revegetation.

The interior of the Power Plant building would be adapted to accommodate the Pelton wheel; historic building elements would remain intact. A compatible structure may be built within the power plant to house the contemporary Pelton wheel, power generation equipment, and batteries.

About 200-400 lineal feet of spent water pipeline would be constructed between the Pelton wheel and the toe of Kennicott Glacier. The spent water line would either be on grade, or buried at a depth of 4-6 feet. An outfall device would be used to minimize erosion.

The existing satellite generator building situated west of the Company Store would be retained and reused, as its location enables a tie-in to the existing buried power distribution line that connects the Store, Refrigeration Building, West Bunkhouse, New School, Recreation Building, and Old School. The existing power line is buried in the bed of the historic Wagon Road that connects the Store and Dairy Barn; the line would be extended about 200 feet from the Old School to the Dairy Barn.

#### *2.2.3.2 Power Distribution*

A combination of buried and overhead electrical power distribution lines would be constructed to replicate the historic power distribution system. Poles would be set for the overhead lines. About 1400 lineal feet of buried and overhead power line would be constructed from the Power Plant south to the existing satellite generator building situated west of the Company Store. The power distribution line would follow the historic railroad corridor. Power would be supplied from the distribution line to the Machine Shop, Transformer Building, Leaching Plant, Mill, General Manager's building, and Railroad Depot. Cottage 39C would be connected to the power

grid; about 300 lineal feet of overhead power line would be provided along the historic rail road alleyway. Power meters would be located to minimize impacts on the historic fabric. Electrical service could be provided to the upslope potable water treatment facility and water storage tank area. About 1600-1800 lineal feet of line would be required; the line would be placed in trenching that would also be used for water pipelines.

#### **2.2.4 Sanitary Sewer System**

Collection, treatment and disposal of sewage (wastewater) generated by visitors and staff in NHL buildings and on the west side of the Kennicott River would be achieved primarily by septic systems (septic tanks and leach fields).

The buildings that would be equipped with sewer service are the Dairy Barn, Old School, Recreation Hall, New School, West Bunkhouse, Store, Machine Shop, Power Plant, and Silk Stocking cottages. While conventional septic systems are typically ideal for remote locations and minimal use facilities, site constraints include steep terrain, quick perk characteristics, and small lot sizes. However, with appropriate engineering, it appears that conventional septic systems would function properly.

The existing ADEC-approved septic system and leach field at the Dairy Barn would be expanded to service recently acquired dairy barn property. The Store, West Bunkhouse, New School, Recreation Hall, Old School and Dairy Barn would be serviced by this system field. Expansion of the septic system and leach field would be as follows.

- Historic Stables/ Dairy Barn: 7000-9500 square feet
- Store: 1500-2200 square feet.
- Silk Stocking Cottages: 1000-1800 square feet.
- Septic between New School and West Bunkhouse: 1000-1800 square feet.

Excavations would be made along the west side of the site behind the Store and under the historic wagon road. About 1050 lineal feet of buried sewer line from the Store to the Dairy Barn would be provided.

A sewage lift station may be required. The lift station would be installed in a buried manhole in the line between the Store and Dairy Barn. A total of 6-8 manholes would be constructed. To avoid the lift station, approximately 200 lineal feet of deep trenching may be required.

Additional excavation would be required to enlarge the leach field to handle projected load. A conventional septic and leach field would be developed adjacent to the Silk Stocking cottages. A septic / leach field would be constructed west of the Store; this is planned as a temporary component until such time as funding is available for construction of a sewer line for the Store and Dairy Barn. When the Dairy Barn sewer system becomes operational, the septic field at the Store would be abandoned and restored using passive revegetation.



An existing ADEC septic field which is located between the New School and the Store would remain operational until the Dairy Barn septic field is constructed. At that time the existing field would be abandoned and restored using passive revegetation.

### **2.2.5 Fire Suppression**

The proposed fire suppression system would consist of underground piping with installed hydrants, water suppression/sprinkler system at each building, and mini-pumper emergency response vehicle. Specifically, as recommended in the 2005 Value Analysis, a wet/dry conventional sprinkler system would be installed in buildings with the exception of the Mill and Power Plant.

A foam deluge system would be used at the Mill because of its unique construction and sheer size. Computer modeling would be used optimize deluge detection and assure the quickest response time. At the Power Plant, computer modeling would be used to determine the need for installation of sprinklers; existing fuel loads in this building may not produce sufficient heat to activate ceiling sprinklers. An exterior deluge system may also be used if it is decided to not install sprinklers in the adjacent Leaching Plant; this would prevent ignition of the Mill from a fire originating in the Leaching Plant.

The 2005 Value Analysis considered several fire detection, alarm, and security alternatives for Kennecott. Year-round fire detection and security monitoring using combined systems would be an element of the proposed action.

At the Support Complex site west of the Kennicott River, WRST would develop a building sprinkler system with water pumped from a well, and provide a plastic water holding tank external to the well house with up to 10,000-gallon tank capacity. Such a sprinkler system would also require a trench to each cabin from an existing water stub-out.

### **2.2.6 Water Gathering and Storage**

A water intake structure would be constructed on Bonanza Creek and possibly National Creek. Historically, water intakes were constructed at an elevation of 2350 feet on Bonanza and National creeks. The water was used for milling operations, power generation, fire protection, and drinking water. The following elements are proposed:

A water intake structure would be constructed at or below the historic intake (currently in private ownership) on Bonanza Creek at an elevation of about 2350 feet. Another water intake structure would be constructed at an elevation of about 2350 feet on National Creek. To construct the intakes, the sides of both stream beds would be excavated and concrete intakes about 6 feet by 6 feet by 6 feet would be constructed and installed nearly flush with the ground surface. The areas of construction would be backfilled and restored with passive revegetation.

A water storage tank with a capacity of 150,000 gallons would be constructed at an elevation of about 2270 feet. A smaller, potable water treatment tank with a capacity of about 5000 gallons may also be required in the vicinity of the larger water storage tank. Vegetation would be

cleared and a level gravel terrace would be graded in an area of about 0.5 acres. About 2200-2600 lineal feet of 10-inch diameter hydroelectric waterline between the Bonanza Creek intake and the storage tank would be constructed. A route from the intake to Bonanza Road 1000-1300 feet long would be cleared and graded; the route would be cleared of vegetation in a swath 12-16 feet in width. A water pipeline would be constructed either on grade, or buried at a depth of 4-6 feet. A pathway for construction equipment and line maintenance would be constructed parallel to the pipeline. Recurring maintenance would use all-terrain vehicles and the final path width

would be 6-9 feet. Site restoration would be achieved with passive revegetation.



**Figure 2-9. National Creek within the NHL, just upstream of the Mill Town; gravity concentration mill in background**

A water supply line extending 1400-2100 lineal feet from the National Creek intake to the 150,000 gallon water storage tank would be constructed. A route from the intake to the tank 1400-2100 feet long would be cleared and graded to a width of 12-16 feet. The water pipeline would be constructed either on grade, or buried at a depth of 4-6 feet. A pathway for construction equipment and line maintenance would be constructed parallel to the pipeline. Recurring maintenance would use all-terrain vehicles and the final path width would be 6-9 feet. Site restoration would be achieved with passive revegetation.

### 2.2.7 Potable Water Treatment and Distribution

In the short term, the NPS would provide bottled drinking water at the Depot available for purchase by the public. For the site west of Kennicott River, NPS would maintain a potable water storage tank at the McCarthy Road Information Station with tank refills from the west side well in the Support Complex.

In the long term, two potable water sources would be investigated for Kennecott. One source would be the development and use of conventional wells. The other source would be surface water drawn from the aforementioned water gathering and storage infrastructure.

*Wells* – Wells would be located at least 200 feet from private property to avoid restricting the use and development of private property. Areas meeting this criterion include locations at the core of the site around the General Manager's Office, area around Lot 41 on Silk Stocking, upslope from the Mill, and west of the Dairy Barn (see Figure 2-10). In recent years, two wells have been developed at Kennecott; however, the wells' minimal capacity may be insufficient to meet public demand. It is conceivable that further investigation may find that additional well development for potable water is not feasible due to a low flow aquifer.

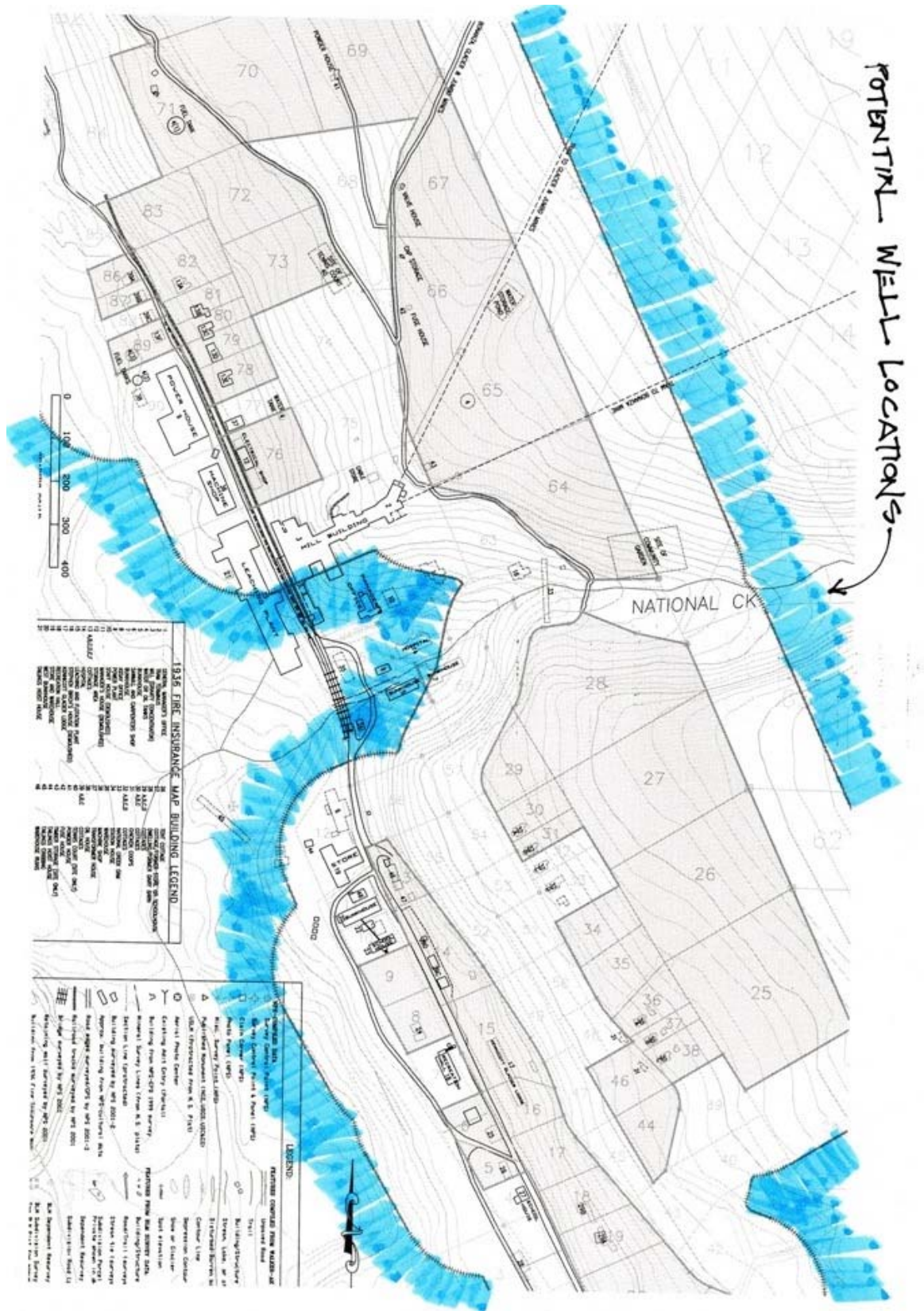


Figure 2-10. Potential well locations in the Kennecott NHL



*Surface Potable Water Source* – Potable water would be supplied by the aforementioned water gathering and storage infrastructure if well production is determined to be an inadequate source of potable water.

*Water Treatment* – A potable water treatment facility would be constructed at either the historic Refrigeration Building, or above the Mill near the 150,000 gallon water storage tank. If sited at the Refrigeration Building or Power Plant, facility design to assure compatibility with the historic fabric would be provided. Facility construction would require clearing, grading, and construction of a building 250-500 square feet in area.

*Potable Water Distribution Lines* – A treated potable water line would be constructed in parallel with a fire flow distribution line in the historic railroad alleyway of the Mill Town. The piping would run together in buried or reconstructed above-ground wood utilidors. About 2800-3600 lineal feet of potable water pipeline would be required; if buried, the line would be 4-6 feet deep. Trenching and excavation in the alleyway would have to proceed in a way to avoid damage to buried archaeological features such as railroad ties, piping, and utilidors. About 800 lineal feet of the pipeline would be located in the route of a pathway adequate to support construction equipment and maintenance using an all-terrain vehicle and trailer. The route would be cleared to a width of 12-16 feet.

The Dairy Barn, Old School, Recreation Hall, New School, West Bunkhouse, Store, Machine Shop, and Power Plant would be connected to the potable water distribution lines with buried connections and fittings. A pump station and potable water line would service 2-4 cottages.

### **2.2.8 Household Waste Management**

NPS facilities and local residents routinely discard household wastes that must be properly managed and disposed for sanitary reasons. Household wastes consist of garbage and trash derived from households including single residences, multiple residences, hotels, motels, bunkhouses, ranger stations, crew quarters, campgrounds, picnic grounds, and day-use recreation areas. To facilitate sanitation and protection of the environment, NPS would consider revising the special regulations for WRST (36 CFR 1373) to allow consolidation of locally derived household waste at the Alaska Department of Natural Resources firewise pavilion site on McCarthy Road west of McCarthy. Subsequently, the consolidated household waste would be transported offsite to Glennallen for proper disposal.

### **2.2.9 Visitor Amenities**

The Proposed Action Alternative would implement a number of actions, projects and operations to enhance visitor amenities and improve and expand upon the visitor experience in the McCarthy-Kennecott area. NPS would construct a trail to the National Historic Landmark from the footbridge by the lake at the toe of the glacier that follows east side of Kennecott River, paralleling the glacier, and connecting to Root Glacier trail. This would be constructed to pedestrian standards. A trail segment that links with the proposed walk-in campground would also be included.

This foot trail segment would be approximately 3 and ½ miles long and would be constructed from the north end of the campground along the glacial moraine up to Kennecott. The foot trail would connect with the start of the Root Glacier trail where it splits off from the Bonanza Mine trail. The trail would be approximately 3 feet in width and would be constructed with existing moraine material. Due to the steep topography in some areas some sections will need some minor development to ensure safety and to ensure that water will move off of the trail. Features such as short sections of primitive stairs or water bars would be integrated into the design as needed. In addition a small footbridge over National Creek may be needed. The trail would not be visible from the wagon road or the RR corridor. Views of Kennecott and surrounding landscape features would be experienced along the way.

The park would establish partnerships to maintain existing trails in the area such as Jumbo, Bonanza, and Root Glacier trails. Vault toilets would not be placed at trailheads in remote locations because servicing the toilets would be impractical; visitors would have to rely on established backcountry sanitation techniques. Primitive restroom facilities, such as outhouses, may be considered by NPS at a later date in locations to be determined.

NPS would also place a Welcome sign before the bend in the road on the west side of the Kennecott River (between MP58 and MP59). The sign text would identify the park unit, the NHL, and the community.

NPS personnel would staff the McCarthy Road Information Station assisted by trained community volunteers. As in the No Action Alternative, under the Proposed Action Alternative, the VIS would be staffed from Memorial Day to Labor Day, seven days a week, eight hours per day. Under the Proposed Action Alternative, NPS would explore partnerships for staffing.

The Park would partner with ADOT&PF, the McCarthy community, and/or ADNR to put panel information at the State's fire-wise pavilion west of the bend in the road. With this signage and visitor contact, WRST would introduce visitors to complex local land ownership patterns. The park also would develop and introduce a comprehensive sign and wayfinding system. In November 2005, the Alaska Regional Office of NPS published sign guidelines for WRST (NPS, 2005g). The sign guidelines address the preservation of existing historic signs, the replication of non-existent historic signs, and the design and construction of contemporary signs. The guidelines include standards for information and interpretive signs. A traveler information system providing timely information on park/NHL conditions, facilities, services and events could be developed at Long Lake for local AM-FM broadcasting.

## **2.2.10 National Creek Encroachment on Cultural Resources**

Under the Proposed Action, as in the case of the No Action Alternative, needed steps must be taken to prevent further damage to the NHL's historic resources. National Creek trestle rehabilitation would include clearing of debris out of an adjacent stream to help channelize the creek and prevent bank erosion.

### 2.2.11 Transportation

Numerous steps would be implemented to address transportation issues under the Proposed Action Alternative. NPS would support a facility plan consistent with McCarthy Road Scenic Corridor Plan, including recommendations on proposed waysides in the McCarthy area (see Section 1.5.2), public and commercial improvements, and road design standards. The Wagon Road would be marked for visitor and local use; it would retain its historic character as a wagon road. WRST would provide transportation-related interpretive planning and exhibit development.

NPS would encourage ADOT&PF to design the rail corridor road as a one-lane gravel road that maintains its historic character with a 25-mph speed limit designed to accommodate safe vehicle passing. Between McCarthy and Kennecott, a cooperative agreement would be sought with NHL landowners and businesses to address NHL road maintenance and another cooperative agreement would be sought with the State and local landowners to address road maintenance outside of the NHL. The purpose of these cooperative agreements would be to find a method by which NPS can participate with other landowners on road maintenance activities.

West of the Kennicott River, this alternative would establish a gateway to McCarthy-Kennecott and expand NPS public parking (up to 50 day use spaces) in the vicinity of the existing McCarthy Road Information Station with an NPS welcome sign. Visitors would have the option to either take a shuttle van to the footbridge, park at privately owned lots, or they could simply walk to the footbridge and cross.

East of the Kennicott River, parking for loading and unloading adjacent to the footbridge would continue to be available on state ROW. Also on the east side of the river, the Proposed Action would encourage development of new private parking and develop parking for 30 cars on NPS land at the “boneyard” concealed behind the railroad berm.

Within the National Historic Landmark, NPS would develop a Memorandum of Understanding (MOU) with NHL landowners to manage vehicle access and parking. Vehicle parking in the NHL would be allowed by landowners, their guests, local McCarthy residents, NPS staff and contractors in designated, limited areas with a daily time limit. The Park Service would discourage the use of common easements in the NHL for vehicle parking. At the Dairy Barn, the only parking would be by NPS and contractors. Limited parking would be allowed by event organizers at the Recreation Hall when they are using that facility for a private function. NPS would pursue a policy with other NHL landowners of limiting parking to 2-4 hours within the ROW in support of transfer of goods and people. All parking would be south of National Creek.

The Proposed Action would organize an effective NPS crew shuttle system to service employees from the west side of the Kennicott River to Kennecott itself. WRST would work with local community to develop an efficient public shuttle system and adequate hours of operation. Designated van shuttle stops would be established at the west-side development (Support Complex), the McCarthy Road Information Station, the west and east sides of the footbridge, the boneyard, in McCarthy, at the ‘Y’ near the museum, the airport, the campground, and the NHL.

Shuttle stops would include an information and orientation bulletin board with bus schedules and map showing McCarthy and Kennecott and “what to do while you’re here” information.

NPS would develop a vehicle turnaround in the NHL at the upper terrace of the recently-purchased Dairy Barn property near the southernmost boundary of the Mill Town (Figures 2-11 and 2-12). This site, which the previous owner created by fill, is adjacent to the road along the east boundary of lots 2 and 3; it appears to be large enough to accommodate a van turnaround. In addition, an area would be set aside for bicycle parking (perhaps under a covered pavilion) and an entrance sign.



**Figure 2-11. Proposed turnaround site in the NHL above roof of Dairy Barn below**

The NPS would authorize commercial operators to provide shuttle service from McCarthy to Kennecott. NPS would also encourage and support bicycle rentals and work with ADOT&PF to develop intervisible pullouts and other road design features to improve traffic flow and safety.

### **2.2.12 Utilidors (utility corridors or conduits)**

Historically, wooden utilidors housed and insulated the Mill Town’s steam distribution system, condensate steam returns, and water distribution for the structures. The remaining historic utilidors are in poor condition, with many beyond repair for the purposes of servicing the new utility systems. Reconstructed wooden utilidors would be constructed to facilitate the installation of the new utility systems and to preserve these historic features.

Construction of new water and electrical distribution utility systems would reincorporate the utilidors in portions of the new utility systems. About 300-700 lineal feet of new utilidors would be constructed to match the historic utilidors. Within the railroad corridor of the Mill Town, 500-2500 lineal feet of new buried utilidors would be constructed.

## **2.3 MITIGATION MEASURES**

During any construction activities on any element of the Kennecott NHL Support Facility Plan, standard best management practices (BMPs) would be implemented. Implementation of these BMPs would control or reduce potential adverse impacts from soil erosion, surface water runoff, and sedimentation. In addition to these measures, other measures would be implemented to minimize or avoid adverse impacts on environmental resources as a result of implementation of either the No Action or Proposed Action Alternatives. Table 2-2 lists these other measures according to the resource area affected. The NPS would implement these measures as part of



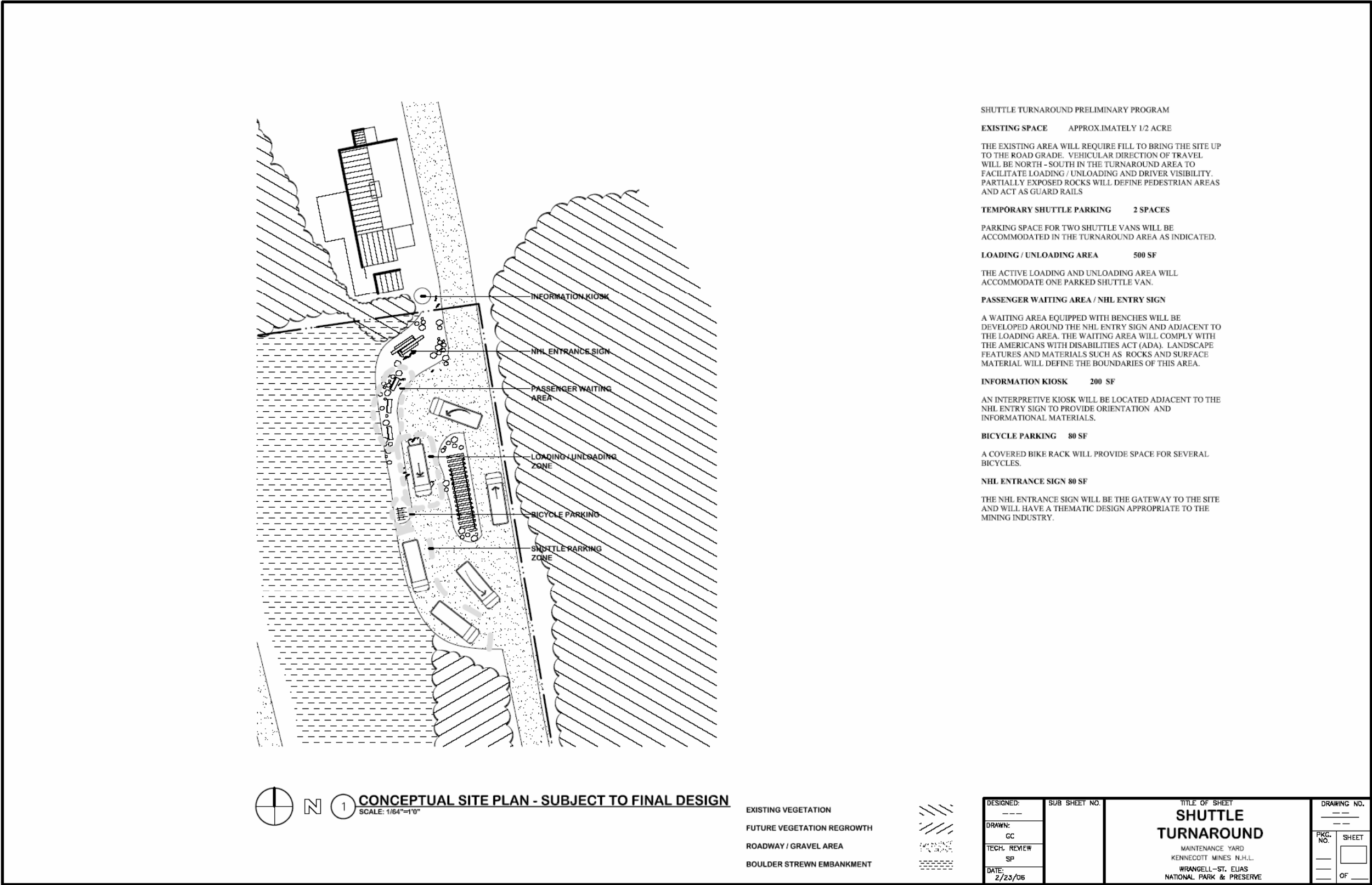


Figure 2-12. Conceptual site plan of proposed vehicle turnaround in the Kennecott NHL

both the No Action Alternative and the Proposed Action Alternative, although more construction work would be conducted under the latter.

<b>Table 2-2. Mitigation Measures by Resource Area</b>	
<b>Resource Area</b>	<b>Mitigation Measures</b>
Soils & Water Resources	<ul style="list-style-type: none"> <li>• The NPS would develop a Storm Water Pollution Prevention Plan (SWPPP) to control overland flow and reduce the potential for sedimentation from any construction site as required by the Alaska DEC NPDES Storm Water General Permit for Large and Small Construction Activities.</li> <li>• Pursuant to Section 401 of the CWA, the NPS would obtain State water quality certification from Alaska DEC, when construction would occur in or near “Waters of the United States”.</li> <li>• Measures would be taken to prevent or control accidental spills of fuels, lubricants, and chemicals from entering waterways and wetlands. Specifically, no fuels would be stored at construction sites, refueling would occur away from waterways and wetlands, and an emergency spill kit, containing absorption pads, absorbent material, a shovel or rake, and other cleanup items, would be readily available on-site in the event of an accidental spill.</li> <li>• Construction would not be conducted when soils are saturated, such as during or immediately following rain events.</li> <li>• When a trail is constructed or maintained, ensure proper installation of drainage controls along the trail to control increased surface water runoff from the trail and to reduce subsequent erosion and sedimentation.</li> <li>• All disturbed areas will be revegetated passively after construction to stabilize soils over the long-term.</li> </ul>
Vegetation	<ul style="list-style-type: none"> <li>• Project sites would be surveyed by a park botanist prior to ground disturbance – preferably during the design stage, when alternative locations may still be feasible – for the presence of rare plant species as designated by the Alaska Natural Heritage Program. Where practicable, all efforts will be taken to mitigate effects on rare plants by impact avoidance.</li> <li>• Any disturbed areas would be revegetated passively by replacing topsoils where possible to facilitate passive revegetation by native, local plants.</li> </ul>
Wildlife and Visitor Safety	<ul style="list-style-type: none"> <li>• NPS will patrol the new walk-in campground regularly to ensure that campers are abiding by rules to follow the consistent securing of bear attractants, which would lower the potential for human-bear conflicts.</li> <li>• NPS educational and outreach efforts to visitors and residents will consistently address the need to reduce conflicts with bears and means of doing so.</li> <li>• Bear safety instructions would be posted at the campground kiosk.</li> <li>• Use signage and/or brochures to remind visitors that as part of the national park system, wildlife is not to be disturbed.</li> </ul>
Cultural Resources	<ul style="list-style-type: none"> <li>• If previously unidentified archaeological features are encountered during construction inside or outside the NHL, work would cease immediately and the park superintendent would be notified to ensure protection of cultural resources.</li> </ul>

## 2.4 THE ENVIRONMENTALLY PREFERRED ALTERNATIVE

As stated in Section 2.7 (D) of the NPS DO-12 Handbook, “The environmentally preferred alternative is the alternative that will best promote the national environmental policy expressed in NEPA (Section 101(b)).”

### National Environmental Policy Act (NEPA) Sec 101 Goal Statements

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

(NEPA, 42 USC 4321-4347)

In sum, the environmentally-preferred alternative is the alternative that, not only results in the least damage to the biological and physical environment, but also that best protects, preserves, and enhances historic, cultural, and natural resources. The Preferred Alternative is clearly the environmentally preferred alternative because it attains the widest range of beneficial uses of the environment with minimal degradation, risk to health and safety, or other undesirable and unintended consequences; and assures for all visitors to the Kennecott-McCarthy area safe, healthful, productive, and esthetically and culturally pleasing surroundings. In particular, it provides for a higher level of cultural/historical resource preservation as well as a higher-quality visitor experience, while at the same time accommodating the expected increase in visitation over the coming years.

## 2.5 ALTERNATIVES AND ACTIONS CONSIDERED BUT ELIMINATED FROM DETAILED STUDY

The following alternatives or options were considered closely by the planning team but dismissed from more detailed analysis in the EA.

### 2.5.1 All NPS support facilities located within NHL

Under this alternative, all existing NPS support facilities would be relocated from McCarthy and West McCarthy up to the NHL itself, and all new facilities would be built there as well.

*This alternative was dismissed from more detailed analysis because it would lead to incompatible development within the NHL.*

### **2.5.2 Non-essential NPS support facilities located at new Operations Support Complex**

This alternative is the opposite of the previous one. It would involve moving all non-essential NPS support facilities and activities – like bulk storage, office space, staff housing, etc. – out of the NHL itself and relocating them either in McCarthy or the Operations Support Complex west of the Kennicott River. Only essential visitor support infrastructure – water supply, sewage systems, fire-fighting equipment, etc. – would be maintained within the NHL District.

*This alternative was rejected from more detailed analysis in the EA because it is impractical, costly and unworkable, as well as unnecessary to protect the historic value and cultural integrity of the NHL.*

### **2.5.3 Cease all stabilization and preservation operations in the NHL**

Under this alternative, NPS would remove all support facilities from the NHL and cease operations to stabilize and restore historic structures there. WRST would allow “nature to take its course” and permit but not encourage or facilitate visitation.

*This alternative was dismissed from more detailed analysis because this nationally significant historic/cultural resource would be subjected to “demolition by neglect” and NPS would be ignoring its mission and mandate to protect nationally significant historic resources under its ownership or jurisdiction. In addition, visitation would likely continue and increase for some years, in spite of the lack of support from NPS. Under this alternative, such increased visitation would not be provided for or managed; uncontrolled visitation would only accelerate the deterioration and loss of historic resources and artifacts.*

*This alternative would lead to an impairment of historical resources, specifically a National Historic Landmark, under WRST’s jurisdiction. Under the NPS Organic Act and the General Authorities Act, impairment of park resources is prohibited.*



**Table 2-3. Comparison of Support Facility Plan Alternatives**

Issue or topic	No Action Alternative	Proposed Action Alternative (NPS Preferred Alternative)
NPS Housing	<ul style="list-style-type: none"> <li>Existing housing includes 4 small cabanas at Kennecott, 2 cottages on Silk Stocking Row (only 1 is habitable right now; as money allows it's being fixed up), &amp; 1 cabin in McCarthy.</li> <li>Six units (cottages) to house seasonal employees are available on the west side of River (McCarthy West Side Development).</li> <li>Six additional units (cottages) cottages to house seasonal employees will be constructed on the west side of River (Park Operations Support Complex or west side development) as funding permits.</li> <li>Consider buying and rehabilitating any of 6 privately-owned historic houses in the NHL if they become available for purchase.</li> </ul>	<ul style="list-style-type: none"> <li>Provide housing for 32 employees by 2010.</li> <li>Maintain all existing, under-construction, and planned housing in the NHL, McCarthy, and the Operations Support Complex.</li> <li>Construct more permanent housing units – including single family housing and dormitory style west of Kennicott River on federal lands south of the Park Operations Support Complex.</li> <li>Encourage employee rentals of local privately-owned housing</li> <li>Consider buying and rehabilitating any of 6 privately-owned historic houses in the NHL if they become available for purchase.</li> </ul>
Construction Materials Storage	<ul style="list-style-type: none"> <li>Within NHL, the interiors of several historic buildings like the power plant and machine shop would continue to be used to store lumber and other buildings supplies.</li> <li>Within NHL, existing storage and lay down site at the Dairy Barn, with a bright blue tarp covering some supplies, would continue to be used.</li> <li>The new lay down area in west side development (support complex) would be used for bulk storage.</li> <li>Some bulk fuel storage would also occur at support complex.</li> <li>Propane tanks used to service NPS buildings within NHL would remain above ground.</li> </ul>	<ul style="list-style-type: none"> <li>Bulk storage would occur at Operations Support Complex west of Kennicott River, as well as contractor storage camp and mobilization &amp; NPS equipment storage.</li> <li>Limited project materials storage (in addition to equipment storage/parking &amp; employee parking) would occur at Dairy Barn if it can be accomplished by a visually unobtrusive method such as fencing or vegetation.</li> <li>Bulk fuel would be stored at site west of Kennicott River (support complex).</li> <li>No bulk fuel would be stored at NHL.</li> <li>Assuming continued access via the freight bridge, the NPS would bury the propane tanks that service the NPS buildings in the NHL.</li> </ul>

**Table 2-3. Comparison of Support Facility Plan Alternatives**

Issue or topic	No Action Alternative	Proposed Action Alternative (NPS Preferred Alternative)
Power Generation and Distribution	<ul style="list-style-type: none"> <li>• Continue to use a 20 KVA diesel generator and underground lines to bring power to some buildings on the south side of National Creek within the NHL.</li> <li>• Use propane for heat only, not for power. No need for propane heat in winter; expect full cold shut-down with limited exceptions.</li> <li>• At Operation Support Complex, utilize a small generator sized to meet the need of 6 cabin units, well, and support building (though most is propane). Generator can be increased in size if need is greater.</li> <li>• Consider emerging alternative energy sources like hydrogen fuel cells as they become feasible.</li> </ul>	<ul style="list-style-type: none"> <li>• A combination of hydroelectric power generation and propane power generation would accommodate power needs in West McCarthy and Kennecott.</li> <li>• Construct 800-2000 lineal feet of water line for hydroelectric power generation between the water storage tank and a new Pelton wheel situated at the historic Power Plant building.</li> <li>• Adapt interior of the Power Plant building to accommodate the Pelton wheel while keeping historic building elements intact.</li> <li>• During stream low-flow periods, propane would serve as a supplemental power source at the Kennecott NHL.</li> <li>• Retain and reuse existing satellite generator building west of the Company Store.</li> <li>• Construct combination of buried and overhead electrical power distribution lines to replicate the historic power distribution system.</li> <li>• At Operations Support Complex, preferred power source is propane with integrated photovoltaic electrical generation</li> <li>• NPS would consider emerging technologies such as hydrogen fuel cells as they become available.</li> </ul>
Sanitary Sewer System	<ul style="list-style-type: none"> <li>• Continue using NPS-maintained sewer system consisting of vault toilets and one septic system in the NHL. Another existing but unused septic system at the Dairy Barn may also be brought into use.</li> <li>• For Operations Support Complex on west side, continue to use existing on-site sewage disposal consisting of a septic tank and leach field.</li> </ul>	<ul style="list-style-type: none"> <li>• Collection, treatment and disposal of sewage (wastewater) in both NHL and the west side Operations Support Complex would be achieved primarily by septic systems (septic tanks and leach fields).</li> <li>• Buildings that would be equipped with sewer service are the Dairy Barn, Old School, Recreation Hall, New School, West Bunkhouse, Store, Machine Shop, Power Plant, and</li> </ul>

**Table 2-3. Comparison of Support Facility Plan Alternatives**

Issue or topic	No Action Alternative	Proposed Action Alternative (NPS Preferred Alternative)
Sanitary Sewer System (continued)		<p>Silk Stocking cottages.</p> <ul style="list-style-type: none"> <li>• Excavate along the west side of the site behind Store and under the historic wagon road. Provide about 1050 lineal feet of buried sewer line from the Store to the Dairy Barn.</li> <li>• Sewage lift station may be required; it would be installed in a buried manhole in the line between the Store and Dairy Barn.</li> <li>• Expansion of leach fields would require additional excavation. Develop a conventional septic and leach field would be developed adjacent to the Silk Stocking cottages.</li> <li>• Develop well or septic system for McCarthy Cabin in McCarthy.</li> </ul>
Fire Suppression	<ul style="list-style-type: none"> <li>• Very limited, existing fire suppression capabilities in the NHL would continue, with foam fire extinguishers the only fire attack tool available.</li> <li>• No initial attack capability would exist for the McCarthy Road Information Station and other west side development (Support Complex).</li> <li>• A sprinkler system would be installed for fire protection of the Support Complex.</li> </ul>	<ul style="list-style-type: none"> <li>• Proposed fire suppression system would consist of underground piping with installed hydrants, water suppression/sprinkler system at each building, and mini-pumper emergency response vehicle.</li> <li>• Install wet/dry conventional sprinkler system in buildings with exception of the Mill and Power Plant.</li> <li>• Use foam deluge system at the Mill because of its unique construction and sheer size.</li> <li>• At Power Plant, use computer modeling to determine need for installation of sprinklers.</li> <li>• Proposed fire suppression includes year-round fire detection and security monitoring using combined systems.</li> <li>• At Support Complex west of Kennicott River, develop building sprinkler system with water pumped from well, and provide plastic water holding tank external to well house with up to 10,000-gallon tank capacity.</li> </ul>

**Table 2-3. Comparison of Support Facility Plan Alternatives**

Issue or topic	No Action Alternative	Proposed Action Alternative (NPS Preferred Alternative)
Water Gathering and Storage	<ul style="list-style-type: none"> <li>• No obsolete facilities or infrastructure would be reconstructed or replaced, and no new facilities would be built, to gather and store water for power generation, fire protection and drinking water.</li> </ul>	<ul style="list-style-type: none"> <li>• A water intake structure would be constructed on Bonanza Creek and possibly National Creek.</li> <li>• It would be constructed at or below the historic intake on Bonanza Creek at an elevation of about 2350 feet.</li> <li>• Another water intake structure may be constructed at an elevation of about 2350 feet on National Creek.</li> <li>• A water storage tank with a capacity of 150,000 gallons would be constructed at an elevation of about 2270 feet.</li> <li>• About 2200-2600 lineal feet of 10-inch diameter hydroelectric waterline between the Bonanza Creek intake and the storage tank would be constructed, either on grade or buried 4-6 feet.</li> <li>• A pathway 6-9 feet wide for construction equipment and line maintenance would be constructed parallel to the pipeline. Site restoration would be achieved with passive revegetation.</li> <li>• Another water supply pipeline extending 1400-2100 lineal feet from the National Creek intake to the storage tank would also be constructed on grade or buried 4-6 feet. A route would be cleared and graded to a width of 12-16 feet.</li> <li>• A pathway for construction equipment and line maintenance would be constructed parallel to the pipeline from National Creek. Recurring maintenance would use all-terrain vehicles and the final path width would be 6-9 feet. Site restoration would be achieved with passive revegetation.</li> </ul>



**Table 2-3. Comparison of Support Facility Plan Alternatives**

Issue or topic	No Action Alternative	Proposed Action Alternative (NPS Preferred Alternative)
Potable Water Treatment and Distribution	<ul style="list-style-type: none"> <li>• NPS would continue to provide bottled water for visitors to purchase in the NHL.</li> <li>• Low-volume, ADEC-approved existing water system in the NHL would continue to operate, using chlorine treatment to make it safe for drinking.</li> <li>• At the west side development (Support Complex) a production well would supply water, but there is no general public drinking water source on NPS or private lands.</li> </ul>	<ul style="list-style-type: none"> <li>• In the short-term, bottled water would be available for purchase at the Depot.</li> <li>• In the long term, two potable water sources would be investigated for Kennecott: conventional wells and surface water drawn from the aforementioned water gathering and storage infrastructure.</li> <li>• Wells would be located at least 200 feet from private property to avoid restricting the use and development of private property.</li> <li>• A potable water treatment facility would be constructed at either the historic Refrigeration Building, or above the Mill near the proposed water storage tank.</li> <li>• Facility design would assure compatibility with the historic fabric would be provided. Construction would require clearing and grading area for a building 250-500 square feet in area.</li> <li>• A treated potable water line 2800-3600 feet long would be constructed in parallel with a fire flow distribution line in the historic railroad alleyway of the Mill Town. The piping would run together in buried or reconstructed above-ground wood utilidors.</li> <li>• The Dairy Barn, Old School, Recreation Hall, New School, West Bunkhouse, Store, Machine Shop, and Power Plant would be connected to the potable water distribution lines with buried connections and fittings. A pump station and potable water line would service 2-4 cottages.</li> <li>• At the Operations Support Complex west of Kennicott River, maintain a potable water storage tank at the McCarthy Road Information Station with tank refills.</li> <li>• Support Complex supplied by well.</li> </ul>

**Table 2-3. Comparison of Support Facility Plan Alternatives**

Issue or topic	No Action Alternative	Proposed Action Alternative (NPS Preferred Alternative)
Household Waste Management	<ul style="list-style-type: none"> <li>• NPS would continue to manage its waste by using unsigned, bear-resistant trash containers at the McCarthy Road Information Station and in the NHL (one at each location).</li> <li>• Trash is periodically hauled along the McCarthy Road all the way to Glennallen for disposal there.</li> </ul>	<ul style="list-style-type: none"> <li>• Consider revising WRST regulations (36 CFR 1373).</li> <li>• After revised WRST regulation is promulgated, consolidate locally derived household waste at Alaska DNR firewise pavilion site and contract for offsite transport and disposal in Glennallen.</li> </ul>
Visitor Amenities	<ul style="list-style-type: none"> <li>• The McCarthy-Kennecott road would continue to be primarily for vehicles and the Wagon Road for pedestrians.</li> <li>• At the NHL, fix the cut bank washout at National Creek for a loop trail, which would enable the traverse of Silk Stocking Road and the top of the mill complex.</li> <li>• Several existing foot trails would continue in use, but the NPS would not clear brush or perform other maintenance on a regular basis.</li> <li>• Several public toilets would continue to be available in the McCarthy-Kennecott area: two at the McCarthy Road Information Station, two at the 2nd footbridge, one at the “Y” by the Museum, one at McCarthy Airport, one by the Company Store, two at the Recreation Hall, and one trail pit toilet at the Jumbo Creek camping area.</li> <li>• Already planned restrooms in the Company Store would primarily serve NHL visitors during normal operating hours, and three vault toilets in the Mill Town would then be for public use after normal operating hours.</li> <li>• Facility development for the new campground includes</li> </ul>	<ul style="list-style-type: none"> <li>• Construct trail to national historic landmark from footbridge by lake at toe of glacier that follows east side of Kennicott River paralleling the glacier, and connects to Root Glacier trail. Also include a trail segment that links with the walk-in campground.</li> <li>• This 3.5-mile foot trail segment would be 3 feet wide and would be constructed from the north end of the campground along the glacial moraine up to Kennecott.</li> <li>• Establish partnerships to maintain existing trails such as Jumbo, Bonanza, Root Glacier, etc.</li> <li>• Visitors would have to rely on established backcountry sanitation techniques. Primitive restroom facilities, such as outhouses, may be considered by NPS at a later date in locations to be determined.</li> <li>• Place a Welcome sign before the bend in the road on the west side of the Kennicott River (between MP58 and MP59). The sign text would identify the park unit, the NHL, and the community.</li> <li>• Staff McCarthy Road Information Station with NPS personnel and trained community volunteers; staff it from Memorial Day to Labor Day, seven days a week, eight hours per day; explore partnerships for staffing.</li> </ul>

**Table 2-3. Comparison of Support Facility Plan Alternatives**

Issue or topic	No Action Alternative	Proposed Action Alternative (NPS Preferred Alternative)
Visitor Amenities (continued)	<p>vault toilets for campers.</p> <ul style="list-style-type: none"> <li>•No welcome sign would greet visitors entering the area.</li> <li>•The McCarthy Road Information Station would continue to be located just west of the Kennicott River footbridge, set back from the McCarthy Road.</li> <li>•Under current plans there would be an entrance sign to the area and McCarthy Road Information Station at Mile 59.5.</li> <li>•The McCarthy Road Information Station would continue to be staffed from Memorial Day to Labor Day, seven days a week, eight hours per day.</li> <li>• Maps and other information would continue to be available at the McCarthy Road Information Station.</li> <li>•A small visitor center now serving the NHL at the Depot would continue to operate, and the Kennecott Company Store would continue being developed with the goal of it being a primary visitor destination.</li> </ul>	<ul style="list-style-type: none"> <li>• Partner with state and put panel information at state fire-wise pavilion west of bend in road.</li> <li>• With signage and visitor contact, introduce visitors to area land ownership complexity</li> <li>• Develop comprehensive signage and wayfinding system.</li> <li>• Potentially develop traveler information system at Long Lake for local AM-FM broadcasting.</li> </ul>
National Creek Encroachment on Cultural Resources	<ul style="list-style-type: none"> <li>•Rehabilitate National Creek trestle by clearing of debris out of adjacent stream to help channelize creek and prevent bank erosion.</li> <li>•Depending on the results and recommendations of an ongoing geomorphological study, NPS may evaluate alternative methods to implement in National Creek to reduce erosion, flooding, and associated damage.</li> </ul>	<ul style="list-style-type: none"> <li>•Rehabilitate National Creek trestle by clearing of debris out of adjacent stream to help channelize creek and prevent bank erosion.</li> <li>•Depending on the results and recommendations of an ongoing geomorphological study, NPS may evaluate alternative methods to implement in National Creek to reduce erosion, flooding, and associated damage.</li> </ul>

**Table 2-3. Comparison of Support Facility Plan Alternatives**

Issue or topic	No Action Alternative	Proposed Action Alternative (NPS Preferred Alternative)
Transportation	<ul style="list-style-type: none"> <li>• NPS would continue to coordinate or cooperate with ADOT&amp;PF and the community of McCarthy on the McCarthy Road SCP.</li> <li>• ADOT&amp;PF and local businesses would continue to maintain the road within the state right-of-way from the NHL boundary to the west end of the study area, with no administrative structure or institutional arrangements to enable the NPS to participate in road maintenance.</li> <li>• West of the Kennicott River 8-10 parking spaces would continue to be available at the NPS McCarthy Road Information Station, and privately-operated parking lots would remain.</li> <li>• East of the Kennicott River at the footbridge, there would no longer be any parking, but loading and unloading of vehicles and passengers could still occur.</li> <li>• Within the NHL, motorists would continue parking vehicles along the rail corridor adjacent to the Kennicott Glacier Lodge and along the lower glacier road behind the Recreation Hall in an uncontrolled manner.</li> <li>• There would continue to be no designated turnaround area or visitor drop-off pick-up location.</li> <li>• Privately operated van shuttles would continue to be the only method for visitors to get from the Kennicott River to McCarthy or the NHL. The available shuttles would generally not run early or late in the day (unless requested by customers), and may not be designed to accommodate wheelchairs or to transport bicycles.</li> <li>• The existing single-lane road between McCarthy and</li> </ul>	<ul style="list-style-type: none"> <li>• Support facility plan consistent with McCarthy Road scenic corridor plan.</li> <li>• No wayside would be developed at the slide area.</li> <li>• Mark Wagon Road for visitor/local use, and retain its historic character as a wagon road.</li> <li>• Provide transportation-related interpretive planning and exhibit development.</li> <li>• Design rail corridor road as one lane gravel road that maintains historic character with 25 MPH speed limit designed to accommodate safe vehicle passing.</li> <li>• Seek cooperative agreement with NHL landowners and businesses to address NHL road maintenance.</li> <li>• Seek cooperative agreement with State and local landowners to address road maintenance outside of NHL.</li> <li>• West of Kennicott River: establish gateway to McCarthy/Kennecott and expand NPS public parking (up to 50 spaces) in vicinity of McCarthy Road Information Station with NPS welcome sign.</li> <li>• Shuttle van options could be take shuttle to footbridge, or shuttle to McCarthy using the private freight bridge (visitors could choose between shuttle options, or simply walk to footbridge and cross).</li> <li>• East of Kennicott River: parking would be available at footbridge on state ROW and private property. Encourage development of new private parking and develop parking for 30 cars at boneyard concealed behind railroad berm.</li> <li>• In the NHL, develop MOU with landowners to manage vehicle access and parking; allow for vehicle parking in NHL by landowners, their guests, local McCarthy residents, NPS staff and contractors in designated, limited</li> </ul>

**Table 2-3. Comparison of Support Facility Plan Alternatives**

Issue or topic	No Action Alternative	Proposed Action Alternative (NPS Preferred Alternative)
Transportation (continued)	the NHL would continue to be used by automobiles, shuttle vans, all-terrain vehicles, motorcycles, bicycles, and pedestrians. The road would also continue to and lack wide spots to allow other vehicles to pass.	<p>areas with a daily time limit.</p> <ul style="list-style-type: none"> <li>• Discourage use of common easements in NHL for vehicle parking.</li> <li>• Permit NPS and contractor parking only at Dairy Barn, and allow limited parking by event organizers at Recreation Hall when they are using the facility for a private function.</li> <li>• NPS would pursue a policy with other NHL landowners limiting parking to 2-4 hours within ROW in support of transfer of goods and people.</li> <li>• Organize effective NPS crew shuttle system to service employees from west side Kennicott River to Kennecott NHL.</li> <li>• Work with local community to develop efficient shuttle system and adequate hours of operation.</li> <li>• Establish designated van shuttle stops at the following locations: west-side development, McCarthy Road Information Station, west and east sides of the Kennicott R. foot-bridge, the boneyard, in McCarthy itself, at the 'Y' near the museum, the airport, the campground, and the NHL.</li> <li>• Develop a vehicle turnaround in the NHL at the upper terrace of the recently-purchased Gagnon property near the southernmost boundary of the Mill Town.</li> <li>• NPS would institute Incidental Business Permit for public shuttles entering the NHL and seek to provide subsidies to support their operation.</li> <li>• Encourage and support bicycle rentals.</li> <li>• Work with ADOT&amp;PF to develop intervisible pullouts and other road design features to improve traffic flow and safety.</li> </ul>



**Table 2-3. Comparison of Support Facility Plan Alternatives**

Issue or topic	No Action Alternative	Proposed Action Alternative (NPS Preferred Alternative)
Utilidors (utility corridors or conduits)	<ul style="list-style-type: none"> <li>Existing decrepit utilidors would not be repaired or replaced.</li> </ul>	<ul style="list-style-type: none"> <li>Reconstructed wooden utilidors would be constructed to facilitate the installation of the new utility systems and to preserve these historic features.</li> <li>Construction of new water and electrical distribution utility systems would reincorporate the utilidors in portions of the new utility systems.</li> <li>About 300-700 lineal feet of new utilidors would be constructed to match the historic utilidors.</li> <li>Within the railroad corridor of the Mill Town, 500-2500 lineal feet of new buried utilidors would be constructed.</li> </ul>

**Table 2-4. Summary Comparison of Impacts of the Support Facility Plan Alternatives**

Issue or topic	No Action Alternative	Proposed Action Alternative (NPS Preferred Alternative)
Soils and Topography	<ul style="list-style-type: none"> <li>• Negligible, long-term, localized, adverse impacts to soils from continued soil compaction and erosion.</li> <li>• Would likely contribute negligible, long-term, adverse cumulative impacts to soils.</li> <li>• Cumulative impacts on soils from other actions would be moderate and localized.</li> </ul>	<ul style="list-style-type: none"> <li>• Minor, mostly short-term, localized, adverse impacts to soils from construction of new facilities.</li> <li>• Would likely contribute minor, long-term, adverse cumulative impacts to soils.</li> <li>• Cumulative impacts on soils from other actions would be moderate and localized.</li> </ul>
Water Resources	<ul style="list-style-type: none"> <li>• Negligible, long-term, localized, adverse impacts on water resources from continued stream sedimentation and possible water contamination.</li> <li>• Would likely contribute negligible, long-term, adverse cumulative impacts to water resources.</li> <li>• Cumulative impacts on water resources from other actions would be moderate and localized.</li> </ul>	<ul style="list-style-type: none"> <li>• Minor, long-term, localized, adverse impacts on water resources from turbidity, stream sedimentation and possible water contamination.</li> <li>• Would likely contribute minor, long-term, adverse cumulative impacts to water resources.</li> <li>• Cumulative impacts on water resources from other actions would be moderate and localized.</li> </ul>
Floodplains	<ul style="list-style-type: none"> <li>• Negligible, long-term, localized, adverse impacts on floodplains from rechannelization of National Creek.</li> <li>• Would likely contribute negligible, long-term, adverse cumulative impacts to floodplains.</li> <li>• Cumulative impacts on floodplains from other actions would be moderate and localized.</li> </ul>	<ul style="list-style-type: none"> <li>• Minor, long-term, localized, adverse impacts on floodplains in general, but rechannelization of National Creek would represent a beneficial impact at that site.</li> <li>• Would likely contribute minor, long-term, adverse cumulative impacts to floodplains.</li> <li>• Cumulative impacts on floodplains from other actions would be moderate and localized.</li> </ul>

**Table 2-4. Summary Comparison of Impacts of the Support Facility Plan Alternatives**

Issue or topic	No Action Alternative	Proposed Action Alternative (NPS Preferred Alternative)
Vegetation	<ul style="list-style-type: none"> <li>• Minor, long-term, localized, adverse impacts to vegetation from continued vegetation trampling and spread of exotic plants.</li> <li>• Would likely contribute negligible, long-term, adverse cumulative impacts to vegetation.</li> <li>• Overall cumulative impacts on vegetation from No Action and other actions would be moderate and localized.</li> </ul>	<ul style="list-style-type: none"> <li>• Minor, long-term, localized, adverse impacts to vegetation from vegetation clearing and trampling.</li> <li>• Would likely contribute minor, long-term, adverse cumulative impacts to vegetation.</li> <li>• Overall cumulative impacts on vegetation from Proposed Action plus other actions would be moderate and localized.</li> </ul>
Wildlife	<ul style="list-style-type: none"> <li>• Minor, long-term, localized, adverse impacts on wildlife and wildlife habitat from continued human-bear conflicts.</li> <li>• Would likely contribute negligible, long-term, adverse cumulative impacts on wildlife and wildlife habitat.</li> <li>• Overall cumulative impacts on wildlife from No Action and other actions would be moderate and localized.</li> </ul>	<ul style="list-style-type: none"> <li>• Minor, long-term, localized, adverse impacts on wildlife and wildlife habitat from disturbance of wildlife and loss of wildlife habitat with construction of new facilities and from possible continued human-bear conflicts.</li> <li>• Would likely contribute minor long-term, adverse cumulative impacts on wildlife and wildlife habitat.</li> <li>• Overall cumulative impacts on wildlife from Proposed Action and other actions would be moderate and localized.</li> </ul>
Cultural Resources	<ul style="list-style-type: none"> <li>• Moderately beneficial, long-term, localized, impacts on cultural resources.</li> <li>• Would likely contribute moderately beneficial, long-term, localized cumulative impacts on cultural resources.</li> <li>• Cumulative impacts from other actions would be moderate and long-term.</li> </ul>	<ul style="list-style-type: none"> <li>• Moderately beneficial, long-term, localized, impacts on cultural resources.</li> <li>• Would likely contribute moderately beneficial, long-term, localized cumulative impacts on cultural resources.</li> </ul>

**Table 2-4. Summary Comparison of Impacts of the Support Facility Plan Alternatives**

Issue or topic	No Action Alternative	Proposed Action Alternative (NPS Preferred Alternative)
Visual Resources	<ul style="list-style-type: none"> <li>• Moderately beneficial, long-term, localized, impacts on visual resources.</li> <li>• Would likely contribute moderately beneficial, long-term, localized cumulative impacts on cultural resources.</li> <li>• Certain existing development in and around the NHL would continue to have a moderately adverse, long-term impact on Kennecott's visual resources.</li> <li>• The additional contribution of moderately beneficial, long-term impacts from NPS stabilization and rehabilitation of historic structures would produce a net minor, beneficial cumulative effect on the visual environment.</li> </ul>	<ul style="list-style-type: none"> <li>• Moderately beneficial, long-term, localized, impacts on visual resources.</li> <li>• Would likely contribute moderately beneficial, long-term, localized cumulative impacts on cultural resources.</li> </ul>
Visitor Use and Experience	<ul style="list-style-type: none"> <li>• Minor adverse, long-term impact on visitor use and experience.</li> <li>• Would interact with other ongoing and future actions to generate moderately adverse, long-term cumulative impacts.</li> </ul>	<ul style="list-style-type: none"> <li>• Moderately beneficial, long-term impact on visitor use and experience</li> <li>• Would interact with other ongoing and future actions to generate moderately beneficial, long-term cumulative impacts.</li> </ul>
Transportation and Access	<ul style="list-style-type: none"> <li>• Long-term, moderately adverse impacts on transportation and access in the McCarthy-Kennecott area.</li> <li>• Cumulative impacts from other actions</li> </ul>	<ul style="list-style-type: none"> <li>• Long-term, moderately beneficial impacts on transportation and access.</li> <li>• Cumulative impacts from other actions by themselves would be moderately adverse</li> </ul>

**Table 2-4. Summary Comparison of Impacts of the Support Facility Plan Alternatives**

Issue or topic	No Action Alternative	Proposed Action Alternative (NPS Preferred Alternative)
Transportation and Access (continued)	combined with the No Action Alternative would also be moderately adverse and long term.	and long term. • Overall cumulative impacts, combining both the Proposed Action and other actions, would be beneficial, minor, and long term.
Utilities and Related Services	<ul style="list-style-type: none"> <li>• Long-term, moderately adverse impacts on utilities and related services in the McCarthy-Kennecott area.</li> <li>• Cumulative impacts from other actions combined with this alternative would also be moderately adverse and long term.</li> </ul>	<ul style="list-style-type: none"> <li>• Long-term, moderately beneficial impacts on utilities and related services.</li> <li>• Cumulative impacts from other actions would be moderately adverse.</li> <li>• Proposed Action and other actions would probably offset one another, resulting in negligible cumulative adverse impacts on utilities and related services over the long term.</li> </ul>
Socioeconomic Environment	<ul style="list-style-type: none"> <li>• Long-term, minor adverse impacts on the socioeconomic environment of the McCarthy-Kennecott area.</li> <li>• Cumulative impacts from other actions would generally be moderately beneficial and long term.</li> <li>• In combination with the other actions, the No Action Alternative would detract from anticipated cumulative socioeconomic benefits for the area because existing facilities and services would not be able to accommodate projected growth in visitation.</li> </ul>	<ul style="list-style-type: none"> <li>• Long-term, moderately beneficial impacts to the socioeconomic environment of the McCarthy-Kennecott area.</li> <li>• The Proposed Action would contribute substantially to long-term, cumulative socioeconomic benefits for the surrounding area from other actions.</li> </ul>

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### 3.0 AFFECTED ENVIRONMENT

Kennecott Mill Town, perched dramatically on a mountainside above the historic village of McCarthy and the gritty Kennicott Glacier, is a vivid reminder of the rich resources and ambition that drew adventurous souls to the “last frontier” of Alaska a century ago (Figure 3-1). Kennecott is tucked away in a remote corner of Wrangell-St. Elias National Park and Preserve, the largest unit of the entire national park system (Figures 1-1 and 1-2).

The Kennecott mines and mill operated from 1901 to 1938, when their exceptionally high-grade copper veins were depleted. Approximately \$200 million in copper was extracted during this relatively brief period, profits from which were used to capitalize mining ventures in other regions of North and South America. Kennecott Copper Corporation is still an important company on the international mining scene today (NPS, no date-a). The remaining structures at the mill site and mines symbolize an ambitious time of exploration, perseverance, and development in Alaska’s extreme environment and remote setting. 14,231 acres of public and private land were designated a National Historic Landmark (NHL) District in 1986. In 1998, the National Park Service acquired 2,839 acres of land in the historic mill town, including its primary structures.



**Figure 3-1. Kennecott Mill Town perched above the Kennicott Glacier, covered by a layer of rubble/debris**

Listings in the National Register of Historic Places and National Historic Landmarks Program point out that Kennecott was one of the largest copper mines in the country and contained “the last of the great high-grade copper ore deposits of the American West” (NPS, 1978; NHLP, 2004). The mine and mill are representative of mining processes of their era. The camp or mill town still contains the powerhouse, tramway station, bunkhouses, and commissary, as well as the visually-dominant 14-story concentration mill. Kennecott was also the site of the world's first successful, commercial-scale ammonia-leaching plant in 1916. This pioneering process greatly increased the amount of recoverable copper ore.

Kennecott’s mines constituted one of the richest copper deposits in the world (Bundtzen, 1982). At the peak of production in 1916, the mines were producing 175 tons of crude ore per day, averaging 70 percent copper. When Kennecott was abandoned in 1938, total production of copper was over 590,000 tons; in addition, about nine million ounces of silver were produced as a byproduct. This constituted almost 86 percent of Alaska's copper production and almost half its silver production (U.S. Bureau of Mines, 1975).

The National Historic Landmarks Program noted in 2004 that threats or damages to the Kennecott NHL include deterioration of structures and lack of maintenance in the six decades between the time the mine and mill closed in 1938 until they were purchased by NPS in 1998 (NHLP, 2004). The principal mill-related industrial structures, buildings at the mine entrances, and the mines themselves all went without maintenance for half a century. A number of structures have reached the critical point where preservation is no longer possible. Still other structures are in better condition but have suffered damage from previous attempts at salvage of building materials and thus made more vulnerable to deterioration from the area's harsh climate. Increasing visitation to the NHL raises the risk that one or more buildings will eventually be destroyed by fire or vandalism.

Kennecott NHL is the single most popular attraction among visitors to Wrangell-St. Elias. NPS needs a Support Facility Plan to guide development in the Kennecott-McCarthy area that responds to growing visitor demand and is at the same time sensitive to historic preservation, environmental and community concerns.

### **3.1 PROJECT AREA**

The project area is located approximately 310 miles east of Anchorage, Alaska, near the eastern terminus of the 60-mile McCarthy Road (Figures 1-1 and 1-2). It extends in a corridor for several miles west along the McCarthy Road from the Kennicott River out to the DNR firewise pavilion and several miles northeast along the McCarthy-Kennecott extension of that road up to and including the Kennecott National Historic Landmark. Within this general corridor, there are several areas in which most actions associated with the Support Facility Plan are concentrated: the existing McCarthy Road Information Station, the existing Interim Operations Support Complex, both sides of the Kennicott River, the town of McCarthy, and the Kennecott NHL itself. Certain other actions in the SFP would be dispersed throughout the project area, particularly along the McCarthy-Kennicott Road itself.

### **3.2 SOILS AND TOPOGRAPHY**

The project area occurs in the McCarthy Mountains subsection of the Wrangell Mountains ecoregion (NPS, 2001b). The valleys in the area are broad, U-shaped and composed mostly of glacial till, with some slope deposits on valley sides, and scoured bedrock. Valley soils are mostly well-drained, coarse and loamy with rocks, and exhibit little development beyond a surface organic layer. Wetter soils, probably with permafrost, occur in some depressions.

Mountains in the project area are rugged, though relatively low in elevation compared to the adjacent high mountains to the north. The mountains are composed of a variety of sedimentary rocks (limestone, sandstone, shale, and chert) and mafic igneous rocks (greenstone), and contain some areas of igneous intrusive rocks (mostly dacite and andesite). Mountain soils are mostly well-drained, rocky with a coarse-loamy matrix, and with little horizon development. Permafrost is probably present in many places, but where present it is generally below one meter in depth. Soils at lower elevation under dense vegetation have a surface organic horizon.

The floodplains are composed of sandy and gravelly alluvium. Soils are mostly stratified sand and gravel without permafrost or much horizon development beyond thin buried organic horizons. Later successional areas have a surface layer of silt and sand.

Kennicott and Root Glaciers are large valley glaciers that are outlets for icefields high in the Wrangell Mountains to the north. The glaciers are covered with snow, ice, and rock rubble and the lower part of the Kennicott Glacier is mostly debris-covered (NPS, 2001b).

Topography in the NHL is steep, with slope angles ranging from 0° (flat) to 25°, and many of the structures are located on the hillsides. The natural landscape at the Kennecott Mill Site placed restrictions on the spatial layout of mining infrastructure (Gilbert et al., 2001). Topographical constraints, such as the 4000-foot elevation change from the valley floor to the mine claims, affected placement of facilities, wagon routes, and transportation structures.

### 3.3 WATER RESOURCES

Two different types of rivers and streams flow in the McCarthy-Kennecott area. McCarthy Creek and the Kennicott River represent one type; they draw much of their water from melting glacier ice and carry a large load of silt and glacial rock flour as suspended sediment. McCarthy Creek is a third order tributary stream that flows into the Kennicott River in the vicinity of the community of McCarthy (NPS, 2004a). The Kennicott River is tributary to the Nizina River; the Nizina River is tributary to the Chitina River; the Chitina tributary to the first order Copper River that flows into the marine waters of Prince William Sound. The other stream type consists of the clear water streams originating from springs. Examples of these are Swift Creek, Clear Creek, National Creek, Amazon Creek, Bonanza Creek and Jumbo Creek. These latter streams run clear year around except during unusually heavy rains or the peak of spring snowmelt (McCarthy-Kennecott.com, 2005); turbidity and suspended sediments increase during extended or heavy rainfall, and during extended dry periods, surface flows diminish



**Figure 3-2. Kennicott Glacier covered with rock rubble and debris behind Kennecott power plant with stacks**



**Figure 3-3. Chitina River downstream of Nizina River confluence**

considerably. Drainage off Bonanza Ridge flows in a westerly direction, either as subsurface outwash or along the margin of Kennicott Glacier (Gilbert et al., 2001).



**Figure 3-4. Kennicott River looking toward terminus of McCarthy Road and footbridge crossing**

Glacial waters seldom have substantial resident fish populations, but they do provide migration routes from the ocean to spawning and wintering grounds in clear water tributaries and lakes (NPS, 1986). Glacial streams have a higher gradient, higher sediment load, higher turbidity, and lower biotic productivity than non-glacial streams (NPS, 1990). The more productive clear water streams can support aquatic invertebrates and resident fish, and are of great importance for spawning.

The five-mile-long Kennicott River runs from the Kennicott Glacier down to the

Nizina River. Two channels flow from the terminus of the glacier: the main channel is on the western side of an alluvial fan and the overflow channel is on the eastern side (Jones and Glass, 1993). Bluffs along the Kennicott River reflect down-cutting by stream erosion after the glacier melted back from its earlier, more extensive size. The river valley gets progressively deeper going downstream. The Kennicott River drops over 250 feet in its five-mile run between the glacier and the Nizina River. Where it empties into the Nizina, the Kennicott River is in an erosional canyon over 350 feet deep; ten miles further downstream the Nizina is entrenched over 600 feet where it joins the Chitina River (NPS, 2005a).

McCarthy Creek originates from glaciers along the south slope of the Wrangell Mountains and runs naturally turbid during the summer months. Its waters tend to clear during non-summer months (NPS, 2004a). Aquatic invertebrates and algae occur in McCarthy Creek. Large woody debris is present within the active channel. Suitable sized salmonid spawning gravels are also present within McCarthy Creek.

Fish habitat in McCarthy Creek contains many low-gradient riffles and scour pools as well as many high-gradient riffles (NPS, 2004a). Numerous off-channel habitats such as side channels and beaver ponds are present at low flows. Beaver ponds provide important rearing habitat for fish. High summer flows of McCarthy Creek may limit the success of spring spawning fish species by transporting stream channel substrate containing developing eggs. High levels of suspended sediments during summer flows may physically damage or cover developing eggs in relatively stable substrates. However, flows occurring in non-summer months are lower velocity, contain relatively little suspended sediment, and appear to provide an environment which supports spawning by fall spawning species such as Dolly Varden (NPS, 2004a).

Both glacial and clear-water streams have sudden and unpredictable rises in water level. The silt-laden waters of glacial streams are poorly suited for drinking, though they can be used in an emergency when collected in a container and given a chance for the coarser sediment to settle

out. Owing to local geology, the clear-water streams carry "hard" water with a substantial dissolved mineral content that precipitates readily as scale. Nearly all of the area clear-water streams cross private property and are regularly used by residents for domestic water supplies (McCarthy-Kennicott.com, 2005).

Concern whether geoenvironmental hazards related to the mines and mill exist at Kennecott was studied by Eppinger et al. (2000). The Kennecott mill complex lies at the base of Bonanza Peak (2,128 m), along the margin of the Kennicott Glacier, at about 610 m in elevation, whereas the mines that supplied the mill are located more than 1,500 m higher on the steep slopes of Bonanza Peak. Surface water samples from the Kennecott area had low metal concentrations. Although sediment, rock, and concentrate data indicated that high concentrations of potentially toxic elements such as arsenic, cadmium, copper, and mercury are found in mill and mine-waste piles, these metals are not mobilized because of the absence of acid-generating minerals in Kennecott-type deposits and the waste piles and mill tailings derived from them.

At Kennecott, surface waters are near neutral in pH and have relatively low conductivities (Eppinger et al., 2000). With respect to drinking water standards, none of the significant inorganic parameters listed by the Alaska Department of Environmental Conservation and U.S. Environmental Protection Agency (pH, Ag, Al, As, Ba, Be, Cd, Cl<sup>-</sup>, Cr, Cu, F<sup>-</sup>, Fe, Hg, Mn, Na, Ni, NO<sub>3</sub><sup>-</sup>, Pb, Se, SO<sub>4</sub><sup>2-</sup>, Tl, and Zn) exceed established maximum contaminant levels. The dominant sulfide minerals in the Kennecott deposits, chalcocite and djurleite, are relatively stable in the surficial environment. Although mercury was not analyzed in water at Kennecott, the likelihood of significant mercury present in the water column or of conversion to methylmercury is low, because the form of mercury (cinnabar) at Kennecott is highly stable, and the surface water is oxidized and has relatively high pH values.

The geochemical data from Eppinger et al. (2000) suggest that Kennecott-type deposits are relatively benign to the environment, due to the large amount of carbonate rocks present, the resulting high buffering capacity of waters, the absence of acid-generating minerals, and the scarcity of metals that could be mobilized at higher pH values.

### **3.4 FLOODPLAINS**

Low-lying areas along McCarthy Creek and the Kennicott River have a history of flooding and flood damage (Jones and Glass, 1993). Snow and ice melt peaks in July and turns glacial streams into raging torrents. Floodplains along McCarthy Creek and its tributaries are frequently flooded and are prone to rapid erosion, scouring and deposition during intense rainfall and periods of rapid snowmelt. The 1980 flood event, one of the largest in recent history, covered or created nearly 850 acres of floodplain (NPS, 2004a). The peak discharge associated with this storm was 4500ft<sup>3</sup>/s. Sediments from continual mass wasting accumulate in stream channels and are mobilized during floods. Severe lateral erosion, scour and deposition also occur during floods.

The Kennicott River is subject to one or more floods each year caused by outbursts from glacier-dammed lakes or from temporarily clogged subglacial channels (Jones and Glass, 1993). These releases of water inundate low-lying areas of the Kennicott River alluvial floodplain. Annual



outburst floods occur from glacier-dammed Hidden Creek Lake, which is located along the west margin of the Kennicott Glacier ten miles northwest of McCarthy (Rickman and Rosenkrans, 1997). Glaciers in the Wrangell Mountains commonly block ice-free tributary valleys, forming unstable lakes. Failures of the glacier ice dams cause periodic flooding downstream. Two glacier dammed lakes are found along Kennicott Glacier and four along Root Glacier. Hidden Creek Lake is the largest, and when it releases (usually in July or August), it causes intense flooding on the Kennicott River. This event can inundate the lower parking areas at the end of the McCarthy Road and cut off access to the footbridge.

McCarthy Creek, because it traverses the unstable landscape of a long valley downstream from its glacier, often carries a large load of non-glacial sediment. The head of McCarthy Creek valley is a convergence zone for precipitation that can generate destructive floods during periods of heavy rain (McCarthy-Kennicott.com, 2005). Low-lying areas along McCarthy Creek have a history of flooding and flood damage. Floods in the McCarthy Creek basin are commonly caused by not only intense and prolonged rainfall but may result from snow melt, formation and subsequent failure of landslide dams, snow avalanche dams, and sudden release of channel blockage by snow and ice (Jones and Glass, 1993).

Flooding is the largest cause of river channel instability, channel migration, and channel rerouting. It is the policy of NPS to preserve floodplain values and minimize hazardous conditions associated with flooding (Rickman and Rosenkrans, 1997).

Past mining and milling activities, road construction, and material stockpiling dating back to 1911 have adversely affected National Creek, particularly in the vicinity of the mill. The stream channel in National Creek's floodplain was confined, dammed, and diverted to support milling operations. These alterations caused hydrologic and hydraulic changes in the fluvial system and floodplain that remain evident today. Upstream of the mill, water diversion facilities were constructed in the National Creek floodplain. Remnants of these facilities remain onsite, causing blockage and restricting flow during floods. Dams, buildings, and mill tailings in the active floodplain are subjected to scour and sediment deposition. Channel obstructions consist of live trees, bedrock outcrops, buildings, equipment, and utility piping; around these obstructions are accumulations of naturally occurring woody debris and smaller pieces of mining-related debris—wood, piping, and equipment (NPS, 2003b).

An abundance of gravel-cobble sediment was deposited in the floodplain of National Creek and the lower levels of two buildings near the mill after an upstream dam failed and released a large amount of accumulated sediment (NPS, 2003b). The recent sediment deposits have created an unstable braided stream that is prone to bank erosion and rapid channel avulsions. Bedrock outcrops, mill debris, and small trees in the floodway control the stream location. The stream is attempting to incise through the recent sediment deposits.

### 3.5 VEGETATION

The project area occurs in the McCarthy Mountains subsection of the Wrangell Mountains ecoregion (NPS, 2001c). Vegetation in the valleys is mostly open white spruce (*Picea glauca*) or mixed spruce-birch forest. Some closed deciduous mid- to tall shrubs are present, especially



on valley side slopes. The mountains have little permanent ice and snow. High elevations have mostly exposed rock, talus, and scree with little vegetation. More stable lower slopes and valley bottoms have deciduous shrubs that generally increase in height and density downslope. Some white spruce forests occur at low elevations. Unvegetated or sparse shrubs and herbs occur in active floodplains. Less disturbed floodplains have deciduous shrubs or cottonwood (*Populus blasamifera*) trees, and later successional stages have white spruce forest.

Before the Kennecott Mill Site was developed in the early 1900's, repeated natural disturbances (e.g., advancing glaciers, floods, and fire) resulted in vegetation that was successional and supported four primary plant communities (Gilbert et al., 2001). These communities were:

- Seral herbs located along the moraine of Kennicott Glacier with scattered and newly established fireweed (*Epilobium angustifolium*), dryas (*Dryas drummondii*), soapberry (*Shepherdia canadensis*), and willow (*Salix* spp.) seedlings
- Open white spruce forest with cottonwood, paper birch, and an understory of willow and alder
- Closed white spruce forest on upper slopes, with paper birch as an associate and an understory of willow and alder (*Alnus crispa*)
- Open tall alder-willow shrub riparian zone along National Creek with barren areas from repeated flooding



Figure 3-5. Balsam poplars wearing fall foliage

Today a white spruce-hardwood forest with alder, willow, poplar, and mixed herbaceous plants dominates existing vegetation at the mill site (Gilbert et al., 2001). Virtually all of the land cleared during the mining era has revegetated. The lower elevations of Bonanza Ridge are forested. Further up the ridge, at tree line, the trees give way to shrubs and herbaceous vegetation. The ridge top is in the alpine zone. A spruce beetle outbreak that began in 1990 has killed many mature spruces. White spruce communities comprise 33% of the Kennecott Mill Site, shrub communities comprise 41%, and the remaining 26% cover is herbaceous (NPS, 2000a).

Vegetation surveys of the Kennecott District support operations project site (West Development Area) were conducted in July 2002 and June 2000 (NPS, 2003a). Based on field observations, the land cover types were balsam poplar woodland and open white spruce forest. Species present in the cottonwood woodland were cottonwood, feltleaf willow, diamond-leaf willow, soapberry, and dryas. Dandelion was the only non-native species present. Species occurring in the white spruce forest included white spruce, diamond-leaf willow, Bebb willow, grayleaf willow, soapberry, alpine bearberry, northern red- fruit toadflax, and dryas; major dominants were white spruce and soapberry. No federally or state listed plant species were found.

Vegetation communities along McCarthy Creek occur on the active floodplain, recently formed terraces, side slopes, and uplands (NPS, 2004a). The active floodplain is scoured by floodwaters every year or two, and is predominately barren gravels and cobbles with scattered forbs and willow shoots. Early successional terraces (5-15 years old) are sparsely vegetated with dryas mats, miscellaneous forbs and low willows. Terraces less than approximately 100 years old have early riparian forests of cottonwood and white spruce saplings, with an understory of willow, soapberry, and moss and forb ground cover. Older terraces support mature white spruce forests with scattered cottonwood trees, tall shrub understory (thickets of alder and willow) and ground cover with a rich vascular flora and thick moss layer. Steep side slopes rise above the terraced valley floor, forested with mature white spruce forest similar to the old terraces, or vigorous stands of young birch with an understory of shrubs such as highbush cranberry (*Viburnum edule*), soapberry and forbs including fireweed and lupine (*Lupinus arcticus*). Upland areas are gentle slopes with mature white spruce forest and patches of wetlands. The white spruce forests have been recently infested with spruce bark beetles, so that many of the older trees are dead, leaving spruce generally less than 100 years old, with scattered old birch and an understory of tall willow and alder. Wetlands have scattered black spruce (*Picea mariana*), low willows and ground layer of mosses and low ericaceous shrubs and forbs.

Higher elevations above tree line in the study area support sub-alpine and alpine plant communities. As the upper elevational limit of trees is approached, spruce forest becomes more open and there is a higher cover of tundra shrubs. In the southern Wrangell Mountains, shrub tundra and meadows within it contain a group of species generally absent in northern regions of the park. This trend is particularly evident in lush meadow areas where the vegetation is often dominated by species with coastal affinities such as *Arnica latifolia*, *Erigeron peregrinus*, *Carex nigricans*, *Heracleum lanatum*, *Juncus mertensianus*, *Luetkea pectinata*, *Senecio triangularis*, *Vahlodea atropurpurea*, and *Valeriana sitchensis* (NPS, 2005b).

Snowbed areas and north-facing slopes in the alpine zone are characterized by a high cover of heaths (principally *Cassiope tetragona*), mountain avens (*Dryas alaskensis*), polar willow (*Salix polaris*) and netted willow (*S. reticulata*) with a characteristic assemblage of common forbs including *Antennaria monocephala*, spring beauty (*Claytonia sarmentosa*), mountain sorrel (*Oxyria digyna*), *Polygonum viviparum*, and buttercups (*Ranunculus eschscholtzii*, *R. nivalis* and *R. pygmaeus*) (NPS, 2005b). Club moss (*Huperzia selago*) and the grasses *Hierochloe alpina* and *Trisetum spicatum* are also common in snowbed sites. A small group of species is noticeably more abundant in snowbed sites in the southern Wrangell Mountains as compared to northern regions of the park. *Luetkea pectinata*, *Potentilla diversifolia* and *Sibbaldia procumbens*, for example, are abundant in the south and west parts of the park and uncommon or absent in the north and east. Dry sites from the sub-alpine to alpine zone support a range of plant communities from discontinuous graminoid-forb associations to continuous dryas-graminoid-forb tundra depending on slope, aspect, substrate and slope morphology. Xeric alpine plant communities harbor numerous rare and endemic plant species. Endemic species that occur in dry sites throughout alpine areas of the park include *Astragalus nutzotinensis*, *Erigeron purpuratus*, *Saxifraga reflexa* and *Senecio ogoturukensis*.

Densmore and McKee (2001) found that the McCarthy-Kennecott area had the usual exotics of inhabited areas that have or have had gardens, lawns, and livestock including many common

dandelion (*Taraxacum officinale*) plants, many stands of several exotic clover (*Trifolium* spp.) species, quackgrass (*Elymus repens*), shepherd's purse (*Capsella bursa-pastoris*), pineapple weed (*Matricaria discoidea*), and a large seed bank of exotic agricultural weeds which would germinate if the soil were disturbed. The wagon trail and hiking trails had only a few dandelion. The worst area for potentially invasive exotic plants was around the building that was recently restored as the NPS visitor center for the mine. This area has been recently planted with smooth brome (*Bromus inermis*), red fescue (*Festuca rubra*), and other grasses, and oxeye daisy (*Leucanthemum vulgare*).

The NHL has not been surveyed for rare plants. However, rare plants were documented for Bonanza Peak along Bonanza Ridge (NPS, 2000). Six state listed rare plants have been documented for Bonanza Ridge (Table 3-1) and 41 rare plant species that are known to occur in the Chitina Valley (available in Gilbert et al., 2001) may also be found in the McCarthy-Kennecott area.

**Table 3-1. Rare plants documented for Bonanza Ridge**

Common Name	Scientific Name	AKNHP Rank <sup>1</sup>
Aleutian cress	<i>Aphragmus eschscholzianus</i>	G3/S3
Presl's sedge	<i>Carex preslii</i>	G4/S1
Mountain fragile fern	<i>Cystopteris montana</i>	G5/S3
Creeping savin	<i>Juniperus horizontalis</i>	G5/S1S2
Mountain stitchwort	<i>Minuartia biflora</i>	G5/S2
Pale poppy	<i>Papaver alboroseum</i>	G3/S3
Source: Gilbert et al., 2001		

<sup>1</sup> AKNHP = Alaska Natural Heritage Program

G = global rank

S = state rank

G1 = critically imperiled globally (5 occurrences or fewer)

G2 = imperiled globally (6-20 occurrences)

G3 = either very rare and local throughout its range or found locally in a restricted range (21-100 occurrences), threatened throughout its range

G4 = widespread and apparently secure globally, although it may be rare in parts of its range

G5 = demonstrably secure globally, although it may be rare in parts of its range

S1 = critically imperiled in the state, 5 or fewer occurrences

S2 = imperiled in the state, 6-20 occurrences

S3 = rare or uncommon in the state, 21-100 occurrences

### 3.6 WILDLIFE

Wrangell-St. Elias National Park and Preserve contains one of the largest protected ecosystems in North America, and supports numerous populations of wildlife species. Wildlife management in the preserve is a cooperative effort among the National Park Service and the Alaska Department of Fish and Game (NPS, 2004a). The study area is situated in the preserve in Game Management Unit 11; notable wildlife species are brown (grizzly) bear, black bear, and moose, lynx, and red fox (NPS, 2000a). Caribou do not typically occur in the project area; the three caribou herds that use portions of the park and preserve are found north of the Wrangell Mountains (NPS, 2004a). Dall sheep are present at higher elevations, and are not typically found in areas where proposed actions would occur. Other wildlife species in the area include

snowshoe hare, red squirrel, porcupine, ermine (short-tailed weasel), northern red-backed vole, meadow vole, and, rarely, the little brown bat (NPS, 2000).

Two passerine migratory routes pass through the park and there are records for 239 species of birds with approximately 53 species listed as residents (NPS, 2005c). Common birds in the McCarthy-Kennecott area include the great horned owl, northern goshawk, spruce grouse, northern raven, black-billed magpie. Other passerine birds that can be seen in the area are the gray jay, dark-eyed junco, yellow-rumped warbler, orange-crowned warbler, black-capped chickadee, American robin, Swainson's thrush, ruby-crowned kinglet, alder flycatcher, and common redpoll (NPS, 2000). No waterfowl or shorebirds are known to inhabit the area. A recent fish inventory (Markis et al., 2004) documented nine species of fish in the Chitina watershed, of which the McCarthy-Kennecott area is a part. The most abundant species included chinook (king) salmon, coho (silver) salmon, Dolly Varden, rainbow trout, and slimy sculpin. Less abundant species included arctic grayling, sockeye (red) salmon, longnose sucker, and round whitefish. No fish were found in National, Jumbo, or Bonanza creeks. Dolly Varden and coho salmon were found in Clear and Swift creeks. Dolly Varden also occurs in McCarthy Creek (NPS, 2003a). No survey data were presented for the Kennicott River.



**Figure 3-6. Alaskan Brown Bear**

Encounters between humans and bears (both black and brown) have been common in the McCarthy-Kennecott area for many years. In 2000 and 2001, the National Park Service conducted a bear study to quantify the nature of these encounters and describe the resident bear population (Wilder, 2003). A human-bear conflict is defined as any instance where human food, garbage, or other attractants bring bears into close proximity with humans; where bears opportunistically receive food rewards from human encounters; where property is damaged; where bears are killed or wounded; or

any encounter where bears display aggressive behavior toward humans. Food and food odors are bear attractants; unsecured attractants can increase the number of human-bear conflicts.

Data indicate that at least 26, and possibly as many as 36, bears were killed during the years 1999 to 2001 (Wilder, 2003). In 2000-2001, there were 157 reports of bear-human conflicts, although this is likely an underestimate, as many incidents go unreported. The most common reason for conflicts was human food, and bears received a food reward in 37% of reported incidents. In the cases where the human party in the conflict was identified as either a local resident or park visitor, local residents were involved in 80% of reported human-bear conflicts. A dangerous situation currently exists in the area due to the high number of food conditioned bears and lack of basic services for local residents.

Soapberry (*Shepherdia canadensis*) occurs on recent glacial moraines in very extensive stands. The fruit are relatively high in protein and energy and is easily digestible. In the fall bears seek out the most productive and nutritious food sources available. The ripening of soapberry draws bears to the McCarthy-Kennecott area.

Based on the NPS bear study (Wilder, 2003), current knowledge and research regarding human-bear conflicts in the McCarthy-Kennecott area indicate that:

- The number of resident humans in the area, the number of humans visiting the area, the amount of road and trail access, the amount of off-road and off-trail travel, and the occurrence and sanitation of human development are positively correlated with the frequency of human-bear conflicts.
- Bears are common in the McCarthy-Kennecott area.
- Natural food sources for bears are abundant.
- Soapberries are an important food resource for bears in the area, and may influence the occurrence of human-bear conflicts.
- Past human-bear conflicts in the area have involved many bears rather than a few “problem” bears.
- High-quality food sources and increased human presence increase habituation of bears to humans.
- Unsecured attractants are a major cause of human-bear conflicts, and maintain the presence of food-conditioned bears.
- Bears habituated to humans and conditioned to human foods are responsible for the majority of recorded human injuries arising from human-bear conflicts.
- Defensive actions (shooting of bears) associated with human-bear conflicts would increase direct and indirect injury and mortality for black and brown (grizzly) bears.

### 3.7 CULTURAL RESOURCES

The historic significance of the Kennecott Mine and Mill Town are described in Section 1.2. Cultural resources include: historic properties as defined in the National Historic Preservation Act (NHPA), cultural items as defined in the Native American Graves Protection and Repatriation Act (NAGPRA), archaeological resources as defined in the Archeological Resources Protection Act (ARPA), sacred sites as defined in Executive Order 13007, *Protection and Accommodation of Access To "Indian Sacred Sites,"* to which access is provided under the American Indian Religious Freedom Act (AIRFA), and collections.

As defined by the NHPA, a historic property or historic resource is any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places (NRHP), including any artifacts, records, and remains that are related to and located in such properties. The term also includes properties of traditional religious and cultural importance (traditional cultural properties), which are eligible for inclusion in the NRHP as a result of their association with the cultural practices or beliefs of an American Indian tribe or Native Hawaiian organization. Archaeological resources include any materials of human life or activities that are at least 100 years old, and that are of archaeological interest.

**Historic Property:** Sites, buildings, structures, or objects that may have significant archaeological and historic values, or properties that may play a significant traditional role in a community’s historical-rooted beliefs, customs, and practices.

**National Register of Historic Places (NRHP):** A nationwide listing of districts, sites, buildings, structures, and objects of national, state, or local significance in American history, architecture, or culture that is maintained by the Secretary of the Interior, NPS.

Section 106 of the NHPA (P.L. 89-655) provides the framework for Federal review and consideration of cultural resources during Federal project planning and execution. The implementing regulations for the Section 106 process (36 CFR Part 800) have been promulgated by the Advisory Council on Historic Preservation (ACHP). The Secretary of the Interior maintains the NRHP and sets forth significance criteria (36 CFR Part 60) for inclusion in the register.

Cultural resources may be considered “historic properties” for the purpose of consideration by a Federal undertaking if they meet NRHP criteria. The implementing regulations at 36

CFR 800.16(v) define an undertaking as “a project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a Federal agency, including those carried out by or on behalf of a Federal agency; those carried out with Federal financial assistance; those requiring a Federal permit, license or approval; and those subject to state or local regulation administered pursuant to a delegation or approval by a Federal agency.” Historic properties are those that are formally placed in the NRHP by the Secretary of the Interior, and those that meet the criteria and are determined eligible for inclusion.

Those properties on the NRHP that possess exceptional value in illustrating the nation's heritage can be designated by the Secretary of the Interior as a National Historic Landmark. Only 3% of properties listed in the NRHP are designated as National Historic Landmarks. Section 800.10 of ACHP regulations (36 CFR 800), as well as Section 110(f) of the NHPA, offer protection from a Federal undertaking which may directly and adversely affect any National Historic Landmark. In addition, once a property is designated as a National Historic Landmark, the National Park Service commits to assist in the preservation of these irreplaceable properties through the National Historic Landmarks Assistance Initiative. The Assistance Initiative promotes the preservation of National Historic Landmarks through technical assistance to their stewards – owners, managers, and friends groups – and education of the general public about the importance of National Historic Landmarks. The National Park Service works with partners such as other federal agencies, state governments, Indian tribes, local governments, colleges and universities, private organizations and individuals, and nonprofit organizations such as the National Park Foundation, the National Parks and Conservation Association, and the National Trust for Historic Preservation to educate and assist the public in preserving its historic heritage (NPS, 2003c).

**National Historic Landmark (NHL):** A special type of historic property designated by the Secretary of the Interior because of its national importance in American history, architecture, archaeology, engineering, or culture.

In 1986, 14,231 acres of public and private land at Kennecott were designated a National Historic Landmark District. While NHL and National Register status are often a source of pride for landowners and the community, they grant no protection to the resources from the actions and development decisions of private landowners. Thus, the acquisition by NPS of 2,839 acres in the historic mill town within the NHL in 1998, including most of the mill town’s primary structures, was a major step forward on behalf of Kennecott’s preservation.



As described in Section 1.2, the Kennecott NHL faces a number of challenges related to its long-term preservation. Many of the historic structures are in great need of stabilization to prevent their collapse or gradual deterioration and disintegration from decades of exposure to the harsh forces of nature in the area.

The town of McCarthy developed in the early 1900's as a mining support town. Its location as a central freight and passenger stop ensured its growth as the Kennecott mine and mill grew; all rail traffic bound for Kennecott had to pass through McCarthy. When the mine and railroad eventually closed in the late 1930's, McCarthy lost most of its population, but it was never abandoned entirely; it never became a ghost town (McCarthy Lodge.com, 2005). Today, McCarthy contains a number of historic structures.



Figure 3-7. Ma Johnson's Hotel in McCarthy

### 3.7.1 Cultural Landscapes

Cultural landscapes are broadly defined as geographic areas that include both natural and cultural resources, and the wildlife or domestic animals therein that are associated with a historical event, activity, or person, or that exhibit either cultural or aesthetic values.

At Kennecott, as in all mining ventures, the occurrence and utilization of natural resources as well as broader landforms and topography helped shape the development and operation of the mines and mill. From the early exploration and discovery of high-grade copper ore on Bonanza Ridge to the eventual siting of infrastructure, processing facilities and related services at the moraine on the edge of the Kennicott Glacier, the nature of the landscape heavily influenced the configuration and functional relationships of the mill town's components (NPS, 2000). Vegetation clearing, the location of the copper ore and mines above the mill site, the steep terrain, the presence of the Kennicott Glacier, and the presence of Bonanza and National creeks, exploited for hydroelectric power and water, respectively, all affected development of the Kennecott cultural landscape. This landscape was intensively inventoried by NPS in its 2001 *Cultural Landscape Report*.

Outside the NHL, the historic town of McCarthy, associated with Kennecott almost from the very beginning, would represent an undesignated cultural landscape. The existence and location of the town at the foot of the mountain, near the confluence of Kennicott River and McCarthy Creek, and its close proximity to the mill town are a function of both the natural landscape and historical social and economic factors. The road from McCarthy to Kennecott, following the old railroad bed, and the old wagon road between McCarthy-Kennecott would also have features of cultural landscapes.

### 3.7.2 Archeological Resources

Archeology is the study of physical evidence left behind by past generations, both prehistoric and historic, and later discovered on the ground, under the ground, and underwater.

At the time of first contact with Europeans, what is now Wrangell-St. Elias National Park was occupied primarily by Athapaskan Indians, in particular the Ahtna of the Copper River drainage. When the Athapaskan Indians arrived in the area is not well known, but they may have been present for more than a thousand years (NPS, 1986). Numerous sites representing the later Athabaskan tradition, dating to about 800 BP, have been documented along the western boundary of the national park and preserve. Major excavations have been conducted at Dakah De'nin's Village, a site situated along the Copper River near Chitina, dated from the protohistoric period. Directly across the river, at Taral, investigations have revealed an historic period occupation (NPS, no date-b). To date, no significant prehistoric archeological resources have been identified in the Kennecott-McCarthy area.

Within the NHL, archeological features help define the character of Kennecott (NPS, 2000a). Archeological resources in the NHL include collapsed buildings, pipelines, large industrial artifacts (e.g. mining equipment, remnant cable, machinery), dumps, and equipment storage piles. Most of these are considered significant because of their association with historic activities at Kennecott during 1900-1938. Other later features that are not considered significant are not managed as cultural resources. Approximately 70% of the mill town's surviving archeological resources are considered to be in stable condition, that is, having reached an equilibrium with the processes of deterioration and erosion. Stable resources would include large metal objects; wooden features like collapsed buildings tend not to be in stable condition.

Outside the NHL, an archeological survey along the McCarthy Road conducted by the Alaska Office of History and Archeology identified significant and insignificant historic resources, most associated with the Copper River and Northwestern Railway, including trestles, railway remains, remnants of old homesteads and artifact scatters (NPS, 2002). Archeological-cultural surveys by WRST staff at the McCarthy walk-in campground and the Interim Operations Support Complex did not identify any significant resources at either site (NPS, 2003a).

### 3.7.3 Historic Structures and Buildings

Within the NHL, historic structures include boardwalks, dams, bridges, tram towers, and landscape features such as tailings piles. Many of these structures are made of wood and are continually deteriorating (NPS, 2000a). A failed dam on National Creek caused flood damage to the National Creek bunkhouse, railroad trestle, and the assay building.

The NHL includes 45 major residential, commercial, and industrial historic buildings, 25



**Figure 3-8. Train turnaround (switching station) in McCarthy**

outbuildings, and the four upper mountain mine sites. Of 70 standing buildings, 14 major buildings have been acquired by NPS. All of them are built of wood and have survived more than 60 years of abandonment and neglect; their condition ranges from poor to fair (NPS, 2000a).

Outside the NHL, McCarthy contains a number of historic buildings and some historic structures like the switching station (Figure 3-8).

### 3.7.4 Cultural Objects, Museum Collections and Archives

Kennecott artifacts include cultural objects and archival materials. Cultural objects are items like tools, domestic items, remnants of larger features, wooden pipes, equipment, and machinery parts (NPS, 2000a). The objects, made of both metal and wood, are scattered throughout the landscape but may also be found in buildings, dumps, and equipment storage piles. The metallic objects are considered stable but the wooden objects continue to be subject to erosion and weathering-related deterioration.

Archival materials consist of forms, receipts, and other paper documents, usually found in buildings. These materials have been collected over the decades both by collectors and through combined efforts of the University of Alaska, NPS, and the McCarthy Museum. Uncollected archival materials remaining in the mill town tend to be in poor condition (NPS, 2000a).

## 3.8 VISUAL RESOURCES

Wrangell-St. Elias National Park and Preserve, as noted in Chapter 1, has some of the most spectacular scenery and visual resources anywhere in North America. While the Wrangell Mountains in the project vicinity are not as lofty as in other parts of the park, the McCarthy-Kennecott gateway community is still known for its outstanding views of rugged Alaskan wilderness, including glaciers, snow-capped mountains, rivers, and extensive boreal forests.

Within the NHL itself, visual resources include a cultural-historic component, that is, the view of aging, individual, historic buildings and structures in various states of deterioration, and more holistically, the appearance of the historic mill town district in its entirety. In recent decades, unmanaged vegetation, especially trees and shrubs, have encroached upon and obstructed many historic views (Gilbert et al., 2001). Also, certain newer, non-historic structures and land uses within the NHL may not be entirely consistent with the desired appearance and character of the Kennecott Mill Town, or may impinge upon important viewsheds. An example is the existing NPS materials lay down/storage area near the Dairy Barn, in which supplies and tarp(s) covering them can be visually prominent or obtrusive (Figure 3-9).



**Figure 3-9. Existing NPS bulk storage area in the Kennecott NHL**

### 3.9 VISITOR USE AND EXPERIENCE

The NPS Organic Act calls for the national park system and NPS, "to provide for the enjoyment of the [resources] in such manner and by such means as will leave them unimpaired for the enjoyment of future generations" (NPS, 2001d). WRST has two mission goals that follow from this broad statutory mandate:

**Mission Goal IIa:** *Visitors safely enjoy and are satisfied with the availability, accessibility, diversity, and quality of park facilities, services, and appropriate recreational opportunities.*

Enjoyment of national parks is a fundamental aspect of the visitor experience. Visitor enjoyment and safety are affected by the quality of park programs, facilities, and services, whether provided by the National Park Service, a concessioner, or a contractor. Availability of park facilities, services, and recreational opportunities refers to convenient locations and times of operation that fit visitors' transportation and schedule needs (NPS, 2000b).

**Mission Goal IIb:** *Park visitors and the general public understand and appreciate the preservation of parks and their resources for this and future generations.*

Visitors' park experiences grow from enjoying the park to understanding why it exists and the significance of its resources. Satisfactory visitor experiences build public support for preserving this country's heritage as contained in the national parks (NPS, 2000b).

Total visitation at WRST is on the rise. Recreation visits grew from 40,352 in FY 2002, to 43,311 in FY 2003, and 57,221 in FY 2004 (NPS, 2005d). The Kennecott District is the most heavily visited area of the park: recent visitation studies showed that more than 50% of park visitors go to McCarthy-Kennecott. Visiting McCarthy-Kennecott was the third most popular reason for visiting the park, and walking around the Kennecott mine site was the third most popular visitor activity. Furthermore, the most popular backcountry in WRST is the backcountry surrounding the McCarthy-Kennecott area. Most park visitation takes place between June and September, and visitors come to the Kennecott District by road or air as shown below (NPS, 2003a):

**Table 3-2. Visitation to Kennecott District, 2000-2020**

Year	Visitors Arriving by Road	Visitors Arriving by Air
2000	8,012	470
2005	8,704	822
2010	9,527	1,174
2015	11,098	1,526
2020	11,864	1,878

*Source: State of Alaska, McCarthy Road, Chitina Roundtable Project, April 2000*

At present, the area still offers limited facilities and services to accommodate the use and contribute to the enjoyment and education of Kennecott-McCarthy visitors. There is no welcome sign for visitors arriving at the McCarthy-Kennecott area, nor even any overall sense of have entered this historic district. While some visitor facilities are provided, information on services

and activities can be hard to find. Lack of readily available information about land ownership patterns can sometimes result in visitors accidentally trespassing on private lands. A McCarthy Road Information Station – with interpretive and informational media – is located just west of the Kennicott River footbridge, but it is set back from the road where it is inconspicuous, and it does not have sufficient staffing (it is staffed by park employees from Memorial Day to Labor Day, seven days a week, eight hours per day). While maps and other information are available at the McCarthy Road Information Station, the facilities provide inadequate wayfinding.

As described later in the transportation section, reaching the NHL from the Kennicott River can prove time-consuming or inconvenient for visitors. In addition, confusing parking arrangements have occasionally resulted in conflicts between visitors and private property owners.

Within the NHL itself, there is presently a small visitor center at the Depot, and the Kennecott Company Store is being developed with the goal of it being a primary visitor destination. While the Mill Town retains much of its historic, rustic character and charm, ongoing stabilization and rehabilitation activities may interfere somewhat with visitor enjoyment of individual structures and buildings. Some of structures are off-limits to general visitors for safety reasons or are being used for storage. In addition, some non-historic, non-compatible more recent development detracts from the overall historic character of the site.

Existing plans have not yet been implemented for fixing the cut bank washout at National Creek for a loop trail, which would enable the traverse of Silk Stocking Road and the top of the mill complex. Several other existing trails are overgrown and in poor condition, compromising the visitor experience.

Several public toilets are available in the McCarthy-Kennecott area: two at the McCarthy Road Information Station, two at the second footbridge, one at the “Y” by the Museum, one at McCarthy Airport, one by the Company Store, two at the Recreation Hall, and one trail pit toilet at the Jumbo Creek camping area. Proposed restrooms in the Company Store will primarily serve NHL visitors during normal operating hours, and the three vault toilets in the Mill Town would then be for public use after normal operating hours. There are an inadequate number of toilets on the north side of the NHL, and there are no public toilets on the west side of the Kennicott River at the footbridge. Facility development for the new walk-in campground includes vault toilets for campers.

### **3.10 TRANSPORTATION AND ACCESS**

The main transportation route in the area is the McCarthy Road, which reaches its eastern terminus on the west bank of the Kennicott River at about MP 60. Some park staff commute weekly from Richardson Highway communities to McCarthy along this route. There is no bridge providing access to vehicles across the river at this point, but a state-built footbridge allows pedestrians and carts to cross. The one-lane, unpaved McCarthy Road continues on the east side of the Kennicott River, skirting past McCarthy and continuing for about four miles up to the Kennecott Mill Town, following the original railroad alignment. This road is used by automobiles, shuttle vans, all-terrain vehicles, motorcycles, bicycles, and pedestrians. It

generally lacks wide spots to allow other vehicles to pass and on busier days this can lead to congestion.

ADOT&PF and local businesses maintain the road within the state right-of-way from the NHL boundary to the west end of the study area, but at present there is no administrative structure or institutional arrangements to enable the NPS to participate in road maintenance. Overall, the road between McCarthy and Kennecott is inadequately maintained and safety problems exist like the lack of intervisible pullouts to readily and safely allow vehicles moving in the opposite direction to pass.

An historic, unpaved wagon road provides an alternate route for hikers and pedestrians from McCarthy to Kennecott.

Approximately one-quarter mile downstream of the footbridge crossing of the Kennicott River is a vehicular bridge constructed on private land by a local resident with bridge-building experience. NPS utilized this bridge on several occasions, but crossing fees were high, and so NPS used it sparingly. WRST negotiated a permit with the owner that allows for unlimited freight crossings for a flat fee.

As mentioned in Section 2.1.10, NPS is cooperating with ADOT&PF and the community of McCarthy on implementing the McCarthy Road SCP. However, the McCarthy-Kennecott Mines NHL segment did not receive funding from the State of Alaska or the NPS, and is not part of the EIS for the Chitina-Kennicott River segment

West of the Kennicott River 8-10 parking spaces are available at the NPS McCarthy Road Information Station, and there are several privately-owned parking lots, including one at the footbridge. The NPS parking at the McCarthy Road Information Station is inconvenient due to its distance from the Kennicott River footbridge, and there have been some conflicts with parking and loading/unloading at the footbridge. There is, however, a free shuttle between NPS parking at the information station and the Kennicott River footbridge.

East of the Kennicott River, informal, unmarked parking spaces for up to about 15 vehicles used to be available at the footbridge on the State right-of-way and private property; however, in 2005 this space was eliminated and now the site can only be used for loading and unloading supplies and passengers from vehicles.

Within the NHL, motorists now park vehicles along the rail corridor adjacent to the Kennicott Glacier Lodge and along the lower glacier road behind the Recreation Hall in an uncontrolled fashion. There is no designated turnaround area or visitor drop-off.

Besides walking and bicycling, several privately operated van shuttles are the only method for visitors to reach McCarthy or the NHL from the Kennicott River. These shuttles do not usually run early or late in the day, and are not generally able to readily accommodate wheelchairs or transport bicycles. If specifically requested by customers, shuttles can make early or late runs.



### **3.11 UTILITIES AND RELATED SERVICES**

#### **3.11.1 Energy and Electrical Power**

Within the NHL, the NPS uses a 20 KVA diesel generator and underground lines to bring power to certain buildings on the south side of National Creek: Store, contemporary Laundry, New School, Old School, Recreation Hall, and, soon, the Dairy Barn. However, the generator is not large enough to supply projected power needs with full build-out; furthermore, it does not fit within the historic context of the area. Interior space heating needs in spring, summer and fall are met by propane; full shut-down during winter months precludes the need for heating during the coldest season.

On the west side of the Kennicott River, electrical power needs for both office space and housing in the Interim Operations Support Complex will be met by a small 4 kw generator.

#### **3.11.2 Wastewater Collection, Treatment and Disposal**

The NPS-maintained sewer system in the NHL includes vault toilets and two septic tanks. There is a septic tank/leach field on lot 33 along Silk Stocking Row which services the cottage on that lot. It was installed by a previous owner and its ADEC status (i.e. whether it is permitted and in compliance) is unknown. The Dairy Barn site also has a fairly well-developed leach field that connected to buildings south of National Creek. It consists of a 10,000-gallon septic tank on the property line of lots 2 and 3 and an ADEC-approved 936-square foot leach field on lot 2. However, this system is not and has never been used.

The west side development (Support Complex) has a septic tank and leach field that support the size of the facility as it is now planned.

#### **3.11.3 Fire Suppression**

The NHL has very limited fire suppression capabilities, with foam being the only fire attack tool currently available. There is no water collection and storage system that is distributed to hydrants and sprinklers for fire protection. These conditions would continue under the No Action Alternative.

On the west side of the Kennicott River, no initial attack capability exists for the McCarthy Road Information Station and the Interim Operations Support Complex. The NPS is currently constructing a sprinkler system for fire protection of the Support Complex.

#### **3.11.4 Drinking Water**

Currently, the NPS provides bottled water for visitors to purchase in the NHL. There is also a seasonal, low-volume, ADEC-approved existing water system in the NHL – water is collected from National Creek and treated with chlorine to make it safe for drinking. However, turbidity and a lack of power to drive the chlorination process make this system difficult to maintain.

Substantial upgrades to the system would be required to expand capacity sufficiently to meet anticipated visitor demand in the future.

A production well exists at the Interim Operations Support Complex in West McCarthy, but there is no general public drinking water source on NPS or private lands there.

### **3.11.5 Household Waste Management**

The NPS currently manages its household waste by using unsigned, bear-resistant trash containers at the McCarthy Road Information Station and in the NHL (one at each location). Trash is periodically hauled along the McCarthy Road all the way to Glennallen for disposal there.

## **3.12 SOCIOECONOMIC ENVIRONMENT**

McCarthy is located in the Valdez-Cordova census area of Alaska, one of 27 such designated areas in the state. The estimated population of this large 34,319-square mile census area in 2003 was 9,933. This represented 1.5% of Alaska's estimated 2003 population of 648, 818. The census area's population density was 0.3 persons per square mile, versus 1.1 for Alaska. The Valdez-Cordova area's 2003 population declined 2.6% from the 2000 Census population of 10,195, while in contrast, Alaska's population grew 3.5% in the same three years (USCB, 2005).

In 2000, 75% of the population in the Valdez-Cordova census area was non-Hispanic white in racial/ethnic origin, 13% was Alaska Native, 4% was Asian, and 3% was Latino. Only 0.3% was black. Except for blacks, these percentages were comparable to the racial/ethnic composition of the state as a whole; blacks were 10 times more numerous a percentage of the population (3.5%) in Alaska than in the Valdez-Cordova census area.

In the McCarthy Census Designated Place (CDP), the 2000 Census counted 42 residents, all of whom were white, in 26 separate households (USCB, 2000a). The median age was 46 years. Of the 26 households, seven were family households, and four had children under 18. Six residents had disabilities. There were an additional 21 vacant housing units used seasonally, recreationally, or occasionally.

The rural Alaskan character of the McCarthy community is shown by statistics from the 2000 Census. Of 20 occupied housing units, four (20%) were heated with fuel oil or kerosene, 15 (75%) were heated with wood, and one (5%) was heated with solar energy. Ninety percent of the housing units lacked complete plumbing facilities, 70% lacked complete kitchen facilities, and 45% had no telephone service.

Within the Valdez-Cordova census area, educational attainment in 2000 was similar to state levels: 88.5% of the population 25 or older were high school graduates, versus 88.3% of Alaskans; 21% had at least a Bachelor's degree, compared with 25% of all Alaskans. McCarthy had a somewhat more highly educated populace, on average, than either the census area or the state as a whole: 92% (22 of 24 residents) of the residents 25 years and older had at least a high school diploma, and 29% had a Bachelor's degree or higher.



In terms of economic well-being, the census area is similar to the state. The median household income in the Valdez-Cordova census area in 1999 was \$48,734 compared to \$51,571 among all Alaska residents. The poverty level among census area residents was 9.8%; in Alaska as a whole it was 9.4%. McCarthy had a higher poverty rate – 15% – and a much lower median household income – \$17,188 – than either the broader census area or the entire state. Lower median family and household incomes and higher poverty rates are characteristic of remote, rural communities in Alaska and elsewhere that have few employment opportunities. In McCarthy, 41% of the civilian labor force was unemployed. Only 3 people among the 29 residents 16 and older were employed; fully 48% of the population aged 16 and older (14 residents) were not even in the labor force.

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## 4.0 ENVIRONMENTAL CONSEQUENCES

This chapter provides an evaluation of the potential effects or impacts of each of the alternatives on the resources described in the issue statements presented in Chapter 1, *Purpose and Need for Action*.

### 4.1 METHODOLOGY

The impact analysis has been conducted in a consistent manner based on standardized impact definitions. For each issue or resource, direct, indirect, and cumulative impacts have been characterized as negligible, minor, moderate, or major. Impacts identified for each issue or resource was based on their duration, extent, and intensity. These impact level thresholds are defined below.

#### **Duration of Impact:**

*Temporary* – Impact would occur during the site preparation and construction phases only. Once construction has ended, resource conditions are likely to return to pre-construction conditions.

*Short-term* – Impact would extend past the construction phase, but would not last more than a couple of years, at most.

*Long-term* – Impact would likely last more than a couple of years, or over the lifetime of the project.

#### **Extent of Impact:**

*Localized* – Impacts would affect the resource area only on the project site or its immediate surroundings, and would not extend into the region.

*Regional* – Impacts would affect the resource area on a regional level or on the park as a whole, extending well past the immediate project site.

*National* – Impacts would affect the resource area on a national level, extending well past the region or park as a whole.

#### **Intensity of Impact:**

*Negligible* – Minimal or no impact on the resource area; any change that occurs is neither noticeable nor measurable.

*Minor* – Change in a resource area occurs, but no substantial resource impact results; the change in the resource is barely perceptible and would not alter the condition or appearance of the resource.

*Moderate* – Noticeable change in a resource occurs and this change alters the condition or appearance of the resource, but the integrity of the resource remains intact.

*Major* – Substantial impact or change in a resource area occurs that is easily defined, highly noticeable, and measurably alters the condition or appearance of the resource.

## 4.2 CUMULATIVE IMPACTS

Cumulative impacts were assessed by combining the potential environmental impacts of the alternatives with the potential impacts of known projects that have occurred in the past, are currently occurring, or are projected to occur in the future within the region of the Preferred Alternative. Known past, present, and reasonably foreseeable future projects and actions in the authorized WRST boundary include areas of nonfederal land, past mining development, human habitation, roads, buildings, and land applications that amount to about 1.3 million acres. Known past, current, and reasonably foreseeable future projects and actions in the vicinity of the project site are described below.

### 4.2.1 Past and Present Projects and Actions

Kennecott Mill Town Stabilization and Rehabilitation Work – In 2004 and 2005, crews working under park supervision made progress in the ongoing effort to stabilize historic buildings in the Kennecott Mill Town. Work focused primarily on the Store/Warehouse, General Manager's Office, Mill Building (including the Ore Chute), the Power Plant, and the National Creek Footbridge. Additional work was performed on the Kennecott and Blackburn Schools.

In the summer of 2005, work proceeded at several sites, including the Store/Warehouse (which will eventually house the Visitor Center and NHL Administrative Offices), General Manager's Office and Power Plant. At the Store/Warehouse, leveling and foundation repair will be completed and exterior wall repairs will be started. At the General Manager's Office, the oldest standing building in Kennecott, summer 2005 work included completion of the exterior shell; installation of doors, windows and new paint will also be initiated. At the Power Plant, foundation repair work is taking place on the north end of the building and stabilization of the smoke stacks will be undertaken. Crews will also be working on other projects, including the Mill Building and Recreation Hall. Certain buildings may be restricted or closed to the public during this construction work.

Invasive Non-Native Plants – NPS is developing a program to control invasive non-native plant species. It consists of both educational/outreach and weed pulling work.

National Creek Geomorphic Study – During the summer of 2005, a contractor conducted hydrologic and geomorphic field work on National Creek. This study will provide information regarding the geomorphic processes in the National Creek watershed, allowing NPS to evaluate the geomorphic risks to potential projects designed to protect the historic structures and cultural integrity of the National Creek drainage. A report was to be delivered to the NPS in December 2005.

Interim Park Operations Support Complex – WRST is completing development of this facility in West McCarthy, which consists of cabins and support cabins and bulk storage space.

Opening of Copper River Princess Wilderness Lodge – This 85-room lodge in Copper Center, near the WRST headquarters, opened in 2002, offering guided tours to Kennecott and McCarthy. More broadly, there has been an increase in private sector facilities catering to adventure tourists in the region that both accommodates the growth in visitation to the NHL District and encourages further growth. In the NHL itself, the 25-room Kennicott Glacier Lodge was built in 1987 as a replica of one of the historic mining buildings.

Past Mining and Construction Activities – Extensive copper mining at four upper mountain mine sites and associated land development and disturbance occurred in and around the NHL from 1901 to 1938. These actions, undertaken at a time when measures to protect the environment were all but non-existent, caused widespread, long-term, cumulative impacts in the McCarthy-Kennecott on soils, water resources, hydrology and floodplains, and vegetation, among other resources.

Soils in and near the Kennecott Mill Town and in the town of McCarthy have been altered due to construction of buildings, roads, trails, and other facilities and from accumulation of tailings and oil-stained soil. Past mining at the higher elevation mine sites has also resulted in soil impacts. Besides the actual footprint of these facilities, soils in the immediate surrounding areas have been impacted by compaction from pedestrian and vehicle traffic. Dispersed soil impacts have also been caused by off-trail pedestrian traffic that has resulted in compaction over broad areas and erosion on steeper slopes. Concentrated areas of compaction and erosion often take the form of unofficial social trails.

Widespread disturbance to water resources from past mining activity exists in the Kennecott area. Amazon, Jumbo, Bonanza, and National creeks have all been disturbed since the early 1900's by access roads and activities associated with hardrock mining (NPS, 1990). Stream impacts exist from water diversions, in-stream obstructions, and changes in stream morphology, runoff from access roads, and potential water contamination from abandoned hazardous materials.

Extensive disturbance of riparian habitat and interruption of hydrology exists from road construction and material stockpile. Loss of riparian habitat affects both the aquatic and terrestrial habitats through decreased nutrient sources to stream systems, decreased shade and cover for fish, and decreased riparian habitat available for wildlife (NPS, 1990). Changes in physical stream characteristics and removal of riparian vegetation through mining operations and access routes have caused impacts to aquatic biota over time, such as loss of shade, cover, detrital input, and suitable habitat.

Hazardous materials (i.e., asbestos, mine tailings, batteries) present a source of contamination to groundwater and surface water and potential impact to aquatic biota. These materials have existed in the NHL for over 50 years, and leaching from these sources in the past and into the future is a continuing cumulative impact (NPS, 1990).

During the Kennecott mining era, National Creek and its floodplain were intensively altered by mining activity and material stockpiling. These alterations caused hydrologic and hydraulic changes in the fluvial system, floodplain, and wetlands that are evident today. In the vicinity of the mill, the stream channel was confined, dammed and diverted to support milling operations. Water diversion facilities were constructed upstream of the mill. Remnants of these facilities remain, causing blockage and flow restriction during floods. Dams, buildings, and mill tailings in the active floodplain are subject to scour and sediment deposition. Stream gravel has been deposited in the lower levels of two buildings along National Creek. National Creek now has an abundance of both naturally occurring and mining-related debris and sediment accumulation (NPS, 2003b).

Other floodplains in the project area have been disturbed in the past, causing altered water flow. Actions included diverting stream channels away from infrastructure and installing culverts.

Vegetation clearing in the McCarthy-Kennecott area has resulted from construction and maintenance of the McCarthy Road and construction of facilities along the road, such as the west side support complex. Vegetation in and near the Kennecott Mill Town and in the town of McCarthy has been cleared for construction of buildings, roads, trails, and other facilities.

Past mining at the higher elevation mine sites has also resulted in vegetation impacts. Besides the actual footprint of these facilities, plants in the immediate surrounding areas have been impacted by trampling from pedestrian and vehicle traffic. Dispersed vegetation impacts have also been caused by off-trail pedestrian traffic. Concentrated areas of pedestrian traffic often take the form of unofficial social trails where vegetation is often denuded. An additional impact to the vegetation of the area includes a bark beetle infestation in the 1990s which killed many of the mature white spruce trees on the terraces, side slopes and uplands.

Most of the areas where vegetation was historically cleared have stabilized and revegetated on their own to some degree. Before 1900, most areas in the NHL were in some successional stage of white spruce forest, except notably in the vicinity of National Creek. During the development of the Mill Town (1900-1938), logging and clearing of land left the area in various stages of secondary succession. Primary succession was also proceeding on the younger moraines. Both of these processes caused a dramatic increase in the amount of willow and alder in the area, with diminishing spruce forest. The majority of land cleared for mining activities became an area covered with dense shrubs, spruce stumps, slash, and mining debris. Today there is more total vegetation cover than at any time since the start of the mining era. This is due to the ongoing retreat of Kennicott Glacier and the consequent colonization of its lateral moraines. All the vegetation in the NHL is a seral stage of white spruce forest, as it was before the miners arrived. However, a larger proportion of vegetated land is in early to middle succession than it was 100 years ago, and a smaller percentage is in late successional or mature forest.

#### **4.2.2 Future Projects and Actions**

Each of the projects or actions described above will also be continuing in the future. In addition, the following reasonably foreseeable future actions below also have potential for interacting with the proposed action to produce cumulative impacts:

Walk-in Campground – WRST is planning on developing a walk-in campground on the east side of the Kennicott River on the opposite side of the McCarthy-Kennecott Road from the McCarthy Airport. The chosen site sits on 42 acres in a glacial fluvial outwash and access will be limited to non-motorized methods along a designated trail from the McCarthy-Kennecott Road traversing federal land. It will include vault toilets, bear-resistant trash receptacles, drinking water from a well, and a centralized food preparation area. It also incorporates a number of mitigation measures aimed at minimizing human-bear conflicts.

McCarthy Road Upgrade – ADOT&PF has planned a major upgrade of the McCarthy Road from Chitina to McCarthy. A Scenic Corridor Plan, released in 1997 and described in Section 1.5.2 of this EA, set forth design criteria consistent with NPS park road standards and ADPT&PF standards, as well as proposing a number of interpretive wayside (four in the McCarthy area), scenic overlooks, and trails. The Federal Highway Administration, in cooperation with ADPT&PF, initiated an EIS in 2003 on these proposed improvements. Preliminary alternatives being evaluated in the EIS included the following:

- No build; continued use of the current road, with limited on-going maintenance activities.
- Improving the most serious roadway deficiencies.
- Reconstructing the road to a design speed of 35 mph, considering all or some of the guidelines specified in the ``McCarthy Scenic Corridor Plan."
- Reconstructing the road to a design speed of 50 mph, meeting modern highway standards.
- Hybrid of the previous two alternatives: reconstructing some segments of the road with design speeds of 50 mph and others with 35 mph.

Under each alternative, minor realignments, the location and number of waysides and other enhancement facilities, and the final surfacing of the road (gravel or hard) are being evaluated.

#### Transfer of State DNR Lands to University of Alaska

Early in 2005, the governor of Alaska introduced bills in the State House and Senate to transfer state DNR lands to the University of Alaska to provide the college with a new source of income in the coming years (Kenyon, 2005). About 12,500 acres near McCarthy are included in the proposal; the land borders the Nizina River, forming a corridor ranging between 1-3 miles in width, running for several miles east of the Nizina Bridge area at MP of the McCarthy Road. These lands are presently used by area residents for subsistence purposes, including hiking, fishing, berry picking, firewood gathering, and obtaining gravel and house logs. If approved, this proposal could potentially lead to sale and subdivision of some of this acreage, with possible restrictions on such subsistence uses. A related bill introduced in the U.S. Senate would require the University of Alaska to relinquish its inholdings in national parks and national wildlife refuges, including WRST, in exchange for selecting other acreage from the federal government.

#### Hydroelectric Development on Bonanza Creek

The 2003 Kennecott Utilities Study performed a hydroelectric analysis and determined that a hydroelectric facility on Bonanza Creek, where one existed when the Mill Town was booming

80 years ago, would be feasible. A hydroelectric facility would consist of several structures, including a diversion structure and intake site, a pipeline or penstock to transport water from the stream to the powerhouse, the powerhouse itself, containing a turbine and generator, a tailrace and flume to discharge water back into a watercourse (National or Bonanza Creek), and a transmission line that would carry power from the generator to the local grid. Most of these facilities would have to be constructed anew, though it may be possible to reuse the existing, abandoned powerhouse. Hydroelectric development on Bonanza Creek would require further site-specific design engineering and environmental analysis before it could proceed.

### **4.3 NO ACTION ALTERNATIVE**

#### **4.3.1 Soils and Topography**

Under the No Action Alternative, no new actions are planned that would contribute negative impacts to soils. Soil impacts from currently planned improvements that would be implemented, such as the new walk-in campground (1 acre of disturbance) and new housing in the west side support complex in west McCarthy, are described elsewhere (NPS, 2002; NPS, 2003a).

Several practices that are currently occurring would continue to adversely affect soils. Cars would continue to park off-road in the right-of-way east of the Kennicott River and in the NHL due to uncontrolled parking and lack of sufficient designated parking areas, with continuing localized churning and compacting of soils. The rate and extent of current soil impacts (e.g., compaction from foot traffic) would be expected to correspond to visitation levels.

Additional localized soil disturbance, such as compaction and alteration of soil structure, would occur from the already planned sprinkler system for the west side support complex which would require a water storage tank and a trench to each cabin.

Bulk fuel storage at the west side support complex and in the NHL and from above ground storage tanks in NHL could potentially result in localized soil contamination from possible spills. Fuels kill most soil microorganisms and create toxic soil solutions that kill plants and contaminate ground water. Soils recover from spills by the leaching of contaminants from precipitation and natural bioremediation. Toxic effects from spills can last for years depending on soil texture, the volume and type of spill, and rates of biologic activity. Productive soils can also be lost if contaminated soils are excavated and removed during remediation operations. Proper handling of fuel according to regulations would minimize any such soil impacts.

There would be reduced soil erosion and sedimentation of National Creek with the implementation of a plan to fix the cut bank washout for a loop trail enabling the traverse of Silk Stocking Road and the top of the mill complex, which would be a beneficial impact.

*Cumulative Impacts* – Past and future activities can remove soils from production and lead to the loss of soil resources through burial, and wind and water erosion. In most cases the loss of production is temporary and when human occupancy and use is discontinued soil productivity resumes, although at an initially reduced level. Disturbance also changes the original character of native soils by modifying texture, organic matter content and drainage class. Vegetation



regrowth often reflects that change and new growth usually contrasts with surrounding undisturbed sites. The modifications also affect site productivity – in some areas increasing productivity due to improved soil drainage.

The No Action Alternative would have negligible, long-term, localized, adverse impacts to soils from continued soil compaction and erosion. Implementation of the No Action Alternative would likely contribute negligible, long-term, adverse cumulative impacts to soils. Combined with known past, current, and future projects and actions, overall there would be minor to moderate adverse cumulative impacts on soils.

*Conclusion* – The No Action Alternative would have negligible, long-term, localized, adverse impacts to soils from continued soil compaction and erosion. Implementation of the No Action Alternative would likely contribute negligible, long-term, adverse cumulative impacts to soils. The level of impact on soils from the No Action Alternative would not result in impairment of park resources that fulfill specific purposes identified in the WRST enabling legislation or that are key to the natural and cultural integrity of the national park and preserve.

#### **4.3.2 Water Resources**

Under the No Action Alternative, no new actions are planned that would contribute negative impacts to water resources. However, the lack of action to improve existing facilities could lead to adverse impacts on water resources.

At the NHL, existing plans have not yet been implemented for fixing the cut bank washout at National Creek for a loop trail and several existing trails are overgrown and in poor condition. Increased sediment loads from erosion of these trails would degrade the surface water quality of National Creek and other nearby streams. Additional development of sanitary sewage capacity is needed in the NHL for increased use of historic buildings. Without a new or upgraded septic system and increased use, surface or groundwater contamination could occur from failure of the leach field and septic tank. Lack of sufficient public toilets on the north side of the NHL and on the west side of the Kennicott River near the footbridge could lead to surface water contamination with fecal coliform bacteria from improper disposal of human waste near streams.

Additionally, there is potential for groundwater contamination from possible leaks or spills from bulk fuel storage at the west side support complex and in the NHL and from above ground fuel storage tanks in the NHL. Proper handling of fuel according to regulations would minimize any ground or surface water impacts.

*Cumulative Impacts* – The No Action Alternative would have negligible, long-term, localized, adverse impacts on water resources from continued stream sedimentation and possible water contamination. Implementation of the No Action Alternative would likely contribute negligible, long-term, adverse cumulative impacts to water resources. Combined with known past, current, and future projects and actions, overall there would be moderate adverse cumulative impacts on water resources.

*Conclusion* – The No Action Alternative would have negligible, long-term, localized, adverse impacts on water resources from continued stream sedimentation and possible water contamination. Implementation of the No Action Alternative would likely contribute negligible, long-term, adverse cumulative impacts to water resources. The level of impact on water resources from the No Action Alternative would not result in impairment of park resources that fulfill specific purposes identified in the WRST enabling legislation or that are key to the natural and cultural integrity of the national park and preserve.

#### **4.3.3 Floodplains**

Under the No Action Alternative, no new actions are planned that would contribute impacts to floodplains.

*Cumulative Impacts* – The No Action Alternative would have negligible, long-term, localized, adverse impacts on floodplains. Implementation of the No Action Alternative would likely contribute negligible, long-term, adverse cumulative impacts to floodplains. Combined with known past, current, and future projects and actions, overall there would be moderate adverse cumulative impacts on floodplains.

*Conclusion* – The No Action Alternative would have negligible, long-term, localized, adverse impacts on floodplains. Implementation of the No Action Alternative would likely contribute negligible, long-term, adverse cumulative impacts to floodplains. The level of impact on floodplains from the No Action Alternative would not result in impairment of park resources that fulfill specific purposes identified in the WRST enabling legislation or that are key to the natural and cultural integrity of the park and preserve.

#### **4.3.4 Vegetation**

Under the No Action Alternative, no new actions are planned that would contribute negative impacts to vegetation. Vegetation impacts from currently planned improvements that would be implemented, such as the new walk-in campground (1 acre of disturbance) and new housing in the west side support complex in West McCarthy, are described elsewhere (NPS, 2002; NPS, 2003).

Several practices that are currently occurring would continue to adversely affect vegetation. Cars would continue to park off-road in the right-of-way east of the Kennicott River and in the NHL due to uncontrolled parking and lack of sufficient designated parking areas, with continuing destruction of vegetation. Without the implementation of an exotic plant management plan, the pressure of invasive vegetation on native flora would increase within the NHL and the park. Limited fire suppression capabilities could lead to burning of vegetation if there is a fire in the NHL and at the west side support complex. The rate and extent of current vegetation impacts (e.g., trampling of plants due to foot traffic) would be expected to correspond with visitation levels.

Vegetation disturbance, such as trampling and removal, would occur from the already planned sprinkler system for the west side support complex which would require a water storage tank and a trench to each cabin.

*Cumulative Impacts* – As discussed in Section 4.2.1, vegetation in and near the Kennecott Mill Town and in the town of McCarthy was cleared for construction of buildings, roads, trails, and other facilities. Vegetation continues to be selectively thinned at the Mill Town to reestablish historic views and to mitigate potential damage to historic structures. Vegetation that now encroaches on historic structures in the NHL could be removed in the future to assure preservation of cultural resources and to enhance the historic character of the mill town. Vegetable gardens, which consist of non-native plants but were part of the historic landscape, may in the future be reestablished. Selective thinning of vegetation can occur on NPS properties in the NHL to reestablish historic views and viewsheds and to protect the site from the effects of fire and damage to buildings (Gilbert et al., 2001). NPS is working with private property owners who want to conduct selective thinning on their land in a manner consistent with historic district goals.

The No Action Alternative would have minor, long-term, localized, adverse impacts to vegetation from continued vegetation trampling and spread of exotic plants. Implementation of the No Action Alternative would likely contribute negligible, long-term, adverse cumulative impacts to vegetation. Combined with known past, current, and future projects and actions, overall there would be moderate adverse cumulative impacts on vegetation.

*Conclusion* – The No Action Alternative would have minor, long-term, localized, adverse impacts to vegetation from continued vegetation trampling and spread of exotic plants. Implementation of the No Action Alternative would likely contribute negligible, long-term, adverse cumulative impacts to vegetation. The level of impact on vegetation from the No Action Alternative would not result in impairment of park resources that fulfill specific purposes identified in the WRST enabling legislation or that are key to the natural and cultural integrity of the park and preserve.

#### **4.3.5 Wildlife**

Under the No Action Alternative, no new actions are planned that would contribute negative impacts to wildlife and wildlife habitat. However, the lack of a household waste disposal system could mean that there would be continued bear attractants available, such as food and trash. Currently, bear resistant trash cans at the McCarthy Road Information Station and in the NHL are for NPS use only. All other parties, including contractors and visitors, are likely contributing to the problems associated with bears obtaining human food, as described under Wildlife in the Affected Environment chapter, due to lack of adequate waste disposal facilities. The availability of unsecured bear attractants could increase and the potential for human-bear conflicts would increase as would injuries and bear mortality.

*Cumulative Impacts* – Past mining activity; past, present, and future subsistence and sport hunting; past, present, and future development; past, present, and future inholder access; past, present, and future visitation all contribute to cumulative impacts on wildlife. These actions

have resulted in long and short-term habitat loss, displacement of wildlife, increased human-bear conflicts, and increased bear mortality.

Past human activity and development on federal, state, and private lands in the area have directly affected wildlife habitat. Collectively, future developments in the McCarthy area would cause additional habitat alteration. The cumulative impact on wildlife habitat from ongoing and future actions would be negligible because of the extensive amount of wildlife habitat that exists in the national park and preserve.

The No Action Alternative would have minor, long-term, localized, adverse impacts on wildlife and wildlife habitat from continued human-bear conflicts. Implementation of the No Action Alternative would likely contribute negligible, long-term, adverse cumulative impacts on wildlife and wildlife habitat. Combined with known past, current, and future projects and actions, overall there would be moderate, adverse cumulative impacts on wildlife.

*Conclusion* – The No Action Alternative would have minor, long-term, localized, adverse impacts on wildlife and wildlife habitat from continued human-bear conflicts. Implementation of the No Action Alternative would likely contribute negligible, long-term, adverse cumulative impacts on wildlife and wildlife habitat. The level of impact on wildlife and wildlife habitat from the No Action Alternative would not result in impairment of park resources that fulfill specific purposes identified in the WRST enabling legislation or that are key to the natural and cultural integrity of the park and preserve.

#### **4.3.6 Cultural Resources**

*Cultural Landscapes* – Under the No Action Alternative, ongoing efforts to stabilize and rehabilitate structures in the NHL that contribute to the cultural landscape would continue, producing a moderately beneficial impact on the cultural landscape. However, this benefit would be offset partially by the continuation of other current circumstances in the NHL, such as vegetation encroachment and visually intrusive elements including blue tarps covering supplies and propane tanks. NPS would continue to use the diesel generator, which does not fit within the historic context of the area, to bring power to several buildings within the NHL. These elements would continue to detract from the character of the cultural landscape at Kennecott.

National Creek trestle rehabilitation would prevent further damage to the NHL's historic resources. Channelizing the creek would reduce its encroachment on cultural resources and benefit the historic character of the cultural landscape.

Outside the NHL, the No Action Alternative would have little or no effect on the cultural landscape of McCarthy, the McCarthy Road, the wagon road, and other historic areas.

*Archeological Resources* – Significant archeological resources in the NHL include collapsed buildings, pipelines, large industrial artifacts (e.g. mining equipment, remnant cable, machinery), dumps, and equipment storage piles. The No Action Alternative would have a negligible impact on the long-term condition of archeological resources in the NHL.

Outside the NHL, the No Action Alternative would have no effects on archeological resources.

*Historic Structures and Buildings* – Within the NHL, historic structures include boardwalks, dams, bridges, tram towers, and landscape features such as tailings piles. Of 70 standing buildings in the NHL, 14 major ones have been acquired by NPS; all are constructed of wood and their condition varies from poor to fair. If the NPS could purchase any of the six privately owned historic houses remaining in the NHL, they would be rehabilitated to provide additional employee housing. Ongoing stabilization and rehabilitation activities, and planned National Creek trestle rehabilitation, both which would continue under the No Action Alternative, would result in a long-term moderately beneficial impact on historic structures and buildings in the NHL.

With very limited fire suppression capabilities, there would be a low probability of saving structures from fire. The benefits of stabilization and rehabilitation activities would be somewhat offset by this adverse effect.

Outside the NHL, the No Action Alternative would have no effect on historic structures and buildings.

*Cultural Objects, Museum Collections and Archives* – The No Action Alternative would maintain current preservation practices and procedures with regard to artifacts and cultural objects like tools, domestic items, remnants of larger features, wooden pipes, equipment, and machinery parts. Metallic objects would remain stable but wooden objects would continue weathering-related deterioration. With very limited fire suppression capabilities, there would be a low probability saving objects, collections, and archives from fire.

*Cumulative Impacts* – Past, present, and future actions would all contribute to cumulative impacts on cultural resources in the Kennecott Mill Town NHL. By and large, due primarily to the extensive and intensive ongoing efforts by NPS at building and structure stabilization and rehabilitation, these cumulative cultural resources impacts in the NHL would be moderately beneficial, especially in terms of the cultural landscape and historic structures and buildings.

Overall, the No Action Alternative would produce moderately beneficial, long-term, localized, impacts on cultural resources. Combined with known past, current, and future projects and actions, overall there would be moderately beneficial, cumulative impacts on cultural resources.

*Conclusion* – Overall, the No Action Alternative would produce moderately beneficial, long-term, localized, impacts on cultural resources. Implementation of the No Action Alternative would likely contribute moderately beneficial, long-term, localized cumulative impacts on cultural resources. The level of impact on cultural resources from the No Action Alternative would not result in impairment of park resources that fulfill specific purposes identified in the WRST enabling legislation or that are key to the natural and cultural integrity of the park and preserve.

#### 4.3.7 Visual Resources

Under the No Action Alternative, broader visual resources in the McCarthy-Kennecott area would remain outstanding. Within the NHL itself, visual resources relate primarily to the cultural-historic character of the Mill Town. Ongoing work to stabilize and rehabilitate deteriorating structures and buildings in the Mill Town will, over the long term, serve to retain the site's visual resources; thus, under the No Action Alternative, there would be moderately beneficial, localized, long-term impacts on visual resources. In the short term, the work itself and the storage and movement of supplies related to it would have minor, localized adverse effects on visual resources. Also, vegetation encroachment would continue to impinge upon viewsheds, somewhat offsetting the overall long-term beneficial effects of stabilizing Mill Town structures.

*Cumulative Impacts* – Some existing, non-contributing, incompatible development in and around the NHL would continue to have a moderately adverse, long-term impact on Kennecott's visual resources. The additional contribution of moderately beneficial, long-term impacts from NPS stabilization and rehabilitation of historic structures would produce a net minor, beneficial cumulative effect on the visual environment.

*Conclusion* – Overall, the No Action Alternative would produce moderately beneficial, long-term, localized, impacts on visual resources. Implementation of the No Action Alternative would likely contribute moderately beneficial, long-term, localized cumulative impacts on visual resources. The level of impact on visual resources from the No Action Alternative would not result in impairment of park resources that fulfill specific purposes identified in the WRST enabling legislation or that are key to the natural and cultural integrity of the park and preserve.

#### 4.3.8 Visitor Use and Experience

Under the No Action Alternative, facilities and services to accommodate an increasing number of visitors to Kennecott-McCarthy would continue to be limited. There would continue to be no welcome sign for visitors and no overall indication at having arrived in the historic district. While some visitor facilities would continue to be provided, obtaining information on services and activities would remain difficult. Incidents of accidental trespass on the patchwork of private property in the area would likely continue because of the lack of readily available information about land ownership patterns. The inconspicuous, set-back location of the McCarthy Road Information Station along the McCarthy Road west of the Kennicott River would continue to elude some arriving, first-time visitors. Also, staffing of the information station would continue to be limited to eight hours per day, seven days per week, Memorial Day to Labor Day, which would not serve those visitors arriving in the area earlier or later in the day or year.

Reaching the NHL from the Kennicott River would continue to be time-consuming or inconvenient for some visitors. In addition, confusing parking arrangements at the river might continue to occasionally result in conflicts between visitors and private property owners.

Within the NHL itself, existing and already planned visitor facilities and services that would proceed under the No Action Alternative would likely be able to accommodate most but not all expected increases in visitation. While the existing Depot visitor center is small, the much larger Kennecott Company Store is being developed as the primary visitor destination. Over the short term, ongoing stabilization and rehabilitation activities may interfere somewhat with visitor enjoyment of individual structures and buildings, but over the longer term, this preservation work would enhance the quality of the visitor experience. The limited network of overgrown, poorly maintained trails inhibits full mobility of pedestrian visitors in the NHL and limits opportunities to more fully explore and appreciate the setting.

Under the No Action Alternative, existing and planned public toilets would be sufficient in much of the NHL, at least during normal operating hours, but there would be an inadequate number of public toilets on the north side of the NHL, and there would continue to be no public toilets on the west side of the Kennicott River at the footbridge. The new walk-in campground would include vault toilets for campers.

Overall, the No Action Alternative would only partially meet the various needs of growing visitation to the area, thus compromising visitor use and experience. It would fall short of meeting the park's Mission Goal IIa (*Visitors safely enjoy and are satisfied with the availability, accessibility, diversity, and quality of park facilities, services, and appropriate recreational opportunities*) and Mission Goal IIb (*Park visitors and the general public understand and appreciate the preservation of parks and their resources for this and future generations*). Thus, the No Action Alternative would have a minor adverse, long-term impact on visitor use and experience at the Kennecott area of WRST.

*Cumulative Impacts* – The principal outcome of other actions such as the McCarthy Road upgrade, increasing private sector investment in lodging and other tourism ventures, and the new walk-in campground will be to foster growth in the number of visitors coming to McCarthy-Kennecott. The cumulative impact of these actions on visitor use and experience would be moderately beneficial, in that the area does not appear to have reached its theoretical recreational carrying capacity. However, given its limited visitor facilities and services, such growth in visitation would probably exacerbate existing problems that even now limit safe enjoyment of the area by the visiting public. Thus, the overall cumulative impact on visitor use and experience of proceeding with the No Action Alternative would be moderately adverse and long-term.

*Conclusion* – The No Action Alternative would have a minor adverse, long-term impact on visitor use and experience at the Kennecott area of WRST. In addition, it would interact with other ongoing and future actions to generate moderately adverse, long-term cumulative impacts.

#### **4.3.9 Transportation and Access**

The No Action Alternative would limit transportation and access as follows:

- NPS would be unable to participate in road maintenance between the NHL and the Kennicott River and inadequate maintenance and unacceptable safety problems would



persist. This single-lane road would continue to lack wide spots allowing for vehicles passing in the same or opposite direction to pass or cross safely.

- Vehicle parking west of Kennicott River at McCarthy Road Information Station would remain limited to 8-10 parking spaces.
- Vehicle parking east of the Kennicott River within the state right-of-way would remain limited and uncontrolled, with no designated spaces.
- Within the Kennecott NHL, uncontrolled parking would continue along the rail corridor adjacent to the Kennicott Glacier Lodge and along the lower glacier road behind the Recreation Hall.
- There would continue to be no designated turnaround area or visitor drop-off.
- Privately operated van shuttles would continue to be the only method for visitors to get from the Kennicott River to McCarthy or the NHL. These shuttles would not generally run early or late in the day (except for special requests), and may be unable to adequately accommodate wheelchairs or to transport bicycles.
- There would not be designated shuttle stops.

The No Action Alternative would have moderate adverse long-term impacts on transportation and access.

*Cumulative Impacts* – The most important implications for cumulative transportation-related impacts derive from the proposed McCarthy Road upgrade and other private-sector and NPS investments which would have the net effect of boosting visitation and traffic in the McCarthy-Kennecott area. The former action would improve the McCarthy Road, increase safe travel speeds, enhance interpretive and recreational opportunities, and overall, facilitate greater visitation. NPS work in the NHL and private-sector investment in tourist lodging and outings would also attract more visitors to the area. Since the No Action Alternative would not address existing limitations on road maintenance, vehicle parking, and local transportation options for visitors, there would be moderate adverse long-term cumulative impacts on transportation and access.

*Conclusion* – The No Action Alternative would result in long-term, moderately adverse impacts on transportation and access. There would be moderate adverse long-term cumulative impacts.

#### **4.3.10 Utilities and Related Services**

Under the No Action Alternative, most NPS utilities and services would remain as they are at present, while several others (those already planned or under construction already) would be improved, expanded or added. However, there would still be several limitations, including the following:

- Within the NHL, the 20 KVA diesel generator and underground lines NPS uses to bring power to certain buildings would not have the capacity to meet projected electricity demand.
- Two existing septic systems in the NHL would be undersized to handle anticipated increases in visitation and new facilities that would be connected to these systems.

- Very limited fire suppression capabilities in the NHL would persist, placing both humans and historic structures at risk from fires.
- Most drinking water in the NHL would continue to be bottled water for purchase, and the drinking water supply system with water collected from National Creek would continue to be limited in volume and difficult to maintain.
- There would continue to be no comprehensive, long-term solution for waste management, including disposal of construction debris.
- There would continue to be no potentially combined waste management solution for McCarthy, NPS and other residents in the area.

While the No Action Alternative would not directly exacerbate these problems, by not providing a satisfactory solution to them, it would constitute a moderately adverse, long-term impact on utilities and related services.

*Cumulative Impacts* – NPS would continue to generate a household waste stream from normal operations as well as, for the foreseeable future, construction debris from stabilization and rehabilitation efforts in the NHL. Rising visitation to the area, encouraged by other actions, would increase local waste generation in and around McCarthy as well. Without a comprehensive waste management system to handle larger waste streams for the entire McCarthy-Kennecott area, the area may continue to be constrained by limited capability for waste disposal. Similarly, not having sufficient wastewater treatment and disposal capacity could cause localized groundwater contamination and affect adjacent development within the NHL. Overall, then, the No Action Alternative would result in moderately severe, long-term impacts on utilities and related services.

*Conclusion* – The No Action Alternative would result in long-term, moderately adverse impacts on utilities and related services in the McCarthy-Kennecott area. Cumulative impacts from other actions combined with the No Action Alternative would also be moderately adverse and long term.

#### **4.3.11 Socioeconomic Environment**

The No Action Alternative would have a negligible direct effect on the socioeconomic environment of the McCarthy-Kennecott area. It would neither increase nor decrease employment, nor would it add to or subtract from the tax base or inject new funds into the local economy from direct and indirect spending on goods and services. Similarly, it would not place any new burdens on existing social systems, such as education, medical or housing. Indirectly, however, the No Action Alternative would result in minor, long-term adverse impacts, by not allowing for the necessary infrastructure, facilities and services to accommodate projected growth of tourism in McCarthy-Kennecott and visitation to the NHL.

*Cumulative Impacts* – As described elsewhere, other reasonably foreseeable actions would have the net effect of increasing tourism in the area and visitation to the Kennecott National Historic Landmark. McCarthy residents appear generally supportive of this prospect, provided that it is well planned and provided for and that their concerns are addressed. Thus, cumulatively, these other actions together would create a moderately beneficial, long-term impact for the

socioeconomic environment of the McCarthy community. However, if NPS were not to increase the capacity of infrastructure, facilities and support services to meet rising projected demand, it could potentially hinder this anticipated growth or exacerbate its negative consequences (e.g. increased traffic congestion, parking conflicts, bear encounters, trespassing, etc.). Thus, the No Action Alternative would partially offset expected cumulative socioeconomic benefits from other actions.

*Conclusion* – The No Action Alternative would result in long-term, minor adverse impacts on the socioeconomic environment of the McCarthy-Kennecott area. In contrast, cumulative impacts from other actions would generally be moderately beneficial and long term. When considered in combination with the other actions, the No Action Alternative would detract from anticipated cumulative socioeconomic benefits for the area because existing facilities and services would not be able to accommodate projected growth in visitation, leading to probable dissatisfaction on the part of residents and visitors alike.

## **4.4 PROPOSED ACTION ALTERNATIVE**

### **4.4.1 Soils and Topography**

New areas of soil disturbance would occur from construction of several new facilities under the Preferred Alternative. The majority of disturbance would occur in previously disturbed areas, minimizing soil impacts.

New housing units to be constructed at the west side Operations Support Complex, including construction of new parking lots (0.5 acre of disturbance) and pads supporting new vault toilets (< 0.1 acre of disturbance), would have direct, localized impacts on soils. These actions would compact and destroy the function of the organic soil horizon and mineral soils. Removal of the vegetation mat and grading during construction would expose mineral soils to potential erosion during storm events. Increased foot traffic adjacent to new structures could compact or churn soils. Soil porosity could decrease and water could pond on flat or depressed surfaces. Disturbed soils on the margins of gravel or paved surfaces would be more easily eroded and increased sediment could be carried into nearby streams. These impacts would reduce the area's biological productivity as much of the ground surface would be covered by non-native building materials.

Soil disturbance, such as compaction and alteration of soil structure, would occur in localized areas from installation/burial of propane tanks (< 0.1 acre) in the NHL, expanding the leach field (0.12 to 0.16 acre) in the NHL, drilling new wells (< 0.1 acre) in the NHL, installing a 150,000–gallon water tank at elevation 2270 feet in the NHL (0.5 acre), clearing and grading up to 1,300 linear feet to a width of 12-16 feet (0.5 acre) for installation of a new water line from Bonanza Creek to the water tank, clearing and grading up to 2,100 linear feet to a width of 12-16 feet (0.8 acre) for installation of a new water line from National Creek to the water tank, installing a new well and septic system (< 0.1 acre) at the NPS cabin in McCarthy, developing a fire suppression system in the NHL, and installing the already planned sprinkler system for the west side support complex which would include a water storage tank and a trench to each cabin. Disruption of organic and mineral horizons and removal of the vegetation mat could lead to exposure of

mineral soils and potential erosion and increased sediment carried into nearby streams. Soil compaction from foot traffic may occur during construction/installation activities.

Bulk fuel storage at the west side support complex and buried propane tanks in the NHL could result in soil contamination from possible leaks and spills. Fuels kill most soil microorganisms and create toxic soil solutions that kill plants and contaminate ground water. Soils recover from spills by the leaching of contaminants from precipitation and natural bioremediation. Toxic effects from spills can last for years depending on soil texture, the volume and type of spill, and rates of biologic activity. Soils can also be lost from productivity if contaminated soils are excavated and removed during remediation operations. However, with bulk fuel no longer being stored in the NHL, the potential for fuel spills would be decreased. Proper handling of fuel according to regulations would minimize any soil impacts.

The cutting and filling needed to construct new hiking trails could result in increased soil erosion on 0.5 acre. Soil impacts would be localized and include compaction and churning. Trail users stepping off the trails as necessary for passing, resting, etc. would cause compaction beyond the actual trail tread. Installation of new signs for visitor orientation, installation of a new water storage tanks, and ten new shuttle stops would cause minimal soil disturbance where the structures are anchored into the ground (< 0.25 acre). Increased visitation, which may occur from improved visitor services, could result in development of social trails with associated soil compaction and erosion.

Construction of water gathering and storage facilities (water intakes in Bonanza and National creeks, pipelines, and a storage tank) and related hydroelectric generation and distribution facilities would entail earth movement and disruption of soils on a relatively minor scale in areas that were disturbed historically. An approximate volume of 216 cubic feet of ground and soils would be excavated in each streambed and streambank for the installation of a water intake. Soils would be backfilled and allowed to revegetate passively, which should be sufficient to ensure their stability. Hydroelectric water lines leading from Bonanza and National creeks to the proposed water storage tank could potentially be buried in trenches to a depth of six feet. This disturbance would be temporary, since the waterlines would be backfilled within days. Allowing the disturbed linear zone to revegetate passively would likely result in minor erosion at most.

Similar temporary to short-term, minor effects on soils would be expected from clearing, grading, and possible trenching of hydroelectric water lines leading from the water storage tank to the Pelton wheel located in the historic Power Plant building. Approximately 450 lineal feet would need clearing and grading to a width of 12-16 feet, and possible trenching to six feet in depth, disturbing up to one sixth of an acre (<0.2 acre). Likewise, up to 400 lineal feet of trenching to a six-foot depth for a spent water pipeline between the Pelton wheel and the toe of Kennicott Glacier would have temporary to short-term, minor impacts on soils.

Erosion from construction of new facilities would be minimized by implementation of erosion and sediment controls before and after construction. All disturbed areas would be revegetated passively after construction, stabilizing soils over the long-term.

*Cumulative Impacts* – Past and future activities can remove soils from production and lead to the loss of soil resources through burial, and wind and water erosion. In most cases the loss of production is temporary and when human occupancy and use is discontinued soil productivity resumes, although at an initially reduced level. Disturbance also changes the original character of native soils by modifying texture, organic matter content and drainage class. Vegetation regrowth often reflects that change and new growth usually contrasts with surrounding undisturbed sites. The modifications also affect site productivity, in some areas increasing productivity due to improved soil drainage.

The Proposed Action Alternative would have minor, mostly short-term, localized, adverse impacts to soils from construction of new facilities. Implementation of the Proposed Action would likely contribute minor, long-term, adverse cumulative impacts to soils. Combined with known past, current, and future projects and actions, there would be moderate adverse cumulative impacts on soils.

*Conclusion* – The Proposed Action Alternative would have minor, mostly short-term, localized, adverse impacts to soils from construction of new facilities. Implementation of the Proposed Action would likely contribute minor, long-term, adverse cumulative impacts to soils. The level of impact on soils from the Proposed Action Alternative would not result in impairment of park resources that fulfill specific purposes identified in the WRST enabling legislation or that are key to the natural and cultural integrity of the park and preserve.

#### **4.4.2 Water Resources**

Additional housing in the Operations Support Complex on the west side would continue to use the newly installed septic tank and leach field for long-term onsite disposal of sewage. This new system accommodates existing and future planned housing. However, depending on the amount of housing constructed, modifications would be required to the existing septic system, or too much demand could lead to groundwater contamination from coliform bacteria and nitrates if the system fails. Additionally, water quality would be protected with the expanded leach field in the NHL and the new septic system at the NPS cabin in McCarthy, unless the systems fail. Additional vault toilet facilities would constitute a benefit to surface water quality as it would be less likely that human waste would be disposed of near streams, causing localized contamination.

Bulk fuel storage at the west side support complex and buried propane tanks in the NHL could result in groundwater or surface water contamination from possible leaks and spills. However, with bulk fuel no longer being stored in the NHL, the potential for fuel spills would be decreased. Proper handling of fuel according to regulations would minimize any ground or surface water impacts.

As described above under Soils, construction of new facilities could result in more easily eroded soils and increased sediment could be carried into nearby streams, thus affecting water quality and aquatic habitat. Since much of construction disturbance would occur near surface water, the potential for uncontrolled sediment runoff is high. However, erosion and sediment controls implemented before and after construction would minimize runoff to surface waters. All disturbed areas would be revegetated passively after construction to stabilize soils, reducing

long-term erosion and sedimentation. Fuels products (petroleum, oils, and lubricants) would be needed to operate some of the equipment used in construction; therefore, there is some risk of an accidental fuel or chemical spill, which could adversely affect water quality if the spill were to enter surface water. An emergency spill kit, containing absorption pads, absorbent material, a shovel or rake, and other cleanup items, would be readily available on-site in the event of an accidental spill.

Construction of water intakes within Bonanza and National creeks would cause a temporary to short-term disturbance to water quality, primarily from turbidity. Because neither site supports fish populations or complex aquatic ecosystems, the temporary impact of elevated turbidity would constitute only a negligible to minor impact. The presence of the water intake would permanently alter the configuration of each stream in a very small area (approximately 6 by 6 feet, or less than 40 square feet), but this would not represent a degradation of the water resource. The proposed withdrawal and consumptive use would be a minor reduction in downstream flow in both Bonanza and National creeks, but this would comprise only a negligible decline in the annual discharge of the Kennicott River. (Water used to generate hydroelectricity would be returned downstream and would not reduce instream flows.) Utilizing water from these two creeks for both human consumption and hydroelectricity would be restoring a historic beneficial use of their flows at Kennecott.

*Cumulative Impacts* – See Section 4.2. for a discussion of past and potential future cumulative impacts on water resources. The Proposed Action would have minor, long-term, localized, adverse impacts on water resources from turbidity, stream sedimentation and possible water contamination. Implementation of the Proposed Action Alternative would likely contribute minor, long-term, adverse cumulative impacts to water resources. Combined with known past, current, and future projects and actions, there would be moderate, adverse cumulative impacts on water resources.

*Conclusion* – The Proposed Action would have minor, long-term, localized, adverse impacts on water resources from turbidity, stream sedimentation and possible water contamination. Implementation of the Proposed Action Alternative would likely contribute minor, long-term, adverse cumulative impacts to water resources. The level of impact on water resources from the Proposed Action Alternative would not result in impairment of park resources that fulfill specific purposes identified in the WRST enabling legislation or that are key to the natural and cultural integrity of the park and preserve.

#### **4.4.3 Floodplains**

Many of the existing facilities in the McCarthy-Kennecott area have historically been located within floodplains. Proposed new facilities, such as new housing in the west side support complex, trails, parking lots, septic systems, and a fire suppression system would occur alongside existing structures in floodplains. Construction of these facilities could further alter the natural floodplain hydrology of the area. Construction of these facilities may require fill, such as gravel, to be added to elevate foundations, berming, ditching, and installing drainage systems as needed.

Under the Proposed Action, National Creek trestle rehabilitation would include clearing of debris out of an adjacent stream to help channelize the creek and prevent bank erosion. NPS would also rechannelize National Creek to reduce erosion, flooding, and the damage they cause. This would represent a beneficial impact on one particular floodplain, although on balance, net direct impacts from the Proposed Action would be minor adverse, localized and long term.

Construction of water intakes in Bonanza and National creeks and withdrawal of water at each site for hydroelectric generation and drinking water consumption would permanently modify the configuration of the streambed, streambank, and floodplain at each site over a very small area (< 40 square feet). The installation of these structures would not cause obstructions that would exacerbate flood events.

*Cumulative Impacts* – The Proposed Action would have minor, long-term, localized, adverse impacts on floodplains in general, but rechannelization of National Creek would represent a beneficial impact at that site, one that would reduce the flood hazard by clearing debris and other steps. Implementation of this alternative would likely contribute minor, long-term, adverse cumulative impacts to floodplains. Combined with known past, current, and future projects and actions, there would be moderate adverse cumulative impacts on floodplains.

*Conclusion* – The Proposed Action would have minor, long-term, localized, adverse impacts on floodplains in general, but rechannelization of National Creek would represent a beneficial impact at that site, one that would reduce the flood hazard by clearing debris and other steps. Implementation of this alternative would likely contribute minor, long-term, adverse cumulative impacts to floodplains. The level of impact on floodplains from the Proposed Action would not result in impairment of park resources that fulfill specific purposes identified in the WRST enabling legislation or that are key to the natural and cultural integrity of the park and preserve.

#### **4.4.4 Vegetation**

Trees, shrubs, and ground cover would be cleared and/or trampled during construction or installation of new housing in the west side Operations Support Complex, buried propane tanks, wells and septic systems, buried water lines, water tanks, water containment structure, trails, vault toilets, and parking lots (minimum 2 acres). Structures could be sited in open areas to reduce impacts. Long-term maintenance of new facilities could require trimming of vegetation. Trees and other vegetation would be removed to improve visibility of the McCarthy Road Information Station (0.25 acre). Vegetation trampling from foot traffic may occur during construction, installation and maintenance activities. Increased visitation, which may occur from improved visitor services, could result in development of social trails with associated vegetation damage.

A foot trail would be constructed from the north end of the campground along the glacial moraine up to Kennecott to connect with the start of the Root Glacier trail where it splits off from the Bonanza Mine trail. Because of the trail's location on the glacial moraine, disturbance of vegetation can be avoided. It's probable that small amounts of dryas, willow and alder could be impacted.



Exotic plants may find new avenues for invasion of undisturbed areas with the construction of new trails and other facilities. Fill brought in for new construction could result in the introduction and spread of new exotic vegetation seeds. An indirect impact of increased visitation includes the increased possibility for the introduction of exotic plants via seeds which may be carried by boots, tire treads, or other equipment. However, the implementation of an exotic vegetation management plan would direct efforts at containing and controlling the introduction and spread of exotic plant species.

Benefits to vegetation would occur from the fire suppression systems in both the NHL and west side support complex if fires are put out in buildings before they could spread to outside vegetation. Another benefit would be from additional parking facilities, as there would be reduced disturbance of roadside plants from current uncontrolled parking.

Sites for construction of new facilities and installation of new equipment would be surveyed for the presence of rare species of plants prior to ground disturbance. In the event that rare species are positively identified within the area of disturbance, impacts could be mitigated by avoidance. Areas denuded of plants would be restored via passive revegetation.

*Cumulative Impacts* – Overall, the Proposed Action Alternative would have minor, long-term, localized, adverse impacts to vegetation from vegetation clearing and trampling. Implementation of the Proposed Action Alternative would likely contribute minor, long-term, adverse cumulative impacts to vegetation. Combined with known past, current, and future projects and actions, there would be moderate adverse cumulative impacts on vegetation.

*Conclusion* – Overall, the Proposed Action Alternative would have minor, long-term, localized, adverse impacts to vegetation from vegetation clearing and trampling. Implementation of the Proposed Action Alternative would likely contribute minor, long-term, adverse cumulative impacts to vegetation. The level of impact on vegetation from the Proposed Action Alternative would not result in impairment of park resources that fulfill specific purposes identified in the WRST enabling legislation or that are key to the natural and cultural integrity of the park and preserve.

#### **4.4.5 Wildlife**

The construction or installation of new housing in the west side Operations Support Complex, buried propane tanks, well and septic systems, buried water lines, water tanks, water containment structure, vault toilets, trails, and parking lots would cause temporary to short-term displacement of wildlife during periods of construction activity and permanently decrease available wildlife habitat in small, localized areas (minimum 2 acres). The indirect impacts of short-term habitat losses are decreased availability of food and prey species, temporary changes in wildlife distribution, increased competition for food, inefficient use of habitat, and altered movement and activity patterns. Wildlife could be disturbed and displaced by the noise and activity surrounding construction sites for up to eight hours per day for as long as it takes to complete the work (several days to several months). Concentrating human use in wildlife habitat during construction, and subsequently visitor use, could permanently displace some species, but it is unlikely that habitat would be rendered non-functional or that any species' population as a whole

would be extirpated from the area as there would remain many areas that humans do not concentrate in.

Impacts to wildlife from new trails would be primarily behavioral responses to approaching hikers and from habitat alterations, habitat fragmentation, and any habitat loss due to trail construction. Behavioral responses may include flight from approaching hikers, avoidance of trail areas, habituation to humans, association of humans with food, and adjustment of timing to activities such as feeding. Behavioral responses are of short duration, only having an impact while the particular behavior is elicited. However, prolonged or repeated disturbance may lead to long-term or permanent disruptions, particularly if the response disrupts breeding, displaces wildlife from critical resources, reduces rearing success, or alters mortality rates through factors such as predation and defense of life and property (DLP) killings of bears. New trails could also impact wildlife travel corridors, and fragmented habitat could facilitate the encroachment of edge species.

The Proposed Action Alternative could reduce the potential for human-bear conflicts with improved solid waste management. However, increased visitation, which may occur from improved visitor services, could increase bear attractants (food and food odors) and, subsequently, occurrences of human-bear conflicts. If human-bear conflicts increase, the result could be increased direct and indirect injury and mortality of black and brown (grizzly) bears.

*Cumulative Impacts* – The Proposed Action would have minor, long-term, localized, adverse impacts on wildlife and wildlife habitat from disturbance of wildlife and loss of wildlife habitat with construction of new facilities and from possible continued human-bear conflicts. Implementation of the Proposed Action Alternative would likely contribute minor long-term, adverse cumulative impacts on wildlife and wildlife habitat. Combined with known past, current, and future projects and actions, there would be moderate adverse cumulative impacts on wildlife.

*Conclusion* – The Proposed Action would have minor, long-term, localized, adverse impacts on wildlife and wildlife habitat from disturbance of wildlife and loss of wildlife habitat with construction of new facilities and from possible continued human-bear conflicts. Implementation of the Proposed Action Alternative would likely contribute minor long-term, adverse cumulative impacts on wildlife and wildlife habitat. The level of impact on wildlife and wildlife habitat from the Proposed Action Alternative would not result in impairment of park resources that fulfill specific purposes identified in the WRST enabling legislation or that are key to the natural and cultural integrity of the park and preserve.

#### **4.4.6 Cultural Resources**

*Cultural Landscapes* – Under the Proposed Action Alternative, ongoing efforts to stabilize and rehabilitate structures in the NHL that contribute to the cultural landscape would continue, generating a moderately beneficial, long-term impact on the cultural landscape, although with some minor short-term adverse effects from construction activity. Removal of encroaching vegetation and some reduction of visually intrusive elements would further benefit the NHL cultural landscape over the long term. Visually unobtrusive actions, such as storage of materials

in structures that blend with the historic character of the landscape, would be implemented. Burial of above ground storage tanks would further reduce visually intrusive elements.

Under this alternative, NPS would undertake construction and operation of a hydroelectric generation facility, consisting of several structures, on Bonanza or National Creeks as the main source of electrical power (as well as water supply) within the NHL. Most of these facilities would have to be constructed anew, though NPS intends to place the turbine (Pelton wheel) and generator in the historic Power Plant building. Until such time as this could be implemented, NPS would continue to use the diesel generator, which does not fit within the historic context of the area. These elements could detract from the character of the cultural landscape at Kennecott if they are not constructed to blend in or resemble structures from the original power facility. However, if implemented in a culturally sensitive manner, the restoration of a hydroelectric facility would enhance the integrity of the cultural landscape.

Improved initial attack capabilities and a new fire suppression system would highly increase the probability of saving historic wooden structures from fire damage, thus adding beneficial effects to preserving the historic character of the cultural landscape. However, visually intrusive structures associated with the fire suppression system, such as hydrants and water tanks, would detract somewhat from the aesthetics of the cultural landscape.

Construction of new water and electrical distribution utility systems would reincorporate the utilidors in portions of the new utility systems. About 300-700 lineal feet of new utilidors would be constructed to match the historic utilidors. Within the railroad corridor of the Mill Town, 500-2500 lineal feet of new buried utilidors would be constructed. These would help restore the historic appearance of the cultural landscape.

Any new restroom facilities or outhouses and vehicle turnaround that would be located in the NHL could be visually intrusive locally and detract somewhat from the historic character of the landscape.

National Creek trestle rehabilitation would prevent further damage to the NHL's historic resources. Channelizing the creek would reduce its encroachment on cultural resources and benefit the historic character of the cultural landscape.

Outside the NHL, the Proposed Action would have little or no effect on the cultural landscape of McCarthy and the McCarthy Road, but it would seek to preserve the historically important wagon road, rail corridor, and other historic sites.

*Archeological Resources* – Significant archeological resources in the NHL include collapsed buildings, pipelines, large industrial artifacts (e.g. mining equipment, remnant cable, machinery), dumps, and equipment storage piles. Any ground disturbance, such as burial of propane tanks and water lines or drilling of wells could uncover below ground archeological resources. The Proposed Action Alternative would have a negligible impact on the long-term condition of archeological resources in the NHL.

Outside the NHL, the Proposed Action would have no effects on archeological resources.

*Historic Structures and Buildings* – Within the NHL, historic structures include boardwalks, dams, bridges, tram towers, and landscape features such as tailings piles. Of 70 standing buildings in the NHL, 14 major ones have been acquired by NPS; all are constructed of wood and their condition varies from poor to fair. If the NPS could purchase any of the six privately owned historic houses remaining in the NHL, they would be rehabilitated to provide additional employee housing. Ongoing stabilization and rehabilitation activities, which would continue under the Proposed Action, would result in a long-term moderately beneficial impact on historic structures and buildings in the NHL.

Improved initial attack capabilities and a new fire suppression system would highly increase the probability of saving structures from fire damage, thus adding another beneficial impact.

Approximately 300-700 lineal feet of new utilidors would be constructed to match historic utilidors. Within the railroad corridor of the Mill Town, 500-2500 lineal feet of new buried utilidors would be constructed. This actions would restore an integral structure of historic Kennecott.

Outside the NHL, the Proposed Action Alternative would have no effect on historic structures and buildings.

*Cultural Objects, Museum Collections and Archives* – The Proposed Action Alternative would maintain current preservation practices and procedures with regard to artifacts and cultural objects like tools, domestic items, remnants of larger features, wooden pipes, equipment, and machinery parts. Metallic objects would remain stable but wooden objects would continue weathering-related deterioration. Improved initial attack capabilities and a new fire suppression system would highly increase the probability of saving objects, collections, and archives from fire damage.

*Cumulative Impacts* – Past, present, and future actions would all contribute to cumulative impacts on cultural resources in the Kennecott Mill Town NHL. By and large, due primarily to the extensive and intensive ongoing efforts by NPS at building and structure stabilization and rehabilitation, these cumulative cultural resources impacts in the NHL would be moderately beneficial, especially in terms of the cultural landscape and historic structures and buildings.

*Conclusion* – Overall, the Proposed Action Alternative would produce moderately beneficial, long-term, localized, impacts on cultural resources. Relative to the No Action Alternative, the Proposed Action would have a greater positive impact on cultural resources. Implementation of the Proposed Action would likely contribute moderately beneficial, long-term, localized cumulative impacts on cultural resources. The level of impact on cultural resources from the Proposed Action Alternative would not result in impairment of park resources that fulfill specific purposes identified in the WRST enabling legislation or that are key to the natural and cultural integrity of the park and preserve.

#### 4.4.7 Visual Resources

Under the Proposed Action Alternative, broader visual resources in the McCarthy-Kennecott area would remain outstanding. Within the NHL itself, visual resources relate primarily to the cultural-historic character of the Mill Town. Ongoing work to stabilize and rehabilitate deteriorating structures and buildings in the Mill Town would, over the long term, serve to retain the site's visual resources. Reducing vegetation encroachment that now impinges on viewsheds would also improve visual resources in the NHL, by making more structures, and the Mill Town as a whole, more visible. Thus, the Proposed Action would yield moderately beneficial, localized, long-term impacts on visual resources. In the short term, the work itself and the storage and movement of supplies related to it would have localized adverse effects on visual resources. However, under this alternative, efforts would be made to conceal stored equipment and supplies, or otherwise mitigate their visual obtrusiveness, reducing scenic impacts of ongoing construction from minor to negligible.

*Cumulative Impacts* – Some existing, non-contributing, incompatible development in and around the NHL would continue to have a moderately adverse, long-term impact on Kennecott's visual resources. The additional contribution of moderately beneficial, long-term impacts from NPS stabilization and rehabilitation of historic structures would produce a net minor, beneficial cumulative effect on the visual environment.

*Conclusion* – Overall, the Proposed Action Alternative would produce moderately beneficial, long-term, localized, impacts on visual resources. Implementation of the Proposed Action would likely contribute moderately beneficial, long-term, localized cumulative impacts on visual resources.

#### 4.4.8 Visitor Use and Experience

Under the Proposed Action Alternative, facilities and services to accommodate an increasing number of visitors to Kennecott-McCarthy would be expanded. A sign would welcome visitors to the area and information on services and activities would be improved and made more accessible. Incidents of accidental trespass on the patchwork of private property in the area would likely diminish somewhat because of more readily available information about land ownership patterns. The McCarthy Road Information Station along the McCarthy Road west of the Kennicott River would be better identified and made more visible to arriving visitors. Also, NPS would attempt to augment the number of hours the McCarthy Road Information Station is staffed.

Under proposed parking and shuttle arrangements, reaching the NHL from the Kennicott River should no longer be so time-consuming or inconvenient for visitors. The Proposed Action would aim to resolve confusing parking arrangements at the river that have led to conflicts on occasion. Greatly expanded parking at the McCarthy Road Information Station and shuttle service to the west bank of the Kennicott River would facilitate convenient access to the east side of the river, and McCarthy and Kennecott beyond.

Other elements of the Proposed Action, such as partnering to place panel information at the State's fire-wise pavilion west of the bend in the road, development and introduction of a comprehensive sign and wayfinding system, and development of a traveler information system at Long Lake for local AM-FM broadcasting, would also serve to enhance the quantity and quality of information available to visitors.

Constructing a new trail to the NHL that follows the east side of Kennicott River and parallels the Kennicott Glacier, with links to the Root Glacier trail and the walk-in campground, would enhance recreation opportunities for park visitors. If successful, efforts to establish partnerships to maintain existing trails in the area such as Jumbo, Bonanza, and Root Glacier would also be a benefit for visitors, as would placement of more toilets at parking areas, trailheads, and along NHL trails.

Overall, the Proposed Action would certainly improve and enhance the current visitor experience and would aim to meet the various needs of growing visitation to the area. Unlike the No Action Alternative, it could realistically achieve WRST's Mission Goal IIa (*Visitors safely enjoy and are satisfied with the availability, accessibility, diversity, and quality of park facilities, services, and appropriate recreational opportunities*), as well as pursue Mission Goal IIb (*Park visitors and the general public understand and appreciate the preservation of parks and their resources for this and future generations*). Therefore, the Proposed Action Alternative would have moderately beneficial, long-term impacts on visitor use and experience at Kennecott.

*Cumulative Impacts* – The principal outcome of other actions such as the McCarthy Road upgrade, increasing private sector investment in lodging and other tourism ventures, and the new walk-in campground will be to foster growth in the number of visitors coming to McCarthy-Kennecott. The cumulative impact of these actions on visitor use and experience would be moderately beneficial, in that the area does not appear to have reached its theoretical recreational carrying capacity. The Proposed Action would contribute moderately to beneficial cumulative impacts on visitor use and experience by expanding the capacity of facilities and services to meet the needs of more visitors.

*Conclusion* – The Proposed Action Alternative would have a moderately beneficial, long-term impact on visitor use and experience at the Kennecott area of WRST. In addition, it would interact with other ongoing and future actions to generate moderately beneficial, long-term cumulative impacts.

#### **4.4.9 Transportation and Access**

As listed in Section 2.2.10, the Proposed Action would take a number of steps to address transportation-related challenges in the McCarthy-Kennecott area:

- NPS would participate in road maintenance between the NHL and the Kennicott River by means of cooperative agreements with ADOT&PF and local landowners to confront inadequate maintenance and safety issues in this one-lane road segment.
- NPS would work with ADOT&PF to develop intervisible pullouts and other road design features to improve traffic flow and safety.

- The Wagon Road would be marked for visitor and local use, retaining its historic character as a wagon road.
- Shuttle van service to the NHL from the Kennicott River would be increased. NPS would institute Incidental Business Permits for public shuttles entering the NHL and seek to provide subsidies to help support their operation.
- Vehicle parking west of the Kennicott River would be expanded and improved by building a much larger lot at the McCarthy Road Information Station.
- Vehicle parking east of the Kennicott River would include development of new private parking and develop parking for 30 cars on NPS land at the “boneyard” concealed behind the railroad berm.
- Within the Kennecott NHL, NPS would work on developing an MOU with all landowners to clarify and designate where parking could and could not occur.
- A designated turnaround/visitor drop-off would be developed at the Gagnon property above the Dairy Barn.
- NPS would encourage and support bicycle rentals in the McCarthy-Kennecott area.

While the Proposed Action Alternative may not succeed in resolving all transportation issues in the McCarthy-Kennecott area, it would constitute a moderately beneficial, long-term impact on transportation and access.

*Cumulative Impacts* – The most important implications for cumulative transportation-related impacts derive from the proposed McCarthy Road upgrade and other private-sector and NPS investments, all of which would have the net effect of increasing visitation and traffic in the McCarthy-Kennecott area. The former action would improve the McCarthy Road, increase safe travel speeds, enhance interpretive and recreational opportunities, and overall, facilitate greater visitation. NPS work in the NHL and private-sector investment in tourist lodging and outings would also attract more visitors and traffic to the area.

Cumulatively, these other actions would likely result in a long-term, moderately adverse impact on transportation and access in the area. However, because the Proposed Action Alternative focuses on addressing existing and projected transportation-related deficiencies, it should be able to accommodate increasing visitation and traffic in the area while still improving existing transportation-related problems. Overall then, the long-term cumulative impact on transportation of the Proposed Action combined with other actions would be minor and beneficial.

*Conclusion* – The Proposed Action would result in long-term, moderately beneficial impacts on transportation and access in the McCarthy-Kennecott area. Cumulative impacts from other actions by themselves would be moderately adverse and long term. Overall cumulative impacts, combining both the Proposed Action and other actions, would be beneficial, minor, and long term.

#### **4.4.10 Utilities and Related Services**

Under the Proposed Action Alternative, a number of NPS utilities and services would be improved or expanded to meet standards and rising demands:

- NPS would approve the concept of hydroelectric development in Bonanza Creek and authorize more detailed analysis of the engineering aspects and environmental effects of this concept; until any such development occurred, NPS would maintain the existing power supply system (diesel generator and underground lines) within the NHL.
- NPS would expand two existing septic systems in the NHL to handle anticipated increases in visitation and new facilities that would be connected to these systems.
- NPS would develop both a drinking water well and septic system for the Herben Cabin in McCarthy.
- Limited fire suppression capabilities in the NHL would be expanded and improved to safeguard both humans and historic structures from fires.
- NPS would dig two production wells in the NHL to supply drinking water.
- A more comprehensive waste management system would be implemented (ideally in conjunction with the town of McCarthy), beginning with the development of a transfer station at the DNR firewise pavilion.

Overall, these actions would constitute a moderately beneficial, long term impact on utilities and related services in the area.

*Cumulative Impacts* – Rising visitation to the area, encouraged by other actions, would increase the demand for utilities and related services locally. This would constitute a moderately adverse, long-term impact. However, with implementation of the Proposed Action Alternative, it is unlikely that there would be shortages or supply interruptions.

*Conclusion* – The Proposed Action Alternative would result in long-term, moderately beneficial impacts on utilities and related services in the McCarthy-Kennecott area. Cumulative impacts from other actions would be moderately adverse. In combination, the Proposed Action and other actions would probably offset one another, resulting in negligible cumulative adverse impacts on utilities and related services over the long term.

#### **4.4.11 Socioeconomic Environment**

The Proposed Action Alternative would have a minor to moderately beneficial direct effect on the socioeconomic environment of the McCarthy-Kennecott area. It may lead to short-term increases in employment opportunities related to construction projects that would occur under this alternative. This would in turn inject new funds into the local economy from direct and indirect spending on goods and services. Because NPS would aim to provide housing for its own workers and contractors, the Proposed Action would probably not place excessive burdens on housing or other locally provided services. Indirectly, the Proposed Action would result in moderately beneficial long-term impacts for the local community, by furnishing the necessary infrastructure, facilities and services to accommodate projected growth of tourism in McCarthy-Kennecott and visitation to the NHL.

*Cumulative Impacts* – As described elsewhere, other reasonably foreseeable actions would have the net effect of increasing tourism in the area and visitation to the Kennecott NHL. McCarthy residents appear generally supportive of this prospect, provided that it is well planned and provided for and that their concerns are addressed. Thus, cumulatively, these other actions



together would create a moderately beneficial, long-term impact for the socioeconomic environment of the McCarthy community. The Proposed Action would contribute substantially to these long-term, cumulative socioeconomic benefits for the surrounding area.

*Conclusion* – The Proposed Action Alternative would result in long-term, moderately beneficial impacts to the socioeconomic environment of the McCarthy-Kennecott area. When considered in combination with the other actions, the Proposed Action Alternative would add to beneficial cumulative impacts on the socioeconomic environment.

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## 5.0 CONSULTATION & COORDINATION

### 5.1 PUBLIC INVOLVEMENT

NPS kicked off planning for the Kennecott Mines Support Facilities Plan Environmental Assessment in September 2004, by eliciting the input of the local McCarthy-Kennecott community and interested citizens in Anchorage. Advertised public scoping meetings were held in both locations to solicit the public's ideas, concerns, and suggestions. At the September kick-off events local residents and Alaskans provided helpful comments on where they thought employees should be housed, where visitors should camp, how to provide electricity, water and other utilities; they also suggested different ways that construction supplies could be freighted and stored and how run a shuttle system (NPS, 2005f).

Over the winter, the Kennecott planning team utilized these comments to develop a range of alternatives which were presented in a newsletter distributed to the public in April 2005. McCarthy and Anchorage residents once again took the time to evaluate these alternatives and provide input as to which alternatives they preferred at two public meetings held in April.

Several dozen people participated in the scoping meetings and draft alternatives review meetings in McCarthy and Anchorage.

This EA represents the third opportunity for public involvement in the planning process.

Table 5-1 lists the both the preparers of this document and the agencies, organizations, and persons contacted for information. These individuals and organizations assisted in identifying issues, developing alternatives, and analyzing impacts of the alternatives.

**Table 5-1. List of Preparers and Persons and Agencies Contacted**

<b>Person Contacted</b>	<b>Agency/Organization</b>
Dwayne Adams, Landscape Architect	Land Design North, Anchorage
Peter Briggs, Landscape Architect	Land Design North, Anchorage
Geoff Bleakley, Historian	U.S. Department of the Interior (DOI), National Park Service (NPS), Wrangell-St. Elias National Park (WRST), Copper Center, Alaska
Terry Humphrey, Planner	DOI, NPS, Alaska Regional Support Office
Steve Hunt, Environmental Specialist	DOI, NPS, WRST
Ken Hutchison, Kennecott Project Manager	DOI, NPS, WRST
Leon Kolankiewicz, Mangi Project Manager	Mangi Environmental Group, McLean, Virginia
Tim Marshall, Archaeologist	DOI, NPS, WRST
Eveline Martin, Environmental Analyst	Mangi Environmental Group, McLean, Virginia
Marshall Neeck, Kennecott District Ranger	DOI, NPS, WRST
Steve Peterson, Historical Architect	DOI, NPS, Alaska Regional Support Office

Heather Rice, Environmental Protection Specialist	DOI, NPS, Alaska Regional Support Office
Vicki Snitzler, Planner	DOI, NPS, WRST
Will Tipton, Chief of Maintenance	DOI, NPS, WRST
Rebecca Whitney, GIS Specialist	Mangi Environmental Group, McLean, Virginia
Julia Yuan	Mangi Environmental Group, McLean, Virginia

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**APPENDIX A**

**ANILCA Section 810(a)**

**Summary Evaluation and Findings**

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## **ANILCA SECTION 810(a)**

### **SUMMARY EVALUATION AND FINDINGS**

#### **I. INTRODUCTION**

This section was prepared to comply with Title VIII, Section 810 of the Alaska National Interest Lands Conservation Act (ANILCA). It summarizes the evaluations of potential restrictions to subsistence activities which could result from the National Park Service (NPS) proceeding with the development and implementation of a Support Facility Plan for the Kennecott Mines National Historic Landmark in Wrangell-St. Elias National Park. Actions under this plan would support the capacity of NPS to preserve nationally significant historic resources at the former Kennecott Mine and Mill Town as well provide the for safety and enjoyment of an increasing number of visitors to the historic district and neighboring McCarthy, Alaska.

#### **II. THE EVALUATION PROCESS**

Section 810(a) of ANILCA 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 effected 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

(3) 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 to accomplish the purposes of such use, occupancy, or other disposition, and (C) reasonable steps will be taken to minimize adverse impacts upon subsistence uses and resources resulting from such actions."

ANILCA created new units and additions to existing units of the national park system in Alaska. Wrangell-Saint Elias National Park, containing approximately eight million one hundred and forty-seven thousand acres of public lands, and Wrangell-Saint Elias National Preserve containing approximately four million one hundred and seventeen thousand acres of public lands, was created by ANILCA, section 201(9), for the following purposes:

“To maintain unimpaired the scenic beauty and quality of high mountain peaks, foothills, glacial systems, lakes, and streams, valleys, and coastal landscapes in their natural state; to protect habitat for, and populations of, fish and wildlife including but not limited to caribou, brown/grizzly bears, Dall sheep, moose, wolves, trumpeter swans and other waterfowl, and marine mammals; and to provide continued opportunities including reasonable access for mountain climbing, mountaineering, and other wilderness recreational activities. Subsistence uses by local residents shall be permitted in the park, where such uses are traditional, in accordance with the provisions of Title VIII.”

The potential for significant restriction must be evaluated for the proposed action's effect upon "...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."

### III. PROPOSED ACTION ON FEDERAL LANDS

The National Park Service is considering two alternatives for a Support Facility Plan at the Kennecott Mines National Historic Landmark (NHL). A full discussion of the alternatives and their anticipated effects is presented in the attached Environmental Assessment (EA). The alternatives are summarized briefly below with particular attention to subsistence resources.

**No Action Alternative:** Only existing or already planned and approved facilities, infrastructure and services related to NPS operations at Kennecott would occur.

**Proposed Action Alternative:** The NPS would implement a number of actions that would expand its ability to preserve and manage the Kennecott Mines NHL while meeting the needs of a projected increase in the number of visitors to Kennecott and neighboring McCarthy. These actions would expand NPS housing; modify existing construction materials storage arrangements; provide for expanded and reliable energy supply, both for electricity and space heating; increase wastewater treatment capacity; improve fire suppression both to protect human life and irreplaceable historic structures in the NHL; expand the supply and reliability of drinking water; implement more comprehensive solid waste management; significantly augment visitor amenities; reduce the encroachment of National Creek on historic structures within the NHL; and improve transportation infrastructure for the safety and convenience of motorists, pedestrians and bicyclists.

### IV. AFFECTED ENVIRONMENT

A summary of the affected environment pertinent to subsistence use is presented here. The following documents contain additional descriptions of subsistence uses within Wrangell-St. Elias National Park and Preserve:

*General Management Plan/Land Protection Plan, Wrangell-St. Elias National Park and Preserve, NPS Alaska Region, 1986.*

*Final Environmental Impact Statement, Wilderness Recommendation, NPS Alaska Region, 1988.*

*Wrangell-St. Elias Subsistence Management Plan*, NPS Alaska Region, 1998.

Subsistence uses are allowed within Wrangell-St. Elias National Park and Preserve in accordance with Titles II and VIII of ANILCA. The national preserve is open to federal subsistence uses and state authorized general (sport) hunting, trapping and fishing activities. Qualified local rural residents who live in one of the park's 23 designated resident zone communities or have a special subsistence use permit issued by the park superintendent may engage in subsistence activities within the national park. State regulated sport fishing is also allowed in the national park. The proposed action falls within the national preserve, although the Kennecott-McCarthy area is located within approximately 10 kilometers of national park lands to the north and east. Federal subsistence regulations are not applicable to state land, native allotments and other private inholdings in the area.

ANILCA provides a preference for local rural residents over other consumptive users should a shortage of subsistence resources occur and allocation of harvest becomes necessary. This is particularly important for national preserves where State subsistence fishing and hunting is allowed in addition to Federal subsistence fishing and hunting. When the harvest must be limited, State subsistence and general fishing and hunting opportunities must be restricted first before any reduction in the harvest for federal subsistence users occurs.

The park's main subsistence resources are salmon, moose, caribou, Dall sheep, mountain goat, ptarmigan, spruce grouse, snowshoe hare, furbearing animals, berries, mushrooms, and dead and green logs for construction and firewood. Rural residents in the McCarthy-Kennecott area harvest moose, black bear, snowshoe hare, spruce grouse, and blueberries for subsistence purposes. Collection of firewood also occurs.

The NPS 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 considerable from previous years due to weather conditions, migration patterns, and natural population cycles.

## **V. SUBSISTENCE USES AND NEEDS EVALUATION**

To determine the potential impact on existing subsistence activities, three evaluation criteria were analyzed relative to existing subsistence resources which could be impacted.

The evaluation criteria are:

1. the potential to reduce important subsistence fish and wildlife populations by (a) reductions in numbers; (b) redistribution of subsistence resources; or (c) habitat losses;
2. what affect the action might have on subsistence fisher or hunter access;
3. the potential for the action to increase fisher or hunter competition for subsistence resources.

The potential to reduce populations:

Neither the No Action nor the Proposed Action alternatives are likely to have any effect on fish habitat or fish populations, because very little or no proposed work would occur in or next to streams that support fish.

Subsistence wildlife species and habitats would be subjected to minimal potential impacts and disturbances as a result of the actions proposed under both the No Action Alternative and the Proposed Action Alternative. Most construction and development under both alternatives would take place in already developed sites. Under the Proposed Action the total area of existing wildlife habitat permanently impacted would amount to approximately 3-4 acres, which would be used for NPS housing adjacent to the existing Operations Support Complex, an expanded parking lot at the west side McCarthy Road Information Station, and development of the walk-in campground near the McCarthy Airport. For the No Action Alternative, which would provide the additional NPS housing and the walk-in campground, but not the expanded parking lot, the acreage of habitat conversion would be less.

The construction or installation of new housing in the west side Operations Support Complex, buried propane tanks, well and septic systems, buried water lines, water tanks, water containment structure, vault toilets, trails, and parking lots would cause temporary to short-term displacement of wildlife during periods of construction activity and permanently decrease available wildlife habitat in small, localized areas. The indirect impacts of short-term habitat losses are decreased availability of food and prey species, temporary changes in wildlife distribution, increased competition for food, inefficient use of habitat, and altered movement and activity patterns. Wildlife could be disturbed and displaced by the noise and activity surrounding construction sites for up to eight hours per day for as long as it takes to complete the work (several days to several months). Concentrating human use in wildlife habitat during construction, and subsequently visitor use, could permanently displace some species of important for subsistence, but it is unlikely that habitat would be rendered non-functional or that any species' population as a whole would be extirpated from the area as there would remain many areas that humans do not concentrate in.

Impacts to subsistence wildlife from new trails would be primarily behavioral responses to approaching hikers and from habitat alterations, habitat fragmentation, and any habitat loss due to trail construction. Behavioral responses may include flight from approaching hikers, avoidance of trail areas, habituation to humans, association of humans with food, and adjustment of timing to activities such as feeding. Behavioral responses are of short duration, only having an impact while the particular behavior is elicited. However, prolonged or repeated disturbance may lead to long-term or permanent disruptions, particularly if the response disrupts breeding, displaces wildlife from critical resources, reduces rearing success, or alters mortality rates through factors such as predation and defense of life and property (DLP) killings of bears. New trails could also potentially impact wildlife travel corridors, and fragmented habitat could facilitate the encroachment of edge species.

The Proposed Action Alternative could reduce the potential for human-bear conflicts with improved solid waste management. However, increased visitation, which may occur from



improved visitor services, could increase bear attractants (food and food odors) and, subsequently, occurrences of human-bear conflicts. If human-bear conflicts increase, the result could be increased direct and indirect injury and mortality of black bears, which are hunted locally for subsistence.

Overall, mobile wildlife species, including most subsistence species, would avoid any areas undergoing construction activity, and no long-term impact is anticipated. In sum, the proposed alternatives are not expected to significantly alter wildlife movements or reduce populations of important subsistence resources. The amount of potential habitat reduction is quite limited when compared to the overall size of the national park and preserve.

Beyond this, NPS regulations and provisions of ANILCA provide the tools for adequate protection of fish and wildlife populations on federal public lands while ensuring a subsistence priority for local rural residents. NPS regulations allow the superintendent to enact closures, restrictions, or both if necessary to protect subsistence opportunities and ensure the continued viability of particular fish or wildlife populations.

In sum, construction of new facilities planned under the Proposed Action Alternative would remove small amounts of suitable wildlife habitat for species used by local residents for subsistence purposes. However, the habitat loss would not affect local wildlife populations significantly. There would be some loss of berry-bearing vegetation; however, soapberry is not used for subsistence and blueberry is common and widely available in the area.

The effect on subsistence access:

All rights of access for subsistence use on NPS lands are granted by section 811 of ANILCA. Neither alternative discussed in this analysis would have a measurable impact on subsistence access.

The potential to increase competition:

Competition for wildlife or other resources is not expected to significantly impact subsistence users as a result of either the No Action or Proposed Action alternatives. No significant increase in competition for subsistence hunting would be expected from either alternative. Although the Proposed Action Alternative in particular is intended to accommodate increasing visitation to the Kennecott NHL, these visitors would be oriented primarily toward exploration and appreciation of historical and cultural resources in the area, and secondarily toward the wilderness setting and scenery generally, and not toward subsistence hunting opportunities. Any increase in berry picking by recreational visitors over and above the current situation is anticipated to be minimal. Finally, neither alternative would be expected to result in significant growth in the population of residents in the area – and therefore the number of potential subsistence users – at least over the foreseeable future.

National Park Service regulations and ANILCA provisions mandate that if and when it is necessary to restrict taking of fish or wildlife, subsistence users are the priority consumptive users on federal public lands and would be given preference over other consumptive uses

(ANILCA, section 802(2)). Continued implementation of the ANILCA provisions should mitigate any increased competition from resource users other than subsistence users. Therefore, neither alternative is expected to adversely affect resource competition.

## **VI. AVAILABILITY OF OTHER LANDS**

No other lands would satisfy the goal of providing the infrastructure, facilities, and services needed to protect the National Historic Landmark and support NPS operations and visitation to the McCarthy-Kennecott area. All of the sites proposed for construction and improvements are either in or adjacent to already developed areas or located at sites selected to minimize their impacts (like the walk-in campground). Siting the proposed developments at more distant, less disturbed locations would likely result in greater impacts than building in and next to existing developed sites. Additionally, other federal public lands both within and outside of the park and preserve are available for subsistence.

## **VII. ALTERNATIVES CONSIDERED**

The EA and this evaluation have described and analyzed the No Action and Proposed Action alternatives. These alternatives are consistent with NPS mandates and the General Management Plan for the park and preserve. No other alternatives that would reduce or eliminate the use of public lands needed for subsistence purposes were identified. It is possible for subsistence users to utilize other lands inside and outside the park and preserve. Subsistence users extend their activities to other areas as necessary to obtain subsistence resources.

## **VII. FINDINGS**

This analysis concludes that neither the No Action Alternative nor the Proposed Action Alternative will result in a significant restriction of subsistence uses.