



Alaska District
U.S. Army Corps of Engineers

Date: Feb. 3, 2016 Identification No. ER-16-02
Please refer to the identification number when replying.

Environmental Resources Section

Public Notice

Environmental Assessment and Finding of No Significant Impact Recurring Lowell Creek Diversion Tunnel Repairs Seward, Alaska

The U.S. Army Corps of Engineers (Corps) is proposing to restore optimum function to the Lowell Creek Tunnel Diversion structure by executing repairs identified in the Corps' Lowell Creek Tunnel Operations and Maintenance Letter Report dated August 2015.

Repairs and maintenance would involve the removal of accumulated debris, repairing and filling scours and gouges with high strength silica-fume concrete; removing and replacing rails and rock anchors; and reapplication of concrete to surfaces to the tunnel intake, discharge flume, and the tunnel itself.

Information on the proposed action and anticipated environmental effects are discussed in an environmental assessment (EA) and unsigned Finding of No Significant Impact (FONSI), which are available for public review and comment at the following Corps' website: <http://www.poa.usace.army.mil>. Click on the "Reports and Studies" button and look under "Documents Available for Review, Operations and Maintenance." The comment period will close 30 days from the date of this notice. All comments received on or before this date will become part of the official record. The FONSI will be signed upon review of comments received and resolution of significant concerns.

Please send electronic comments to Michael.B.Rouse@usace.army.mil. Written comments may be sent to the following address:

U.S. Army Corps of Engineers, Alaska District
ATTN: CEPOA-PM-C-ER (Rouse)
P.O. Box 6898
Joint Base Elmendorf-Richardson, Alaska 99506-0898

No public meeting is scheduled for this action. If you believe a meeting should be held, please send a written request to the above address during the 30-day review period explaining why you believe a meeting is necessary.

Please contact Mr. Michael Rouse of the Environmental Resources Section via his email address above, phone (907-753-2743), or write to him at the Corps' address if you would like additional information concerning the proposed project.

A handwritten signature in black ink, appearing to read "Michael Noah".

Michael Noah
Chief, Environmental Resources Section



**US Army Corps
of Engineers**
Alaska District

Environmental Assessment and Finding of No Significant Impact

Recurring Lowell Creek Diversion Tunnel Repairs Seward, Alaska



February 2016

Finding of No Significant Impact

In accordance with the National Environmental Policy Act of 1969, as amended, the U.S. Army Corps of Engineers, Alaska District (USACE) has assessed the environmental effects of the following action:

Recurring Lowell Creek Diversion Tunnel Repairs Seward, Alaska

This action has been evaluated for its effects on several significant resources, including fish and wildlife, wetlands, threatened or endangered species, marine resources, and cultural resources. No significant short-term or long-term adverse effects were identified.

This Corps action complies with the National Historic Preservation Act, the Endangered Species Act, the Clean Water Act, the Magnuson-Stevens Fishery Conservation and Management Act, and the National Environmental Policy Act. The completed environmental assessment supports the conclusion that the action does not constitute a major Federal action significantly affecting the quality of the human and natural environment. An environmental impact statement is therefore not necessary for the USACE project at Lowell Creek diversion tunnel, Seward, Alaska.

Michael S. Brooks
Colonel, U.S. Army
District Engineer

Date

**Environmental Assessment
Recurring Lowell Creek Diversion Tunnel Repairs
Seward, Alaska**

1. Purpose and Need

Lowell Creek is a glacier-fed stream that runs approximately 3 miles through a steep, talus-strewn canyon at the head of Resurrection Bay on the Kenai Peninsula in the City of Seward, Alaska. Extensive damage resulting from catastrophic flooding of Lowell Creek has occurred since Seward's founding in 1903. In 1917, flooding from Lowell Creek washed away the town's one-room schoolhouse and damaged or destroyed a number of private homes, as well as causing significant damage to newly-built railroad facilities. In 1918, flooding from Lowell Creek destroyed the local hospital. In response to constant flooding, a 1927 Alaska Railroad project constructed an intake dam and timber flume down what is now Jefferson Avenue in order to contain Lowell Creek and its debris flow (Figure 1). The flume and associated structures required constant maintenance to counter the excessive sediment loads of Lowell Creek, and in 1935, succumbed to debris deposition and flooding. (Seward/Bear Creek Flood Service Area Report, 2010).



MOUTH OF LOWELL CREEK, FLUME, AND SEWARD TOWNSITE, AUGUST 1936.

Figure 1. Historic condition of Lowell Creek, 1936

The Lowell Creek flood control project, as authorized by the Flood Control Act of 1936 (Public Law 74-738), was authorized by Congress as a United States Army Corps of Engineers (USACE) project on August 25, 1937. Construction began in 1939 and was finalized in 1940. Currently, the entire surface flow of Lowell Creek is diverted through a 2,068-foot-long concrete-lined, steel-rail reinforced tunnel through Bear Mountain, where it is then subsequently discharged via elevated spillway and flows beneath Lowell Point Bridge into Resurrection Bay (Figure 2).

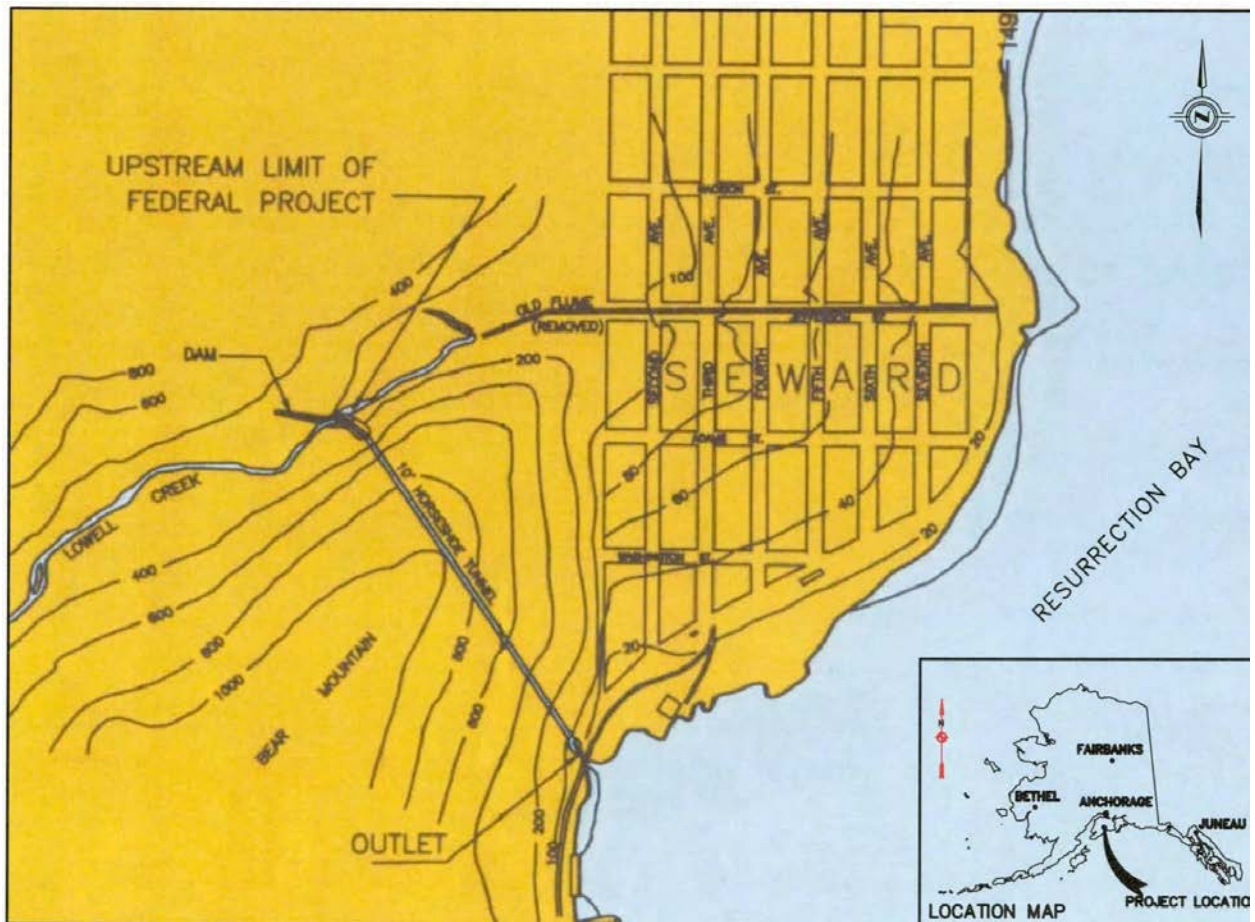


Figure 2. Lowell Creek diversion and tunnel through Bear Mountain.

Since completion of the original project in 1940, periodic repairs to the project have been required due to damages from continual wear or high flow events. The first comprehensive repair of the diversion and tunnel structure took place in 1945; similar repair efforts were conducted in 1968, 1980, 1984, 1988, 1991, and 2003. Inspections subsequent to the 2003 maintenance effort have noted incremental wear and damage associated with its years of service since last repair. The concrete lining of the tunnel has degraded, and the steel reinforcing rails have been exposed and/or damaged. Further damage could lead to malfunction or blockage.

2. Alternatives Considered

2.1 No Action Alternative

The No Action alternative would defer the maintenance to the Lowell Creek diversion and tunnel. However, this alternative would not reduce reasonably perceived impacts to the environment. Rather, it would increase the overall risk to the environment by increasing the probability of a catastrophic failure of the Lowell Creek diversion structure. Because the diversion has been so effective in mitigating impacts of Lowell Creek flooding events within the City of Seward, infrastructure in the original flood plain has increased, and impacts to the downstream human and natural environment would be extensive should the diversion fail or become blocked.

2.2 Tunnel Repair Alternative

The proposed action would restore optimum function to the Lowell Creek Tunnel Diversion by executing repairs identified in USACE's Lowell Creek Tunnel Operations and Maintenance Letter Report (USACE 2015). The method and timing of repairs are proposed to be done as they have in the past: diverting wintertime surface flows (all other seasonal surface flow rates are prohibitive to this project) above the tunnel intake structure into either the existing Jefferson Avenue storm drain or utilizing appropriate piping through the tunnel itself. Tunnel repair would commence after surface flows have been directed away from the working area. Repairs and maintenance would involve the removal of accumulated debris, repairing and filling scours and gouges with high strength silica-fume concrete, removing and replacing rails and rock anchors, and reapplication of concrete to surfaces to the tunnel intake, discharge flume, and tunnel itself. Repair activities are expected to last approximately 4 months but are subject to weather conditions, which could delay or extend the timing of this project. Previously cleared/heavily disturbed lay-down facilities in the immediate vicinity of the project area would be utilized for material and equipment storage. The Alaska District, USACE proposes to enact necessary repairs to the tunnel during the period of January to April, 2017.

3. Project Setting and Existing Conditions

The Gulf of Alaska coast of the Kenai Peninsula has relatively mild winters and cool summers; mean winter lows range from 0 to 20 °F, while mean highs in the summer are below 60 °F. The Lowell Creek drainage basin comprises a 4.1-square-mile area within the in the Kenai Mountain range, which lies along the south-central coast of Alaska (Figure 3). Seward averages 71.8 inches of annual precipitation that peaks in September at 10.4 inches (U.S. Climate Data 2016). Elevation varies within the Lowell Creek basin from 300 feet at the diversion tunnel entrance to 4,000-foot mountain peaks. Lowell Creek's gradient above the diversion structure is approximately 1,000 feet per mile, and exhibits no defined pools or slack areas of surface water. There are no tributaries to the creek; however, very steep mountain drainage slopes indicate nearly sheet flow over solid rock into the main stream (ACOE 1978). Historical water quality measurements for this site are exceedingly sparse, with only one formal measurement on record in the USGS database (USGS 1992). Lowell Creek produces significant debris during flood conditions, once generating an estimated 10,000 cubic yards of debris in an 11-hour timeframe

(Seward/Bear Creek Flood Service Area Report, 2010). The Lowell Creek alluvium is a prominent land feature in Resurrection Bay, and the creek's current depositional potential is apparent at the diversion discharge site where the new alluvium protrudes into the bay.

Significant portions of Seward's modern infrastructure are built upon the alluvium deposited by Lowell Creek, and Jefferson Avenue currently exists in Lowell Creek's historic channel (Figure 2). The successful diversion of Lowell Creek in 1940 has played an exceptional role in providing the stability required to conduct long-term city planning and infrastructure improvements in Seward. The USACE is unable at this time to calculate the long-term beneficial impact that the implementation of the Lowell Creek diversion and tunnel has had on the population and infrastructure of Seward.

The diversion dam across Lowell Creek Canyon is approximately 400 feet long, with a maximum height of 25 feet. The dam, designed to divert water into the tunnel, was not designed to impound water for long periods. The core is rock-filled; the 1 vertical to 2 horizontal (1V:2H) downstream slope is protected by a grouted rock face, and the 1V:1H upstream slope is faced with a reinforced concrete slab.

The spillway is an uncontrolled weir with a discharge capacity computed to be 1,700 cubic feet per second. The downstream side of the dam at the spillway has a 1V:3H grouted rock face. The spillway is a 40-foot-long section of the dam with crest elevation approximately 4 feet below the adjacent top of the dam.

The 10-foot-high, horseshoe-shaped tunnel is 2,068 feet long, constructed on a grade of 4.2 percent. A sharp drop at the intake transition accelerates the water to a velocity of about 43 feet per second to facilitate debris passing through the tunnel. The tunnel is lined with concrete throughout. The floor was originally armored with 40-pound railroad rails welded to the channel cross ties embedded in the basic floor. Spaces between rails were filled with concrete during subsequent tunnel repairs. The tunnel capacity, with the water surface at the spillway crest and flow calculated for debris, has been computed to be 2,350 cubic feet per second.

The tunnel exits to a trapezoidal concrete flume 10 feet wide at the bottom and 109 feet long. The flume invert is 67 feet above mean lower low water in Resurrection Bay, which allows for the accumulation of debris that is carried through the tunnel. The flume exits over a near-vertical rock cliff. At the toe of the cliff, the debris forms a creek channel, which continues about 500 feet to tidewater. A two-lane bridge crosses the channel about 100 feet from the toe of the mountain. Debris from the flume is a continuous maintenance problem at the bridge during high flows, often burying the bridge and flooding nearby facilities

Lowell Creek tunnel repairs, as proposed, are limited in their footprint to the Lowell Creek diversion structure, tunnel, and discharge flume. Immediately adjacent, previously disturbed, and/or built up facilities would be utilized as lay-down sites for equipment and material storage.

Specific maintenance actions are outlined in the USACE 2015 Operations and Maintenance Letter Report for the Lowell Creek Tunnel, Seward Alaska (USACE 2015).

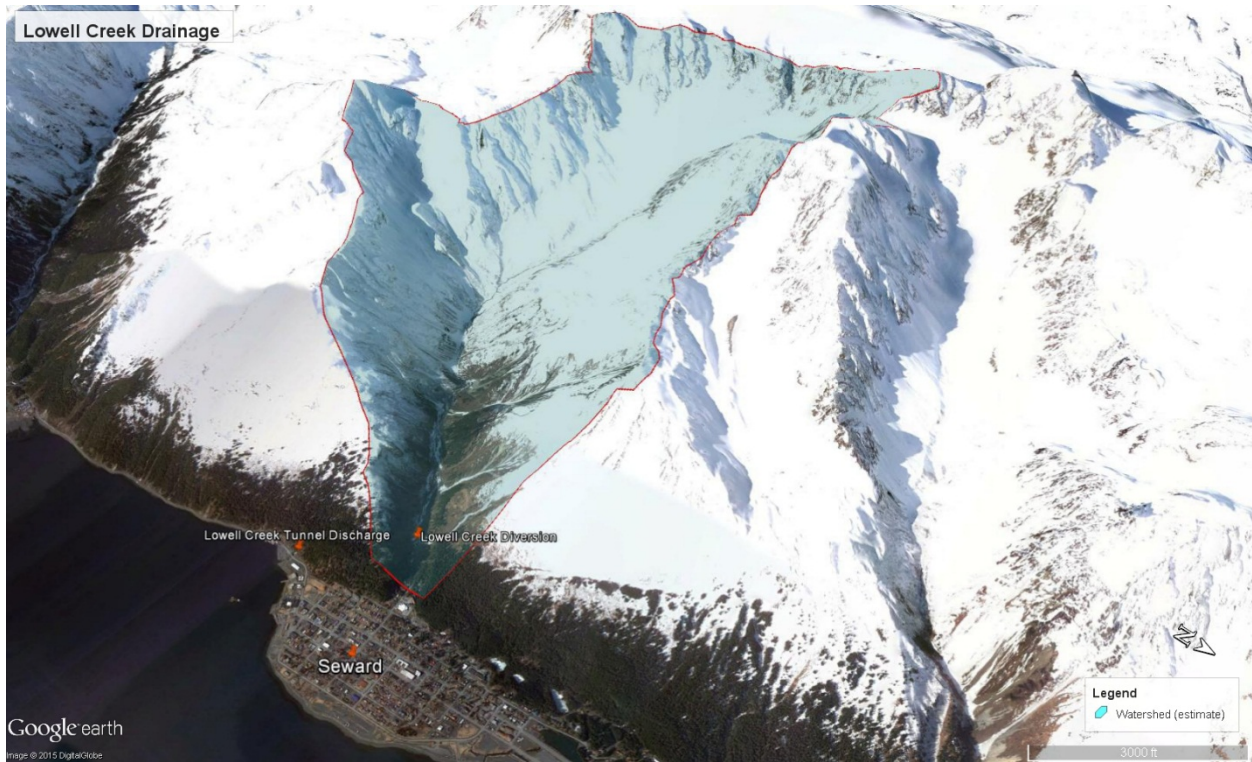


Figure 3. Lowell Creek watershed in relation to Seward.

4. Affected Environment and Environmental Consequences

4.1 Socio-Economics

The City of Seward has a population of approximately 2,768 as of 2014 (ADCRA 2016). Repair activities to the Lowell Creek diversion dam, tunnel, and flume discharge structure represent a considerable beneficial impact to Seward. The current standard of living would be maintained; properties and various other social values would be protected by these repairs. There would be no adverse human health or environmental effects, nor would there be any concern regarding impacts associated with the protection of children from environmental health and safety risks.

4.2 Hydrogeology

The USACE is reasonably confident that no effects resulting from the maintenance activities would alter the current hydrogeological baseline of the Lowell Creek drainage basin.

4.3 Water Quality

The USACE has evaluated its proposed project under the authority of Nationwide Permit #3: Maintenance, which authorizes the repair, rehabilitation, or replacement of any previously authorized, currently serviceable structure, or fill as authorized by 33 CFR 330.3, provided that the structure or fill is not to be put to uses differing from those uses specified or contemplated for it in the original permit or the most recently authorized modification. Minor deviations in the structure's configuration or filled area, including those due to changes in materials, construction techniques, requirements of other regulatory agencies, or current construction codes or safety standards that are necessary to make the repair, rehabilitation, or replacement are authorized.

4.4 Vegetation and Wetlands

Current vegetative characteristics for the Lowell Creek watershed are little different than previously described in 1978: “approximately 30% of the upland drainage exhibits vegetative cover, and is comprised of low growing alders, small shrubs, and isolated patches of scrub conifers” (ACOE 1978). The area beneath the discharge flume to the point where Lowell Creek’s surface waters meet Resurrection Bay is devoid of vegetation. Flushing flow frequency and discharge velocities in this section are sufficient to preclude vegetation establishment. The USACE has considered the likelihood of this project to impact wetlands within the context of Executive Order 11990, Protection of Wetlands. The USACE concludes that no impacts to vegetation or wetlands are reasonably expected to occur during the proposed project maintenance period or as a result of the project itself. The project footprint is restricted to the diversion dam, tunnel, and discharge flume where no wetland vegetation exists.

4.5 Anadromous Waters and Essential Fish Habitat

The USACE is unable to determine the historic presence and/or distribution of fishes in the Lowell Creek drainage prior to the construction of the diversion structure. The diversion tunnel and associated discharge infrastructure that have existed since the project’s completion in 1940 represent a complete barrier to anadromy. Lowell Creek and its diverted waters are not characterized as anadromous waters by the Alaska Department of Fish and Game’s Anadromous Waters Catalog (ADFG 2016)

The USACE has considered the potential of this project to impact Essential Fish Habitat (EFH) as considered within the context of the Magnuson-Stevens Fishery Conservation and Management Act [Section 305 (b), 16 USC 1855]. The waters of Resurrection Bay are designated as EFH under the Fishery Management Plans for groundfish of the Gulf of Alaska and for the Salmon Fisheries in the Exclusive Economic Zone Off Alaska. Proposed repairs to Lowell Creek diversion dam, tunnel, and discharge flume will not affect the quality of the receiving waters of Resurrection Bay, and will not adversely affect EFH. Potential impacts to EFH are negated by the timing and the nature of the work itself; concrete repairs conducted during the wintertime, low-flow period will have cured by the time flows are sufficient to transport scouring debris through the Lowell Creek tunnel and supporting infrastructure.

4.6 Protected Species

4.6.1 Threatened and Endangered Species

Resurrection Bay is known to support differing populations of threatened and endangered species, as well as various marine mammals (NMFS 2016) (USFWS 2016):

- Steller sea lion, Western Distinct Population Segment (endangered)
- Humpback whale (endangered)
- Fin whale (endangered)
- North Pacific right whale (endangered)
- Sperm whale (endangered)
- Short-tailed albatross (endangered)

The only species listed above with designated critical habitat in the vicinity of the proposed project location is the Steller sea lion. Critical habitat has been designated as the 20-nautical-mile aquatic zone surrounding a haulout site in the Chiswell Islands (approximately 59.60°N, 149.59°W) (USFWS 2016). As delineated by USFWS 2016, the outer extent of this designated critical habitat occurs approximately 12 miles immediately due south of Lowell Creek.

No threatened or endangered species are known to occur within the area of the project footprint (NMFS 2016, USFWS 2016). Furthermore, threatened or endangered species occurring in the downstream receiving waters of Resurrection Bay will not be affected by habitat degradation as a result of this project. Maintenance and repair activities are relegated to the winter-time, low-flow period of Lowell Creek's hydrograph. This project, as proposed, does not affect federally threatened or endangered species or their respective habitats.

4.6.2 Marine Mammals

Marine mammals that occur in Resurrection Bay that are not listed under the ESA but protected under the Marine Mammal Protection Act (MMPA) include harbor seal, northern fur seal, Dall's porpoise, harbor porpoise, Pacific white sided dolphin, gray whale, killer whale, minke whale, and northern sea otter (NMFS 2016).

The Lowell Creek diversion tunnel discharges 20 meters above Resurrection Bay at a point approximately 100 meters from tidewater. Marine mammals are not reasonably expected to utilize the fresh surface waters below and between the Lowell Creek discharge flume and the point where they meet Resurrection Bay. The USACE has evaluated the potential of this project to impact marine mammals within the context of the MMPA (16 USC 1361-1423h) and concludes that although marine mammals are, or may be present in the downstream, receiving waters of Resurrection Bay, the project, as proposed, would not alter the existing baseline hydrology of Lowell Creek, nor would its execution increase sediment loading or turbidity, or introduce contaminants into Resurrection Bay, and would have no effect upon marine mammals.

4.6.3 Bald and Golden Eagles

Bald eagles are frequently observed in the area of Resurrection Bay. Along with golden eagles, they receive special conservation status under the Bald and Golden Eagle Protection Act. Bald eagles in Alaska initiate courtship and nest-building behaviors in January and February, and generally, September through January is considered the non-nesting period (USFWS 2016b).

The schedule for repair activities at Lowell Creek is of great importance, and work must be conducted during the lowest portion of the hydrograph to ensure safe and appropriate working conditions. Although eagle courting and nest-building occurs during the same time period as the proposed repairs to the Lowell Creek tunnel, the USACE does not believe that repair actions will have a negative impact upon these behaviors based upon the size of the project footprint and the overall nature of the work to be conducted. No vegetation removal or intentional disturbances to immediately adjacent habitat are planned.

4.7 Birds

Although the southern Kenai Peninsula is replete with resident and migratory bird species, birds and their nests are not reasonably expected to be encountered in the area of the project footprint (the diversion dam, tunnel, and discharge flume). Wintertime working constraints offset potential overlap, as many migratory species would not be expected to over-winter in such a climate and/or depauperate habitat setting.

The USACE has considered the potential of this project to impact birds within the context of the Migratory Bird Treaty Act (16 U.S.C. 703-712; Ch. 128; July 13, 1918; 40 Stat. 755, and as amended). Because the maintenance effort is limited to the areas of the diversion dam, tunnel, and discharge flume, and compounded by the winter timing requirements for this maintenance effort, impacts upon migratory and/or resident birds, their nests, and their foraging activities are not reasonably expected to occur. Some resident bird species may utilize structural areas associated with the diversion dam and/or discharge flume to perch or roost during the projected maintenance period, but are more likely to avoid active construction disturbances either temporally or spatially.

4.8 Cultural Resources

Although no prehistoric sites are recorded in the proposed project footprint, the Lowell Creek diversion tunnel is listed in the Alaska Historic Resources Survey (AHRS) database. The AHRS site card, No. SEW-0011, states that the Lowell Creek diversion tunnel has a period of significance ranging between 1937 and 1940.

In 1977, SEW-0011 was nominated for the National Register of Historic Places. SEW-0011 was nominated under Criterion C for portraying exemplary characteristics for the time and place. The Lowell Creek diversion tunnel was constructed to replace unsatisfactory earlier flood protection works that had so deteriorated by 1937 as to constitute a further community menace and to solve a flood problem dating from the 1900's that threatened the original townsite of Seward. It was USACE's first complete flood control project in Alaska.

On November 13, 2015, the Alaska State Historic Preservation Officer concurred with the USACE's assessment that no historic properties would be adversely affected by the proposed maintenance actions at the Lowell Creek tunnel and diversion structure.

4.9 Air Quality

The EPA National Ambient Air Quality Standard for PM10 is 150 µg/m³ for a 24-hour period. According to the EPA air quality index, the highest PM10 concentration (54 µg/m³) recorded during a 2011-2012 monitoring effort in Seward would be categorized as “good air quality” (Seward 2012). Seward is not in or near a “non-attainment”, “maintenance”, or Class I area (as defined by the Clean Air Act). Gaseous or particulate degradation to the immediate air quality resulting from preparatory and maintenance activities associated with the proposed project would not contribute to, or violate any existing standard, and would rapidly return to ambient conditions.

4.10 Cumulative Impacts

Federal law (40 CFR 651.16) requires that NEPA documents assess cumulative effects, which are the impact on the environment resulting from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions.

Infrastructure expansion within the flood plain of the historic Lowell Creek drainage is a reasonably foreseeable action associated with the flood risk security that an optimally functioning Lowell Creek diversion tunnel presents. Future maintenance and construction that is outside the scope of this EA will be separately evaluated for its constituent impacts per the National Environmental Policy Act.

5. Literature Cited

ACOE 1978:

Lowell Creek Dam, AK00060 Seward, Alaska; Phase I Inspection Report National Dam Safety Program; Prepared by: Alaska District U.S. Army Corps Of Engineers; For: State of Alaska and City of Seward; Date: November 1978.

ADCRA 2016:

<https://www.commerce.alaska.gov/dcra/DCRAExternal/community/Details/326d957a-dc0c-4e28-9406-fc2c89a68cef>

ADFG 2016: <http://www.adfg.alaska.gov/sf/SARR/AWC/index.cfm?ADFG=interactive.home>

NMFS 2016: National Marine Fisheries Service ESA and MMPA Mapper:

<https://alaskafisheries.noaa.gov/mapping/esa/>

Seward, 2012:

Seward PM₁₀ Air Monitoring Program January 2011 to May 2012 Final Report, Alaska Department of Environmental Conservation, Air Quality Division, Air Monitoring and Quality Assurance Program.

<https://dec.alaska.gov/air/am/projects&Reports/Seward%20PM10%20Air%20Monitoring%20Program%20Jan%202011-%20May%202012%20Final%20Report.pdf>

Stauffer, C., 2010. Learning To Live With Water: A History of Flooding in Seward, Alaska. 1903-2009. Seward/Bear Creek Flood Service Area.

USACE 2015: USACE 2015 Operations and Maintenance Letter Report for the Lowell Creek Tunnel, Seward Alaska

U.S. Climate Data: Accessed January, 2016.

<http://www.usclimatedata.com/climate/seward/alaska/united-states/usak0216>

USFWS 2016: United States Fish and Wildlife Service IPaC, Information for Planning and Conservation: <http://ecos.fws.gov/ipac/>

USFWS 2016b: Alaska Region – Eagle Permit Guidelines:

http://www.fws.gov/alaska/eaglepermit/guidelines/baea_nhstry_snstvtty.htm

USGS 1992:

http://nwis.waterdata.usgs.gov/ak/nwis/qwdata/?site_no=15238500&agency_cd=USGS&inventory_output=0&rdb_inventory_output=file&TZoutput=0&pm_cd_compare=Greater than&radio_parm_cds=all_parm_cds&format=html_table&qw_attributes=0&qw_sample_wide=wide&rdb_qw_attributes=0&date_format=YYYY-MM-DD&rdb_compression=file&submitted_form=brief_list