

Environmental Assessment

for

Watershed Enhancements at Joint Base Elmendorf-Richardson

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Acronyms and Abbreviations

°C	degrees Celsius
°F	degrees Fahrenheit
673d	673d Air Base Wing
AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
ADF&G	Alaska Department of Fish and Game
Air Force	U.S. Air Force
AQCR	air quality control regions
CEQ	Council on Environmental Quality
CES	Civil Engineering Squadron
CFR	Code of Federal Regulations
CIBW	Cook Inlet beluga whale (endangered)
DRO	diesel range organics
DWLOC	drinking water level of concern
EA	Environmental Assessment
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Endangered Species Act
ESCP	Erosion and Sediment Control Plan
FONPA	Finding of No Practicable Alternative
FONSI	Finding of No Significant Impact
JBER	Joint Base Elmendorf-Richardson
KMnO ₄	potassium permanganate
MOA	Municipality of Anchorage
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NRHP	National Register of Historic Places
OPlan	JBER Plan 19-3
POA	Port of Anchorage
ppb	parts per billion
RYFO	Resumption of year-round firing opportunities
SOP	standard operating procedure
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service

**FINDING OF NO SIGNIFICANT IMPACT/
FINDING OF NO PRACTICABLE ALTERNATIVE**

NAME OF PROPOSED ACTION

Watershed Enhancements at Joint Base Elmendorf-Richardson (JBER), Alaska.

DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

The U.S. Air Force's (USAF) 673d Civil Engineering Squadron (CES) is proposing to conduct watershed and fishery enhancement activities in the Otter Creek and Sixmile Creek watersheds at JBER.

The Proposed Action in the Otter Creek watershed includes: 1) eliminating northern pike (*Esox Lucius*) from Otter Lake via gill netting and application of the piscicide rotenone; and 2) restocking the lake with rainbow trout (*Oncorhynchus mykiss*). Alternatives considered for achieving the desired objectives at Otter Lake include limitless pike angling, gill netting and/or electrofishing in combination with restocking Otter Lake with anadromous fish. The No Action Alternative would allow invasive northern pike to continue to inhabit Otter Lake.

The Proposed Action in the Sixmile Creek watershed includes removing the existing fish ladder at the Lower Sixmile Lake outlet and replacing it with a modified stream channel design to facilitate fish passage. Alternative fish ladder designs were considered for achieving the desired objectives at Lower Sixmile Lake, but all were considered inferior to a natural roughened channel design for longevity, aesthetic value, and effectiveness in passing salmon species of all age classes. The No Action Alternative would leave the current Lower Sixmile Lake fish ladder in place and unchanged.

The Phase II Option includes additional enhancements in the Otter Creek watershed, based on the efficacy of pike eradication efforts under the Proposed Action at Otter Lake. Phase II activities include stocking Otter Lake with coho salmon (*Oncorhynchus kisutch*), removing/modifying physical barriers impeding anadromous fish passage between Eagle River and Otter Lake. The design of the step-pools would be determined at a later time, but prior to implementation of the Phase II Option. However, the nature of the work would be similar to the proposed reconfiguration for Sixmile Creek in that there would be construction in the creek channel at the location where fish pass into another part of the system (i.e., near the weir). Additional NEPA analysis would be required if the design of the Otter Creek step-pools may result in potential impacts that exceed the scope of analysis in this EA. The No Action Alternative would preclude the selection of the Phase II Option.

SUMMARY OF ENVIRONMENTAL CONSEQUENCES

The Environmental Assessment (EA) assesses the potential environmental consequences from implementing the Proposed Action (Otter Creek and Sixmile Creek Watershed Enhancements), Phase II Option (optional activities), and the No Action Alternative. This EA is incorporated by reference into this FONSI and FONPA. Based on existing information and subject to the potential need for additional NEPA analysis, the EA demonstrates that the Proposed Action and Phase II Option would not result in significant adverse impacts to environmental resources with the implementation of mitigation discussed below. A summary of resources with potential environmental consequences for the action alternatives and associated mitigation measures is presented below.

Threatened and Endangered Species

Direct or indirect adverse impacts to the endangered Cook Inlet beluga whale (CIBW) from the Proposed Action at Otter Lake are not expected. Rotenone deactivation measures would be employed to the Creek to prevent lethal concentrations of rotenone beyond the largest beaver dam on Otter Creek and reaching downstream areas where CIBW prey species are present. If CIBWs did consume prey species that survived the treatment, naturally occurring gastrointestinal enzymes would neutralize the rotenone. Indirect impacts could benefit CIBWs by reducing pike predation on CIBW prey species. The Proposed Action at Sixmile Creek would benefit CIBWs by enhancing anadromous fish productivity in the system. The Phase II option would benefit CIBWs by increasing the availability of CIBW prey species.

Fish and Wildlife

The Proposed Action at Otter Lake is intended to eradicate invasive northern pike and will involve lowering the lake prior to the application of rotenone. Lowering the lake will consist of removing boards from weir structure at the outfall of Otter Lake and/or pumping water into Otter Creek from the lake. Dewatering the upstream pond near the back end of Otter Lake will also need to occur and this will be conducted by slowly releasing water from the beaver dam resulting in waterflow into the lake where it will continue to be released into Otter Creek. It is anticipated that all fish in the lake at the time of the treatment will be killed, including incidental species other than pike. Fish- or invertebrate-eating birds and mammals may experience a temporary reduction in food sources from Otter Lake, and may consume dead or dying fish after the initial rotenone treatment. There is no indication that this temporary reduction results in any significant impacts to most bird or mammal populations. The action of lowering the water surface will result in exposure of the shallow vegetated shoreline and retreat of any fish inhabiting those areas into the deeper portion of the lake. Lowering the lake level will minimize the chance of pike escaping or avoiding the rotenone treatment, maximizing its effectiveness. The lake would remain lowered for the remainder of the winter so that any fish that may have escaped to shoreline pool areas (and evaded the treatment) do not survive the winter. It is likely that pike already inhabit the creek; however, if not, pike migrating into the creek increases the chances of their movement further downstream, potentially impacting prey species for creek-dependent fish and wildlife. Permits will be obtained from Alaska Department of Natural Resource prior to lowering the lake and applying rotenone.

The Proposed Action at Sixmile Creek will benefit anadromous fish populations in the Sixmile system by increasing the likelihood of smolt passage from Sixmile Creek into the lake.

The Phase II Option includes removal of physical barriers to anadromous fish passage. Beaver dam removal can negatively affect fish and fish habitat. by dewatering the upstream pond that exists near the back end of Otter Lake, stranding fish, loss of existing fish habitat created by the beaver dams, and releasing sediment and large volumes of water (potentially devoid of oxygen in winter) downstream. The resulting sedimentation from the ground disturbance that would occur within the channel in addition to fish and fish habitat impacts are anticipated to be temporary impacts that would ultimately lead to improved fish habitat. Beavers would likely have to be either relocated or eradicated to prevent rebuilding of the dams.

Fish passage could be temporarily affected during the implementation of the Proposed Action by diverting flows during creek reconfigurations and lowering Otter Lake; however, these actions are intended to improve fish passage under the Proposed Action and the Phase II Option.

Soils, Vegetation and Wetlands

The Proposed Action at Otter Lake may affect vegetation in littoral areas, as project personnel may be required to walk on and temporarily flatten some plants. Potential impacts to wetlands could result from changes in hydrology related to the Otter Lake water level drawdown prior to rotenone application. Emergent wetlands that fringe the lake would experience the largest changes in hydrology, and would likely exhibit the biggest impacts. Emergent vegetation is

dependent on the water column for physical and chemical support and will likely senesce in its absence. Freezing of emergent vegetation and its soil would also likely cause widespread mortality. Shrub/scrub wetlands and forested wetlands would experience a smaller change in hydrology and are expected to experience only minor vegetation mortality. Changes in soil chemistry would be temporary. Wetland vegetation mortality would also be short term, and is expected to recover over time.

Impacts from the Proposed Action at Sixmile Creek from construction activities include removal/modification of streambed material and streambank vegetation and soils in order to realign and grade the channel downstream of the fish ladder (to be removed). These impacts to Sixmile Creek and its floodplain are unavoidable, because the nature of the Proposed Action is intended to change this portion of the creek in order to improve fish passage. No major adverse impacts to Lower Sixmile Lake are expected from the Proposed Action.

The Phase II Option may result in the loss of a small wetland area created by the largest beaver dam if the dam is removed. However, the positive effects from removal of physical barriers, and beavers, as well as the introduction of coho salmon, from an ecological perspective, are expected to outweigh the potential adverse impacts from the loss of the small wetland area.

Water Resources

Water resource impacts from the Proposed Action at Otter Lake are not expected to be more than minor and short term. Concentrations of rotenone used for fish management are well below water quality levels considered toxic for human ingestion. In the event that either rotenone or rotenolone, a metabolite of rotenone, persists, fish stocking should be delayed until residues have declined to nondetectable levels. Potassium permanganate would be utilized to prevent lethal dose of rotenone migrating beyond the largest beaver dam on Otter Creek. Lowering the lake level, thereby increasing Otter Lake outflow, could potentially result in ponding on the upstream side of the Otter Lake Road culvert; this could be avoided or minimized by lowering the weir and releasing the lake water over a specified period of time. Temporary, minor impacts to the floodplain of Otter Creek may result from the drawdown of Otter Lake, but no long-term impacts are expected.

The Proposed Action at Sixmile Creek may cause minor impacts to water quality as a result of construction activities. These impacts are unavoidable and temporary, and will be mitigated through adherence to the JBER Erosion and Sediment Control Plan (ESCP) and other regulatory requirements.

The Phase II Option could negatively affect water quality by removing beaver dams and releasing sediment and large volumes of water downstream. These impacts would be mitigated to the extent possible through method selection and close coordination with regulatory agencies. Temporary, minor impacts to the floodplain of Otter Creek may result from the removal of the beaver dams, but no long-term impacts are expected.

Air Quality

The application of liquid rotenone formulations is sometimes associated with an aroma (similar to the smell of mothballs). This smell may last for several days, depending on air and water temperatures and wind direction. These air quality effects are temporary, and have shown no adverse health effects. Objectionable odors may also occur as a result of decaying wetlands, vegetation, and fish; however, the area immediately surrounding Otter Lake is not densely populated, and is typically used only by recreationists.

Temporary impacts as a result of the Proposed Action at Sixmile Creek may include airborne dust and noise disturbance. Activities will be conducted under the provisions of an ESCP, and fugitive dust mobilized as a result of construction is not expected to have long term effects.

Cultural Resources

Potential impacts from the Proposed Action and Phase II Option would not adversely affect known cultural resources. Known sites include an Alaska Native site in the vicinity of Otter Lake, a site of unknown origin located near the lower reach of Otter Creek, upstream of where Otter Creek enters the Eagle River flats, and two homestead sites associated with along the lower portion of Sixmile Creek. It is presently undetermined whether these sites are eligible for listing in the National Register of Historic Places (NRHP). Project personnel will be instructed to avoid these sites during implementation of the Proposed Action and Phase II Option.

Ground disturbing activities would occur in the Sixmile Creek channel (Proposed Action) as well as the Otter Creek channel (Phase II Option). Although the areas surrounding the location of the Proposed Action may have been previously disturbed, the ground disturbing work would involve areas that have not been surveyed as well as areas not previously disturbed (i.e., in the creek channels). The federally-recognized Eklutna Native Village and Knik Tribe have identified concerns regarding the possibility of Alaska Native burials located on JBER.

Section 106 consultation under the National Historic Preservation Act (NHPA) is ongoing and no ground disturbing activities will occur prior to completion of consultation. However, the application of rotenone will not involve ground disturbing activities and known historic and Alaska Native sites would be avoided. The application of rotenone would not affect known or unknown cultural resources. Due to the short window of time in the year when rotenone can be applied to Otter Lake, JBER has determined no adverse effects to cultural resources by implementing this portion of the Proposed Action despite the ongoing Section 106 consultation for the Proposed Action and Phase II Option as a whole. For maximum effectiveness, the application of rotenone needs to occur in the fall because of the optimal temperature and light conditions. Additional NEPA analysis may be required for potential impacts to presently unknown cultural resources that may be discovered during the planned archeological surveys, which could be affected by ground disturbing activities.

Recreation

Minor, if any, temporary adverse effects to the health and safety of recreationists are expected from the Proposed Action at Otter Lake, although certain recreational activities may be temporarily impacted. Informational signs could be posted for recreationists visiting the lake, and recreationists would be able to utilize other nearby JBER lakes for any activities that might be restricted at Otter Lake.

The Proposed Action at Sixmile Creek is not expected to affect existing recreational uses for any period beyond construction activities. Removal of the fish ladder and reconfiguration of the channel immediately downstream will impact the Watchable Wildlife platform, as it will be removed during construction. The platform will be replaced after construction, and the more natural aesthetics of the new stream channel configuration could be considered a positive effect. Recreational activities could be impacted if construction activities at the fish ladder require or result in lowering of the lake surface; however, any impacts are expected to be temporary and minor. Other JBER lakes are available for most recreational activities – except floatplane and motorized boat use. Impacts to these users could be minimized by posting informational signs informing user groups of expected dates of activity restrictions.

Aesthetics and Visual Resources

Temporary impacts from the Proposed Action at Otter Lake may include the visibility of dead or decaying fish for up to 4 days after the rotenone treatment, as well as the potential for dead and/or dying vegetation along the shoreline of the lake that will be exposed during the period of lowered water surface. Dead fish will be collected and disposed on a daily basis until the lake freezes, or until no fish are visible. Sixmile Creek immediately downstream from Lower Sixmile Lake will experience temporary aesthetic and visual resource impacts as a direct result of the Proposed Action. The Watchable Wildlife platform will be removed during construction, and the creek will be rerouted to facilitate reconfiguration and grading of the channel. Removal of the existing fish ladder and reconfiguration to the meandering channel design is expected to enhance the visual experience of the area.

The Phase II Option may result in dead and dying vegetation from removal of the beaver dams downstream from Otter Lake that will be visible along the banks of the creek (in the beaver pond areas). However, these locations are not located along any major trails or viewing areas and are expected to recover over time.

MITIGATION

Threatened and Endangered Species. (1) Rotenone deactivation measures would be employed to prevent rotenone from being lethal in downstream areas where CIBW and their prey species exist, below the largest beaver dam. It is anticipated that specific requirements for monitoring would be established through the application for state and federal permits that are required for rotenone application as well as the required Pesticide Discharge Management Plan and Treatment Plan. The Proposed Action will adhere to future requirements set forth by permitting authorities.

Fish and Wildlife. (1) During the drawdown of Otter Lake, there would be a controlled release of water into Otter Creek over a specified time period to reduce the potential for flooding downstream. This would also tend to slow the release of sediment and other dam material that exists near the beaver dams so that adverse impacts on downstream invertebrate and fish communities are minimized. (2) Prior to removal of beaver dams in Otter Creek (Phase II Option), gill netting would be employed a minimum of one time after the rotenone application to ensure that pike are eradicated from Otter Lake. These activities would be coordinated with the ADF&G and any other appropriate regulatory agencies. (3) As explained in Section 2.5 of the EA, additional agency coordination may be required. In addition, a Special Purposes permit (50 CFR 21.27) may be required from the U.S. Fish and Wildlife Service for potential impacts to

migratory birds that may result from scavenging dead pike along the banks of Otter Lake as well as draining of Otter Lake, which may support some bird species. (4) Dead pike that may result on the banks of Otter Lake will be picked up on a regular basis to minimize potential impacts to scavenging birds and to avoid attracting bears to the project site in increased numbers.

Cultural Resources. (1) As part of ongoing Section 106 consultation, an archaeological survey will be conducted prior to ground disturbing activities at both Sixmile Creek and Otter Creek (Phase II Option) due to the potential to contain unknown cultural resources. Any mitigation identified in future consultations, e.g., the NHPA, would be incorporated into the Proposed Action and Phase II Option. Implementation of the Proposed Action at Sixmile Creek and the Phase II Option would not occur until the surveys are completed and the reports reviewed by the State Historic Preservation Office. Further NEPA analysis may be warranted if potential impacts to cultural resources exceed the scope of the analysis presented in the attached EA. (2) Project personnel will be instructed to avoid known sites during implementation of the Proposed Action and Phase II Option. (3) Any digging, clearing, trenching, or other ground disturbing activity that has the potential to uncover prehistoric or historic archeological resources will be conducted in a manner that allows for work stoppage if cultural resources are discovered. If human remains are encountered, work will stop and notification procedures would proceed under JBER policy on the Inadvertent Discovery of Human Remains.

Other Permits: As explained in Section 2.5 of the EA, additional agency coordination may be required. Any mitigation identified in such permits would be incorporated into the Proposed Action and/or the Phase II Option. All identified mitigation measures will be implemented as part of the project. In the event that additional potential impacts are discovered during the permitting processes, additional NEPA analysis may be warranted for impacts that exceed the scope of analysis in the attached EA.

CONCLUSIONS

Finding of No Significant Impact

Based on the analysis presented in the EA conducted in accordance with the requirements of the National Environmental Policy Act, the Council on Environmental Quality regulations, and 32 CFR 989, *et seq.*, and after careful review of the potential impacts, implementation of the Proposed Action and the Phase II Option would not result in significant impacts to the quality of the human or the natural environment. Implementation of mitigation identified above would reduce potential impacts to Threatened and Endangered Species, Fish and Wildlife and Cultural Resources to less than significant levels. Therefore, a Finding of No Significant Impact is warranted, and an Environmental Impact Statement is not required for this action. However, further NEPA analysis may be required based on the results of Section 106 consultation under the NHPA as well as the actual design of the step-pools at Otter Creek.

Finding of No Practicable Alternative

Pursuant to Executive Order (EO) 11990, *Protection of Wetlands*, and EO 11988, *Floodplain Management*, if a federal government agency proposes to conduct an activity in a wetland or floodplain, it will consider alternatives to the action and modify its actions, to the extent feasible, to avoid adverse effects or potential harm.

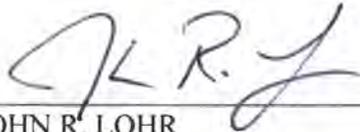
Wetlands. In consideration of the above information, there is no practicable alternative to implementing the Proposed Action in minimizing potential harm to wetlands near Otter Lake

because the site specific conditions at Otter Lake and Otter Creek warrant specific measures. Temporary loss of wetland vegetation at Otter Lake is anticipated during the drawdown of Otter Lake and permanent loss of a small wetland along Otter Creek is anticipated under the Phase II Option during the removal of one of the beaver dams. Affecting these wetlands is unavoidable but the Proposed Action and Phase II Option are anticipated to result in overall beneficial impacts to the watershed as compared to existing conditions.

Floodplains. Similarly, there is no practicable alternative to implementing the Proposed Action at Sixmile Creek and Otter Creek (under the Phase II option) because the site specific conditions warrant specific measures. The removal of the beaver dams (Phase II Option) and modification of the stream channels (Proposed Action and Phase II Option) seek to facilitate fish passage. Work within the floodplain is unavoidable but is anticipated to result in overall beneficial impacts to the watershed as compared to existing conditions.

DECISION

JBER has decided to proceed with Rotenone application at Otter Lake, part of the Proposed Action for the Otter Creek watershed enhancements. Upon completion of Section 106 consultation, the remainder of the Proposed Action and the Phase II Option may occur subject to appropriate NEPA analysis. All work will be completed subject to relevant mitigation measures and permit requirements.



JOHN R. LOHR
Colonel, USAF
Director, Installations and Mission Support

7/3/2013

Date

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1.0 PURPOSE AND NEED FOR THE PROPOSED ACTION

1.1 INTRODUCTION

The U.S. Air Force (Air Force) 673d Air Base Wing (673d) Civil Engineering Squadron (CES) manages natural resources on Joint Base Elmendorf-Richardson (JBER), and is proposing to conduct watershed and fishery enhancement activities in the Otter Creek and Sixmile Creek watersheds (**Figures 1 and 2**). JBER is located near Anchorage, Alaska, and is the home of the Air Force's Alaskan Command, 11th Air Force, Alaskan North American Air Defense region, and the 673d, as well as U.S. Army Alaska.

The Otter Creek watershed, which flows into Eagle River, has seen increasing northern pike (*Esox lucius*) populations and decreasing quality of anadromous fish spawning habitat. These factors have resulted in diminished capacity to support a fully functioning anadromous fish system. Northern pike predation has essentially eliminated all salmonids in Otter Lake. In addition to the absence of salmonids in Otter Lake, physical barriers downstream impede anadromous fish movement within the creek and prevent access to the lake. The culvert conveying the stream beneath Otter Lake Road, the lake level control structure (weir) at the lake outlet, and at least three beaver dams act as physical barriers in the Otter Creek/Otter Lake system.

The Sixmile Creek watershed, adjacent to the Otter Creek watershed, drains directly into Knik Arm southwest of Eagle River. The creek was dammed in two locations to create Upper and Lower Sixmile Lakes. The existing fish ladder configuration at the Lower Sixmile Lake outlet subjects salmon fry to predation by black-billed magpies (*Pica hudsonia*), and restricts salmon smolts access into the lake.

Proposed activities at Otter Lake are aligned with the Alaska Department of Fish and Game (ADF&G) *Management Plan for Invasive Northern Pike in Alaska* (SANPCC, 2006), as well as JBER *Integrated Natural Resource Management Plan* (JBER, 2011) objectives. Activities at Sixmile Creek are being conducted as wetland and habitat mitigation for the Port of Anchorage (POA) expansion, which resulted in adverse impacts to anadromous fish habitat and wetlands. These activities are consistent with JBER's responsibilities under Section 7(a)(1) of the Endangered Species Act (ESA). JBER is directed under Section 7(a)(1) of the ESA to utilize their authorities to carry out programs for the conservation of threatened and endangered species. The Proposed Action and Phase II Option are offered for the benefit of the endangered Cook Inlet beluga whale (CIBW).

The health of anadromous fish populations is important to the regional ecology of Cook Inlet, particularly with respect to the endangered Cook Inlet beluga whale (CIBW) (*Delphinapterus leucas*). Anadromous fish populations that utilize, or have historically utilized, the Otter Creek and Sixmile Creek systems are among those listed as key prey species for CIBW.

1.2 BACKGROUND

The 673d CES is proposing to undertake watershed enhancement activities in the Otter Creek and Sixmile Creek watersheds, located in the northwestern portion of JBER between the mouth of Eagle River and the Elmendorf Air Force Base airfield. The Proposed Action will provide mitigation for wetlands and habitat impacts caused by POA expansion activities including gravel extraction, road construction, and wetland filling. The anadromous fish systems in these watersheds have also been impacted by both natural and constructed physical barriers and predation. The Proposed Action is aligned with goals defined in the JBER Integrated Natural Resource Management Plan (2011).

The Otter Creek and Sixmile Creek watersheds are important to the overall ecology of Knik Arm and Cook Inlet, particularly with respect to the health of the endangered CIBW. The Designation of Critical Habitat for CIBW determined primary prey species to include Pacific salmon – Chinook (*Oncorhynchus tshawytscha*), sockeye (*Oncorhynchus nerka*), chum (*Oncorhynchus keta*), and coho (*Oncorhynchus kisutch*); Pacific eulachon (*Thaleichthys pacificus*); Pacific cod (*Gadus macrocephalus*); walleye Pollock (*Theragra chalcogramma*); saffron cod (*Eleginus gracillis*); and yellowfin sole (*Limanda aspera*) as essential to species conservation (76 Federal Register [FR] 69, 2011). Many of these species utilize, or have historically utilized, the Otter Creek and Sixmile Creek drainages. Due to illegal introductions and subsequent dispersal, northern pike are found in several Cook Inlet watersheds including the Susitna River Basin, the Anchorage Area, and watersheds on the Kenai Peninsula. Northern pike are native north and west of the Alaska Range, but do not naturally occur in Southcentral Alaska. The proliferation of northern pike outside of its native range has become a significant fisheries management concern, as pike are voracious predators and prey heavily on juvenile salmonids. Outside its native range, pike have the potential to interfere with ecosystem function and destroy economically and socially important fisheries.

Baseline benthic macroinvertebrate and zooplankton sampling was conducted in the summer of 2011 to document existing taxa and populations prior to rotenone treatment. Baseline field water quality parameters including temperature, dissolved oxygen, pH, nitrate, conductivity, alkalinity, and total phosphorous were also collected.

1.2.1 Otter Creek Watershed

The Otter Creek watershed (Figures 1 and 2) is a tributary to Eagle River. Otter Lake is a recreation area serving both military and civilian residents of Anchorage. A military recreational development has been maintained on the west side of the lake since the 1950s. The spring-fed stream flowing into Otter Lake enters an historic channel of Eagle River and flows north into the lake. The creek outflows from the lake through a weir, continues to the north and into the Eagle River flats, Eagle River, and ultimately Knik Arm.

Otter Creek has been dammed below the lake by beavers since the 1960s. There are currently at least three known beaver dams along the creek between the lake and the Eagle River flats (**Figure 3**). The largest of the three dams is approximately 8 to 9 feet high, and acts a physical barrier to anadromous fish, impeding adult salmon from moving upstream and entering the lake.

Fish that are able to bypass the beaver dams and move upstream then encounter the culvert conveying the creek beneath Otter Lake Road, which has insufficient flow depth for fish passage. The weir itself acts as an effective velocity barrier, further impeding fish from entering the lake.

Otter Lake was treated with rotenone in 1973 to remove a large population of three-spined stickleback (*Gasterosteus aculeatus*) which were infected with a tapeworm and in heavy competition with rainbow trout (*Oncorhynchus mykiss*) for food (Davis, 1973). No information is available on the results of this effort, but it is assumed to have been acceptably effective, because the lake recovered and functioned as a robust anadromous system until the illegal introduction of northern pike around 2000 (POA, 2011).

ADF&G ended its decades-long rainbow trout stocking program in Otter Lake with its last stocking in 2006, when it determined that the northern pike were consuming the majority of the stocked fish. Coho salmon are common spawners in the Eagle River system and are found in Otter Creek below the furthest-downstream beaver dam. Sockeye salmon are also found in the Eagle River system, nearby Sixmile Creek, and Fish Creek on the north side of the inlet. Sockeye and coho pioneers would be expected to reach Otter Lake if physical barriers are removed.

1.2.2 Sixmile Creek Watershed

The Sixmile Creek watershed (Figures 1 and 2) encompasses approximately 1,770 acres and is fed by up to 30 springs. The creek was dammed in two locations in 1951, creating two road crossings and Lower and Upper Sixmile Lakes. The original stream channel is visible in the shallow waters of the lakes.

A fish ladder was constructed at the Lower Sixmile Lake outlet sometime in the 1970s or 1980s to allow anadromous fish access into the Sixmile Lake system. The Lower Sixmile Lake water surface is approximately 42 inches above Sixmile Creek at the lake outlet. The current steep-pass fish ladder at the outlet is perched and extends beyond a concrete spillway (**Figure 4**). While adult salmon and trout can negotiate the ladder, it serves as a velocity barrier for most juvenile salmon and small trout. Additionally, the existing configuration exposes juvenile fish to aerial predation by birds. Black-billed magpies are commonly observed preying on fry as they attempt to swim up the concrete apron of the spillway.

Two studies were conducted in the early 2000's by Tracey Gotthardt with the Alaska Natural Heritage Program. Gotthardt's first study, "Inventory and Mapping of Sixmile Lakes Sockeye Spawning Habitat on Elmendorf Air Force Base, Alaska", found 18 key spawning sites within the Sixmile Lakes. Of the 18 spawning sites, 13 were found in Upper Sixmile Lake and the remaining 5 were found in Lower Sixmile Lake. In Gotthardt's 2003 study, "Limnological and Fishery Investigations Concerning Sockeye Salmon Production in Sixmile Lakes, Elmendorf Air Force Base, Alaska", found that both the Upper and Lower Sixmile Lakes have a high productivity potential. Gotthardt suggest that Upper Sixmile Lake is slightly more productive than Lower Sixmile Lake due to higher concentrations of dissolved oxygen. Gotthardt compared her study to Rothe et al. 1983 study and found that little has changed in 20 years in regards to the limnological data.

Since Gotthardt's smolt survey in 2003, JBER has continued to annually survey the out migrating smolt from the Sixmile Lakes; although it has been sporadic. This survey typically starts mid-May and continues until the end of June. The cumulative average for the out migrating smolt is 12,744. With the highest number of out migrating smolt in 2012 at 23, 644 and the lowest smolt numbers in 2010 at 4,037.

1.3 PURPOSE AND NEED

1.3.1 Otter Creek Watershed Enhancements

The purpose of the Proposed Action in Otter Lake is to eradicate northern pike and restore the system to a healthy and productive fishery. The Proposed Action is needed because invasive northern pike predation has decimated salmonid fish species in the Otter Creek watershed. The Proposed Action is necessary not only to enhance fish productivity in the system, but also to minimize the potential for northern pike to migrate out of the system and into other nearby Cook Inlet watersheds.

1.3.2 Sixmile Creek Watershed Enhancements

The purpose of the Proposed Action at Lower Sixmile Lake is to improve fish passage from Sixmile Creek into Lower Sixmile Lake, a primary spawning system for sockeye and coho salmon and an over-wintering location for sockeye and coho salmon fry, by removing the existing fish ladder at the lake outlet to Sixmile Creek and replacing it with a more effective fish-passage system. The Proposed Action is needed, because the height of the existing fish ladder connecting Lower Sixmile Lake to Sixmile Creek is such that small fish (e.g., trout and salmon smolt) passage is inhibited.

Improved fish passage between the Sixmile system and Cook Inlet will benefit the salmon population affected by the POA expansion, primarily those smolt and adult fish that pass through the POA area. Out-migrating smolt are believed to exit the mouth of Eagle River and travel near shore downstream through the POA site. Adult salmon are believed to travel primarily along the south shore of Knik Arm, through the POA site, as they return to Eagle River. This project has the potential to substantially benefit the CIBW by increasing the availability of one of their primary prey species, coho salmon. The improved fish passage will also benefit sockeye salmon, rainbow trout, and all species that benefit from healthy salmonid habitat. The Proposed Action is expected to benefit all lifecycle stages of coho salmon, sockeye salmon, and resident rainbow trout populations in the Sixmile Creek system.

1.3.3 Phase II Option – Additional Otter Creek Watershed Enhancements

The purpose of the Phase II Option is to further improve the health and productivity of the fishery in the Otter Creek watershed by augmenting salmon production and facilitating fish passage into Otter Lake. The Phase II Option is dependent upon implementation of the Proposed Action and would not be implemented unless the Proposed Action is implemented, specifically, the eradication of pike from Otter Lake.

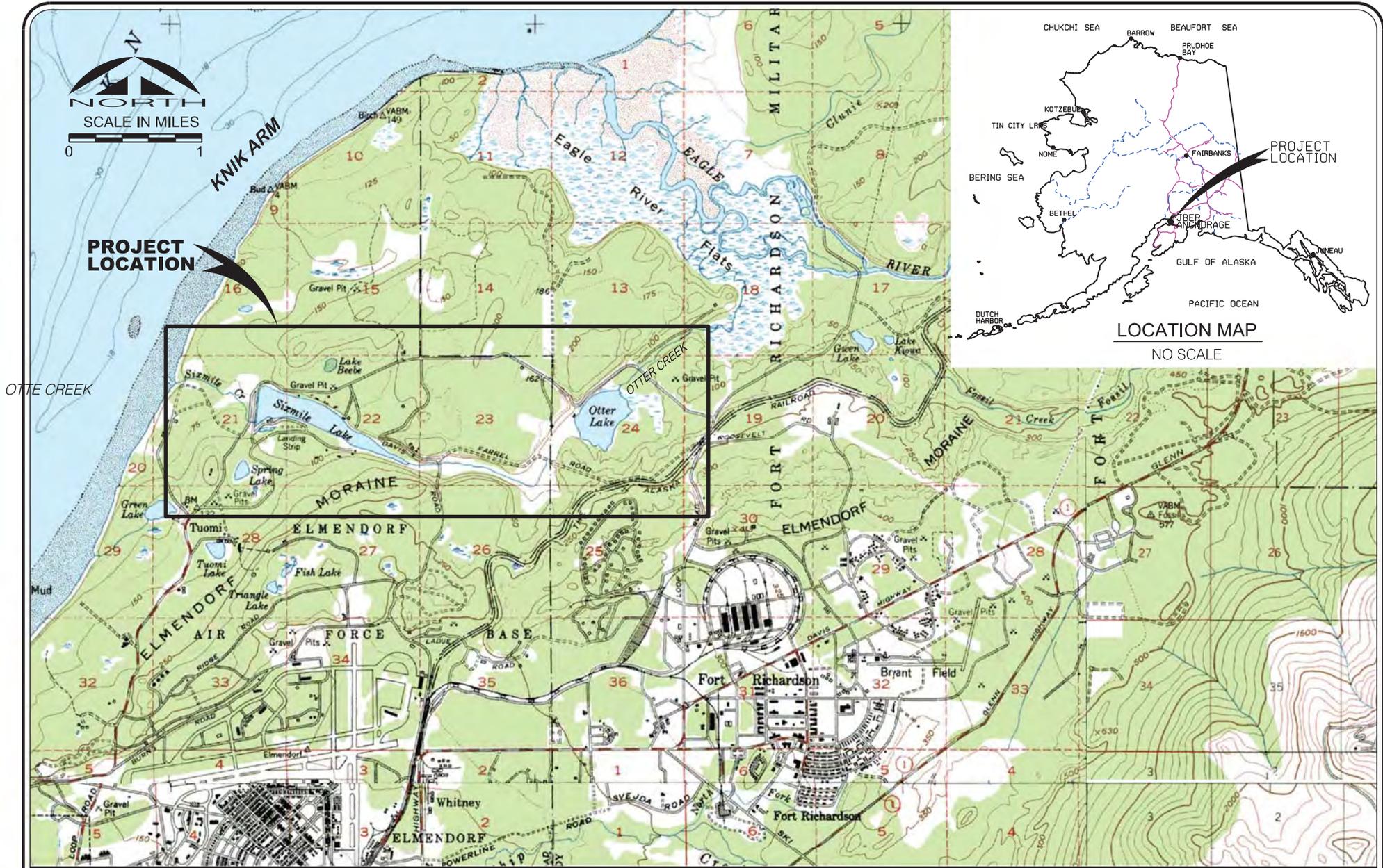


FIGURE 1

JOINT BASE ELMENDORF - RICHARDSON, 673d CIVIL ENGINEERING SQUADRON WATERSHED ENHANCEMENT ENVIRONMENTAL ASSESSMENT

LOCATION AND VICINITY MAP

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FIGURE 2

JOINT BASE ELMENDORF - RICHARDSON, 673d CIVIL ENGINEERING SQUADRON
WATERSHED ENHANCEMENT ENVIRONMENTAL ASSESSMENT

SITE MAP

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NOTE:
PHOTOS TAKEN DECEMBER 2011.

FIGURE 3

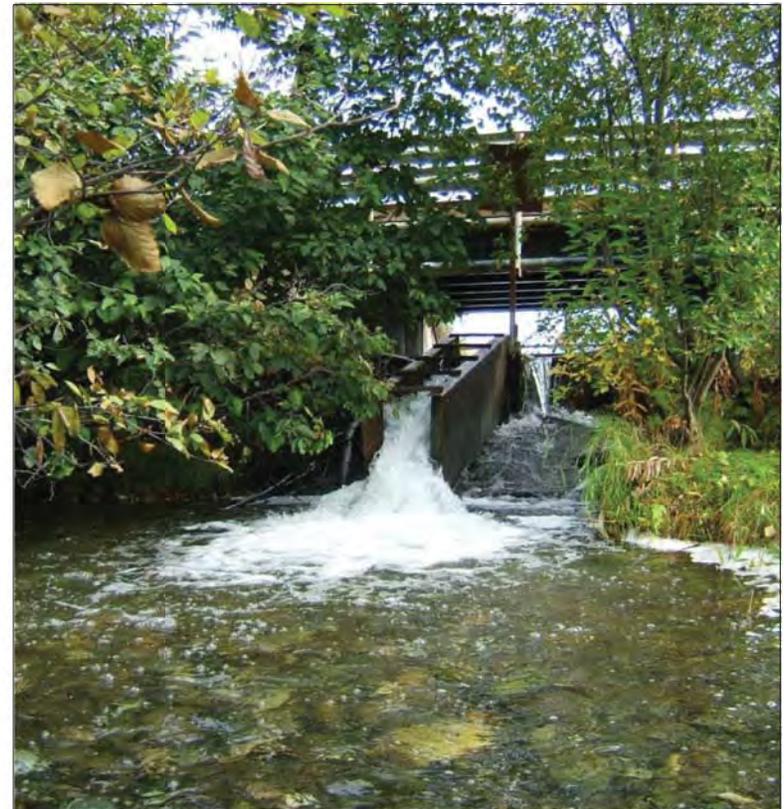
JOINT BASE ELMENDORF - RICHARDSON, 673d CIVIL ENGINEERING SQUADRON
WATERSHED ENHANCEMENT ENVIRONMENTAL ASSESSMENT

OTTER CREEK PHYSICAL BARRIERS

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EXISTING SIXMILE CREEK FISH LADDER
(UPSTREAM VIEW)



EXISTING SIXMILE CREEK FISH LADDER
(DOWNSTREAM VIEW)



FIGURE 4

JOINT BASE ELMENDORF - RICHARDSON, 673d CIVIL ENGINEERING SQUADRON
WATERSHED ENHANCEMENT ENVIRONMENTAL ASSESSMENT

SIXMILE CREEK EXISTING FISH LADDER

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2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

2.1 PROPOSED ACTION

The Proposed Action includes both the Otter Creek and Sixmile Creek Watershed Enhancements. The Otter Creek watershed enhancements include: 1) eliminating northern pike from Otter Lake via gill netting and application of the piscicide rotenone; and 2) restocking the lake with rainbow trout. The Sixmile Creek watershed enhancements include removing the existing fish ladder at the Lower Sixmile Lake outlet and replacing it with a modified stream channel design to facilitate fish passage.

2.1.1 Otter Creek Watershed Enhancements

Rotenone Background Information

Rotenone is used as a piscicide to eradicate targeted fish species from water bodies. Rotenone is a naturally-occurring substance derived from the roots of tropical plants in the bean family Leguminosae. Rotenone is very insoluble in water; other materials can be added to disperse it throughout the water column in deep lakes and flowing waters. Rotenone is used either as a powder from, ground-up plant roots or extracted from the roots and formulated as a liquid. The liquid formulations contain dispersants and emulsifiers (primarily naphthalene, methylnaphthalenes, and xylenes) that add little, if any, toxicity but disperse the rotenone throughout the water (Finlayson et al., 2010). All animals including fish, insects, birds, and mammals have natural enzymes in the digestive tract that neutralize rotenone when ingested orally. Fish (and some forms of amphibians and aquatic invertebrates) are more susceptible because the rotenone is absorbed directly into the bloodstream through the gills, and prevents oxygen in the blood from being utilized during respiration. Although rotenone has some toxicity to all oxygen-breathing animals, it is selective to fish and other gill-breathing organisms at the concentrations used for fish eradications. In general, most common aquatic invertebrates are less sensitive than fish to rotenone. Some types of zooplankton (cladocerans and copepods) are equally sensitive, but can survive the treatment during some life stages. Snails and clams are quite tolerant. Shad (*Alosa* spp.), pike, trout, and salmon are among the most sensitive fish species. The risk of terrestrial animal mortality is considered low since there are not likely to be rotenone residues on terrestrial animal forage items (Finlayson et al., 2010).

Typically, it takes less than 30 minutes for rotenone to affect small fishes, but may require several hours to kill larger fish. Water treated with rotenone is usually nontoxic to fish within 2 weeks of application, depending on sunlight exposure, water temperature, and alkalinity. The optimal temperature for rotenone application to remove the target fish is 70 degrees Fahrenheit (°F). Otter Lake is typically 40°F to 50°F in the fall when the rotenone application is planned, thus the retention and degradation times will be extended.

Chemical deactivation using potassium permanganate (KMnO₄) is the standard method for rotenone neutralization. The effectiveness of neutralization is measured by the ability of caged fish (i.e., sentinel fish) to survive in water downstream from the 30-minute KMnO₄ contact zone. Generally, sentinel fish are placed above the point of KMnO₄ injection and at the end of the 30-

minute contact zone. KMnO_4 is toxic to fish at relatively low concentrations and is more toxic in alkaline water than soft water. However, if KMnO_4 concentrations are in balance with rotenone concentrations, then toxic levels of KMnO_4 are reduced through the oxidation of organic components and rotenone (Finlayson et al., 2010).

Gill Netting

Prior to the rotenone application effort, the Otter Lake weir would be lowered so that the water level would go down over a period of 1 to 2 weeks. The objective is to lower the lake surface to a level such that shallow, vegetated shoreline areas are exposed, and any fish inhabiting those areas are forced into the deeper portion of the lake. Lowering the lake level will minimize the chance of pike escaping or avoiding the rotenone treatment, maximizing its effectiveness. The lake would remain lowered for the remainder of the winter so that any fish that may have escaped to shoreline pool areas (and evaded the treatment) do not survive the winter.

Northern pike eradication would be initiated by utilizing gill-netting capture techniques approximately 1 week prior to rotenone application. Gill nets would be set near the inflow and outflows of Otter Lake, as well as dragged throughout the lake in a systematic manner in order to catch the maximum number of pike. Gill netting would again be employed a minimum of one time after the rotenone application, possibly during the winter season and again during ice-out in the spring.

Rotenone Application

All rotenone applications would be conducted according to label directions and guidance and best management practices as specified in *Rotenone Use in Fisheries Management: Administrative and Technical Guidelines Manual* (Finlayson et al., 2000) and the *Rotenone Standard Operating Procedures (SOP) Manual* (Finlayson et al., 2010). All required safety measures would be adhered to as part of this project. The application would be conducted under the on-site supervision of an ADF&G employee possessing an Alaska Qualified Applicator Certificate.

Live fish bioassays will be conducted in Otter Lake the day before the rotenone treatment to determine the appropriate rotenone concentration to be utilized. The maximum allowable treatment concentration is 200 parts per billion (ppb) (USEPA, 2009), and will not be exceeded. The volume of product required for treatment will be calculated based on bioassay results and the total volume of the lake.

Rotenone would be applied to Otter Lake by means of boats, rafts, backpack sprayers from the shoreline, or rotenone bricks or other floatation devices. Where water is more than 15 feet deep, the rotenone mixture will be applied to lower depths using a point source delivery system. Residual pools on the lake bottom would be treated with rotenone from boats or shore depending on the pool size, volume, and location.

Rotenone application may also occur in the streamlets that feed into Otter Lake and in Otter Creek between the lake and the beaver dams, as practicable, based on the likelihood of pike in those areas. The ultimate downstream extent of rotenone application will be determined and conducted in coordination with ADF&G. Rotenone would be applied to flowing waters by means

of drip stations and hand-type spray bottles, hand-type sprayers, backpack sprayers or other similar devices. Small pockets of water along the creek bank or where it becomes intermittent would be sprayed by hand if feasible.

The potential exists for rotenone to migrate downstream beyond the intended treatment area. It is anticipated that any rotenone that moves downstream would be sufficiently diluted to a level that would not adversely impact fish species beyond Otter Creek. However, the following project elements are intended to minimize downstream migration potential, as well as maximize treatment efficacy:

- Rotenone application at a low flow period (i.e., during fall), allowing it to break down naturally within Otter Lake and Otter Creek.
- If need during the application rotenone neutralization will occur using KMnO_4 in Otter Creek.

It is expected that up to 70 percent of rotenone-killed fish will sink to the bottom of the lake (Bradbury, 1986). Dead fish visible on the lake surface and shoreline will be collected daily until freeze-up by ADF&G or JBER and disposed at the Anchorage Regional Landfill. Dead fish observed after break-up in the spring will again be collected and disposed.

Rotenone Degradation and Neutralization

The rate of rotenone degradation in Otter Lake would be monitored via water and sediment sample laboratory analysis, as well as qualitatively through the use of sentinel fish. Composite samples from the sediment and mid-water column would be collected the day prior to, as well as after, the rotenone treatment. Periodic sampling would continue until rotenone is no longer detected.

Chemical deactivation using KMnO_4 will be conducted in accordance with the Rotenone SOP Manual (Finlayson et al., 2010) and coordinated with ADF&G. Prior to the rotenone treatment, sentinel fish would be placed in the lake and monitored. During and after the rotenone treatment, sentinel fish placed in Otter Lake and Otter Creek will be used to determine if: 1) neutralization of Otter Creek will be necessary, and; 2) the rotenone is adequately mixing throughout the water column. Sentinel fish would be monitored every two hours for the first day, and daily thereafter for one month. If sentinel fish monitoring indicates that rotenone is lethal beyond the first beaver dam in Otter Creek, a KMnO_4 neutralization drip station would be installed. The drip station would be located in Otter Creek downstream from the largest beaver dam in order to neutralize the water before it enters the remaining Otter Creek channel that connects to Eagle River. Neutralization concentrations would be calculated based on existing flow conditions and detected rotenone levels.

After the treatment, water samples will be tested to monitor the break down of rotenone. These samples will help indicate when the lake can be reopened for recreation and when sentinel fish should be placed in the lake to test survivability. However, two rotenone applications are often required in less than optimal conditions; if large numbers of northern pike remain after the first application, a re-application may be performed. All decisions will be coordinated with ADF&G.

Lake Restocking

After all applications of rotenone have been conducted, it may be necessary to verify that the lake has sufficiently detoxified prior to restocking activities. If so, sentinel fish would be placed in a minnow bucket and suspended in the lake for up to 24 hours. If all fish survive, then it could be assumed that the rotenone had sufficiently degraded, and the lake would be considered ready for restocking. Additional benthic macroinvertebrate and zooplankton sampling would also be conducted to assess ecosystem recovery and assure sufficient prey biomass prior to restocking.

Once it is determined that the rotenone is sufficiently degraded, then the lake would be stocked with rainbow trout. Stocking would be conducted using standard practices, and would be conducted in coordination with ADF&G.

2.1.2 Sixmile Creek Watershed Enhancements

The existing fish ladder and spillway design at the outlet of Lower Sixmile Lake will be replaced with a reconfigured meandering configuration that would facilitate small fish passage into Sixmile Lake without the use of a fish ladder (**Figure 5**). The conceptual design for the new stream channel will be formalized in concert with qualified hydrologists and fishery biologists familiar with optimizing stream channels for anadromous fish negotiation.

The reconfiguration of the existing creek segment would involve in-water grading to create a meandering channel gradually increasing in grade between the creek and Sixmile Lake, rather than the abrupt increase in grade that currently exists at the fish ladder. The final configuration is expected to produce an approximately 88-foot roughened channel, approximately 10 feet wide with a 4 percent slope. Gravel fill will be utilized to achieve the desired slope and capped with concrete and embedded stone to prevent subsurface water seepage and to enforce integrity during high flows. Natural rock and gravel will then be placed on the concrete and contoured into desirable habitat configurations with resting areas for fish. Habitat areas will be designed to minimize predation opportunities. Revegetation using alder and willow species would occur along the new spillway. No heavy equipment will be utilized in the creek or lake during construction; however, heavy equipment would be utilized to reconfigure the channel.

In general, removal of the existing fish ladder and construction of the stream configuration is expected to be completed in the following sequence:

1. Surveying and utilities identification.
2. Erosion and sediment control site preparation.
3. Relocation of observation platform and bear resistant trash receptacle.
4. Create new streambed loop going to north side of creek; concrete form construction and pouring, rock placement, finishing and placement of prewashed streambed material.
5. Stream flow diversion into new stream channel.
6. Removal of existing fish ladder, and filling of spillway gap.
7. Site backfill and streambed reclamation.
8. Streambed and bank reclamation, including revegetation.

9. Installation of informational kiosk, replace observation platform and trash receptacle.
10. Additional streambank reclamation, over-story vegetation placement.

A JBER Erosion and Sediment Control Plan (ESCP) will be prepared by the contractor to mitigate for potential impacts from construction activities.

2.2 PHASE II OPTION – ADDITIONAL OTTER CREEK WATERSHED ENHANCEMENTS

Phase II Option includes all activities at Otter Lake and in the Sixmile Creek watershed as described above in the Proposed Action, as well as additional enhancements in the Otter Creek watershed. This option adds a decision point after rainbow trout stocking in Otter Lake, at which time JBER and ADF&G would determine if stocking the lake with coho salmon would be appropriate. The intent of stocking with coho salmon would be to restore the Otter Creek watershed to a fully functioning anadromous fish system. The decision would be based on an assessment of the efficacy of the pike eradication efforts. If it is determined that pike have been completely removed from the system, then Otter Lake would be stocked with coho salmon and physical barriers impeding anadromous fish passage between Eagle River and Otter Lake (beaver dams, weir/channel configuration at the lake outlet, and culvert beneath Otter Lake Road) would be removed or modified. If JBER moves forward with Phase II, all activities would be conducted in coordination with appropriate regulatory agencies.

2.2.1 Otter Creek Beaver Dam Removal

Phase II activities include removal of up to three known beaver dams on Otter Creek (Figure 3), which currently restrict anadromous fish passage. At least one of the dams, the largest and furthest downstream, has been on the creek since the 1960s, and is a substantial structure. The other two known dams become progressively smaller in size, moving upstream. The dam removals would be conducted in coordination with appropriate regulatory agencies, and using approved removal techniques. The exact dam removal methods are not known at this time; however, JBER would attempt to minimize disturbance to natural environment. Currently, there is no vehicular access to the beaver dams. It is possible that dams could be removed by means other than using heavy machinery and thus negating the need for constructing an access road. It is likely that the beavers inhabiting the dams would either need to be relocated or eradicated; the final course of action would be coordinated with ADF&G in accordance with the INRMP. The INRMP states that the beaver dam removals would occur only after the eradication of northern pike is conducted and verified, to minimize the possibility of northern pike migrating from the Otter Creek watershed into Eagle River and Cook Inlet.

2.2.2 Otter Creek Fish Passage and Spawning Habitat Enhancement

Phase II includes stream channel modifications to the section of Otter Creek immediately downstream from the Otter Lake weir to create spawning habitat and enable anadromous fish passage into the lake. A series of step-pools would be created to allow fish to bypass the weir and enter the lake; the weir currently acts as both a height and velocity barrier. As part of the step-pool design, the stream channel immediately downstream from the weir would be modified

into a meandering configuration, similar to the proposed design at Sixmile Creek, to create favorable spawning habitat. The final design would be selected in coordination with ADF&G. It is anticipated that the step-pools would be constructed downstream of the existing culvert at Otter Lake. Similar to the Sixmile Creek Watershed Enhancement, it is likely that heavy machinery would be needed to modify Otter Creek channel; however, the method for construction and exact location of construction is not presently known. As explained above, access to Otter Creek has limited vehicular access. If heavy machinery is determined to be needed for creation of the step-pools and channel reconfiguration, then it is likely that access roads would need to be constructed if current access is not sufficient. Tree clearing is possible with the creation of a new access road.

The culvert beneath Otter Lake Road would be modified so that through flow would be of a sufficient depth to allow for effective fish passage. This would be accomplished by installing a water level control structure on the downstream end of the culvert to increase flow depth. The stream channel immediately downstream from the culvert would then be modified into a series of step pools to allow fish easy access over the water level control structure and into the culvert.

All stream channel modifications and fish passage configurations would adhere to those outlined in the National Marine Fisheries Service (NMFS) *Anadromous Salmonid Passage Facility Design* (2008a).

2.3 OTHER ALTERNATIVES CONSIDERED

2.3.1 Otter Lake Pike Eradication

Other alternatives considered for achieving the desired objectives include limitless pike angling, and gill netting and/or electrofishing in combination with restocking Otter Lake with anadromous fish. These alternatives alone, without the application of a piscicide (i.e., rotenone), were eliminated because gill netting and electrofishing efforts have both proven ineffective at completely eradicating northern pike. Unless the pike are completely eliminated, they would likely reestablish populations, and negate any restocking efforts through predation on anadromous species.

The Proposed Action is the most practicable means of achieving the objectives of eliminating invasive northern pike, conducting habitat mitigation for POA expansion activities, and supporting reestablishment of important prey species for the endangered CIBW.

2.3.2 Lower Sixmile Lake Fish Ladder Replacement

Other fish ladder designs were considered, but all were considered inferior to a natural roughened channel design for longevity, aesthetic value, and effectiveness in passing salmon species of all age classes.

2.4 NO ACTION ALTERNATIVE

The No Action Alternative would include no watershed enhancements at Otter Creek or Sixmile Creek. Also, the Phase II Option would not occur because it is dependent on selection of the Proposed Action.

Selecting the No Action would not meet the purpose and need for the Proposed Action because there would not be improved fish passage at Sixmile Creek and Otter Lake would continue to support pike that compete with the CIBW for salmon species. Note, however, that the Phase II Option need not be carried out to meet the purpose and need for the Proposed Action.

The No Action Alternative is included in this Environmental Assessment (EA) as required by the National Environmental Policy Act (NEPA).

2.4.1 Otter Creek Watershed Enhancements

The no action alternative would not result in any of the impacts associated with the Proposed Action, but would continue to allow invasive northern pike to thrive in Otter Lake, minimizing the likelihood of a productive salmonid or anadromous fishery. Invasive northern pike are prolific in Southcentral Alaska, and if left to thrive in Otter Lake, it is feasible that they may eventually migrate to other areas, further decimating native salmon and trout populations. Salmonid populations are a key prey species for the endangered CIBW.

2.4.2 Sixmile Creek Watershed Enhancements

The no action alternative would not result in any of the impacts associated with the Proposed Action, but would leave the current Lower Sixmile Lake fish ladder in place and unchanged; fry and smolt would continue to be exposed to aerial predation, and adult salmon passage would remain difficult due to the existing configuration.

2.4.3 Phase II Option – Additional Otter Creek Watershed Enhancements

Same as Section 2.4.1. In addition, all existing natural barriers (beaver dams) and engineered structures (culvert and weir) along Otter Creek would remain in place and unchanged. This alternative would continue to impede fish movement along Otter Creek and entrance into Otter Lake.

2.5 REGULATORY COMPLIANCE

The EA has been prepared in accordance with the NEPA, as amended; the Council on Environmental Quality regulations implementing NEPA (Code of Federal Regulations [CFR], Title 40, Parts 1500-1508); and the Air Force Instruction (AFI) 32-7061, which adopts Title 32, Code of Federal Regulations (CFR), Part 989 (32 CFR 989), *Environmental Impact Analysis Process*. This EA has been prepared to determine the potential for significant impacts on the human environment and to determine whether a Finding of No Significant Impact (FONSI) is warranted or if an Environmental Impact Statement (EIS) should be prepared.

In addition to NEPA this EA considers all applicable laws, regulations, and Executive Orders (EOs), including (but not limited to) the following:

- Clean Air Act (CAA)
- Clean Water Act (CWA)
- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)
- Endangered Species Act (ESA)
- Marine Mammal Protection Act
- Migratory Bird Treaty Act
- National Historic Preservation Act (NHPA)
- Resource Conservation and Recovery Act (RCRA)
- Toxic Substances Control Act
- ADF&G Fish Habitat
- AFI 32-7064, Integrated Natural Resource Management
- EO 11988, *Floodplain Management*
- EO 11990, *Protection of Wetlands*
- EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*
- EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*

The 673d CES is currently applying for state and federal pesticide use permits; required Pesticide Discharge Management Plan and Treatment Plan will be available for public comment through a separate process carried out by the Alaska Department of Environmental Conservation (ADEC).

The 673d CES has completed consultation with the United States Fish and Wildlife Service (USFWS) under Section 7 of the ESA. In a letter dated July 18, 2012, the USFWS stated that, “. . . there are no federally listed or proposed species and/or designated or proposed critical habitat within the action area of the proposed project.” that are under the jurisdiction of the USFWS (Appendix C).

The 673d CES has completed consultation with NMFS under Section 7 of the ESA (Appendix B). NMFS has concurred with JBER’s determination that the proposed actions in the Otter Creek and Sixmile Creek watersheds may affect, but are not likely to adversely affect, the CIBW or its critical habitat. NMFS commented that the indirect impacts of the proposed action could benefit CIBW by reducing pike predation on their prey species. In addition, NMFS explained that stocking Otter Lake with coho salmon and removing physical barriers to anadromous fish passage along Otter creek, may benefit the endangered CIBW by restoring the system to a productive salmon run and increase the availability of prey species to the whales.

Additional agency coordination and permitting may include:

- ADF&G Fish Habitat Permit and Fish Resource Permit
- U.S. Army Corps of Engineers (USACE) Permit, Section 404
- ADEC, Section 401 Water Quality Certification
- Department of Natural Resources
- Alaska Department of Natural Resources Temporary Water Use Authorization

Required permits will be obtained prior to the implementation of the Proposed Action and/or the Phase II Option. Some permits require the submittal of a signed EA/FONSI and the completion of Section 7 consultation under the ESA.

2.6 SCOPE OF RESOURCE ANALYSIS

The Proposed Action has the potential to affect certain environmental resources. These potentially affected resources have been identified through communications with state and federal agencies and review of associated site environmental documentation. The EA evaluates the potential environmental consequences of the Proposed Action, Phase II Option, and No Action Alternative on the following resources: Threatened and Endangered Species; Fish and Wildlife; Soils, Vegetation and Wetlands; Water Resources; Air Quality; Hazardous Materials and Solid Waste; Cultural Resources; Recreation; and Aesthetics and Visual Resources. Specific resources that may be affected by the Proposed Action are identified in Section 3, Affected Environment; Environmental Consequences are discussed in Section 4.

Three environmental resources were eliminated from detailed analysis because research revealed that these resources will not be potentially impacted by the Proposed Action or Phase II Option and/or potential impacts are negligible. These resources are Hazardous Materials and Solid Waste, Socioeconomics and Environmental Justice.

Hazardous Materials and Solid Waste

Under the Proposed Action and Phase II Option, no heavy equipment is planned to be utilized within the creek channels during the fish ladder removal and channel reconfiguration at Sixmile Creek and during the construction of the step pools and culvert in Otter Creek. This would avoid petroleum, oils and lubricants from entering the watersheds. The application of rotenone at Otter Lake would be conducted in accordance with all appropriate regulations, guidance, and product labels as well as adhere to JBER Oplan 19-3, *Environmental Management Plan*. Large amounts of waste are not expected to be generated or disposed of as a result of rotenone application. Adherence to the JBER Oplan 19-3 procedures governing the proper management of hazardous materials and wastes would ensure no inadvertent releases or spills into the environment. If a release of hazardous materials is observed or suspected, appropriate JBER procedures would be followed.

Two ADEC contaminated sites are located on the north shore of Lower Sixmile Lake, but are not in the direct vicinity of the location of the Proposed Action and Phase II Option activities and are

not expected to be impacted. The first site (Hazard ID 2785) is located on the north shore of Lower Sixmile Lake at Building 31562, a recreational cabin (ADEC, 2012). Contamination originated from a 1,200-gallon heating oil tank. Annual monitoring indicates that diesel range organics (DRO), benzene, and arsenic remain in groundwater at concentrations exceeding ADEC cleanup levels. Gasoline range organics and DRO exceed cleanup levels in soils. A second site (Hazard ID 2044) is located further east, also on the north shore of Sixmile Lake, directly adjacent to Building 63325 (ADEC, 2012). A former 2,000-gallon unregulated underground storage tank was used to store diesel fuel for an emergency generator. Investigations at the site in 2010 indicate that DRO is present in soils above ADEC cleanup levels.

Socioeconomics

The Proposed Action and the Phase II Option are not expected to impact employment, demand for housing, or demand for services on JBER or in the greater Anchorage area. Recreational fishing opportunities may initially decrease during project activities (rotenone treatment, reconfiguration of Sixmile Creek and Otter Creek), but will likely increase if the Proposed Action and Phase II Options are successful at eradicating pike and facilitating increased fish passage. The potential increase in recreational fishing on JBER will not have a major short-term or long-term effect upon the Anchorage economy. No commercial fishing activities are conducted in Sixmile Creek, Otter Creek, or Otter Lake. The Proposed Action and Phase II Option will have little, if any, socioeconomic impacts on Anchorage, because it is a small-scale fish eradication project on a watershed contained entirely within JBER boundaries. Economic stability of the region will not be impacted.

Environmental Justice

EO 12898 requires federal agencies to address environmental and human health conditions in minority and low-income communities. EO 13045 requires identification and assessment of environmental health and safety risks that may disproportionately affect children. The Proposed Action and Phase II Option would not disproportionately affect minorities, low income communities, and/or children. Only persons engaged in recreational activities at JBER would be temporarily affected by implementing the Proposed Action and Phase II Option because access to Sixmile Creek, Otter Creek, and Otter Lake would be temporarily impaired. Also, human health and safety concerns are none to negligible from implementing the Proposed Action and Phase II Option.

2.7 SUMMARY OF ENVIRONMENTAL IMPACTS

Findings for the Proposed Action, Phase II Option, and No Action Alternative are summarized in Table 2-1.

**Table 2-1
Findings for the Proposed Action, Phase II Option. and No Action Alternative**

Resource	Proposed Action		Phase II Option	No Action Alternative
	Otter Creek Enhancements	Sixmile Creek Enhancements	Additional Otter Creek Enhancements	
Threatened and Endangered Species	Less than significant – None/Negligible Adverse; and Beneficial	Less than significant – Beneficial	Less than significant – Beneficial	Less than significant – Adverse
Fish and Wildlife	Less than significant – Adverse and Beneficial	Less than significant – Adverse and Beneficial	Less than significant – Beneficial	Less than significant – Adverse and Beneficial
Soils, Vegetation and Wetlands	Less than significant - Adverse	Less than significant - Adverse	Less than significant - Adverse	Less than significant – Beneficial
Water Resources	Less than significant - Adverse	Less than significant - Adverse	Less than significant - Adverse	Less than significant – Beneficial
Air Quality	Less than significant – None/Negligible Adverse	Less than significant - Adverse	Less than significant - Adverse	Less than significant – Beneficial
Cultural Resources	Less than significant – None	Less than significant – None	Less than significant – None	Less than significant – Beneficial
Recreation	Less than significant - Adverse	Less than significant - Adverse	Less than significant – Beneficial	Less than significant – Beneficial
Aesthetics and Visual Resources	Less than significant - Adverse	Less than significant – Adverse and Beneficial	Less than significant - Adverse	Less than significant – Beneficial

Note: Adverse impacts generally relate to implementing the proposed action. In some cases beneficial results will accrue as well after the Proposed Action or Phase II Option is implemented. In these cases the finding is Adverse and Beneficial.

2.8 NOTIFICATION AND PUBLIC INVOLVEMENT

The USAF sent Interagency/Intergovernmental Coordination Letters for Environmental Planning (IICEP) to the appropriate agencies on 10 July 2012 and 11 October 2012. These agencies include federal, state, and local agencies; Alaska Native villages/tribes and Alaska Native Corporations (Appendix C). A response was received on 20 November 2012 from Cook Inlet Region, Incorporated (CIRI) (Appendix C) confirming they had no concerns over the Proposed Action. A response was received on 19 November 2012 from Eklutna Native Village (ENV)

requesting more information on the plans and methods for the Proposed Action as well as expressing interest in working with JBER (Appendix C). ENV's request was provided to JBER's Natural and Cultural Resources Element (673 CES/CEANC) for further discussions. USFWS responded as discussed in Section 2.5 (above).

As part of the NEPA process, the USAF made this EA and a Draft FONSI and FONPA available to the public and interested stakeholders. The Notice of Availability (NOA) of the EA and Draft FONSI and FONPA was published in the Anchorage Daily News and on the JBER environmental webpage (<http://www.jber.af.mil/environmental/index.asp>) (see Appendix D). Publication of the NOA initiated the public comment period, which ran from 1 April to 30 April.

The public was given 30 days to comment prior to the signing of the FONSI and FONPA. No public comments were received.

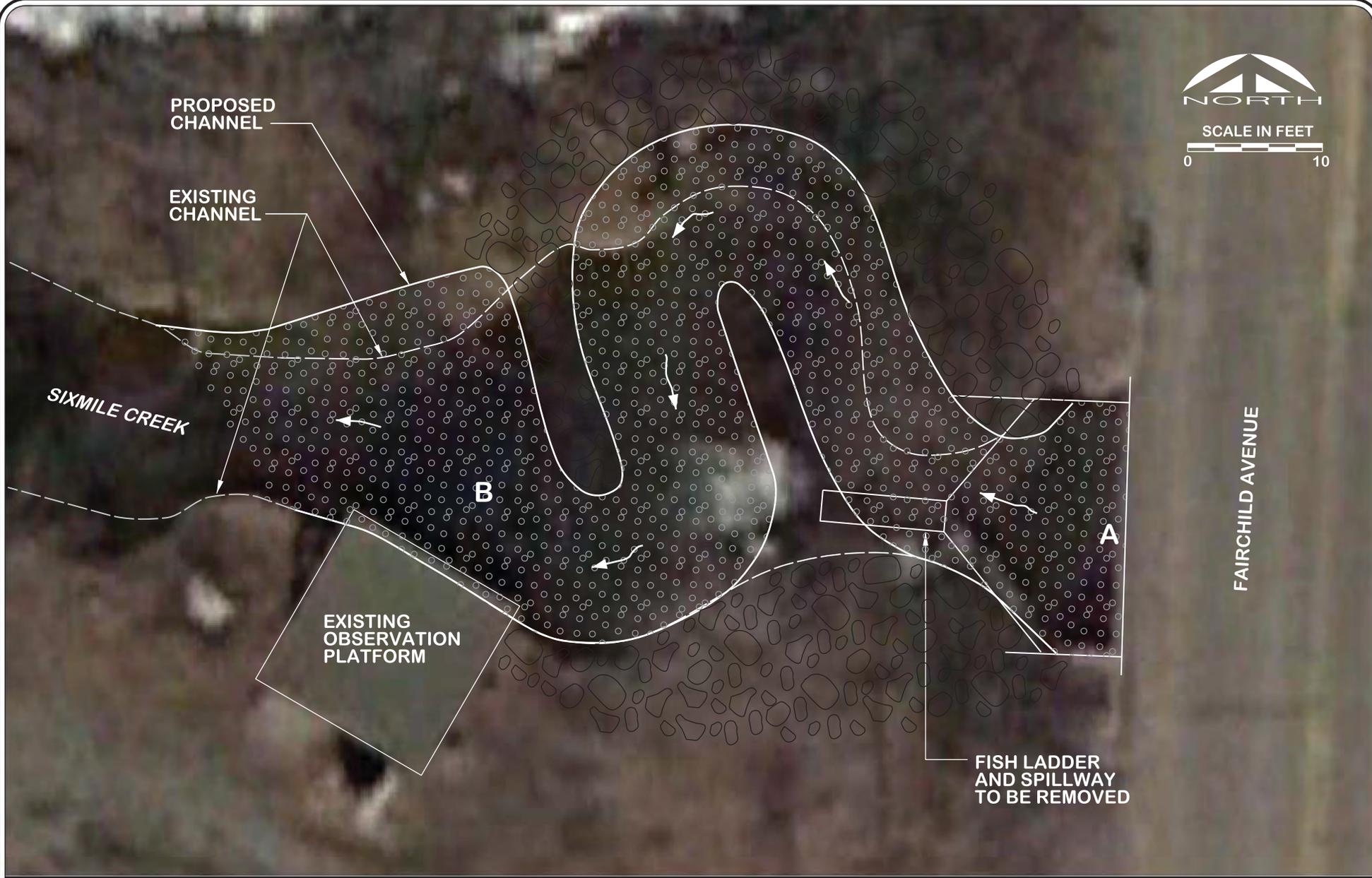
Please direct requests for further information to JBER Deputy Director of Public Affairs, Mr. Bob Hall, at:

Attn: Bob Hall, Joint Base Elmendorf-Richardson Public Affairs
10480 Sijan Avenue, Suite 123
JBER, AK 99505-6000

or

jber.pa.3@us.af.mil

Mr. Hall may also be reached at (907) 552-8152.



LEGEND:

-  PROPOSED CHANNEL
-  ROCK FILL



FLOW

CHANNEL CENTERLINE
DISTANCE A-B = 88 FEET

FIGURE 5

JOINT BASE ELMENDORF - RICHARDSON, 673d CIVIL ENGINEERING SQUADRON
WATERSHED ENHANCEMENT ENVIRONMENTAL ASSESSMENT

SIXMILE CREEK PROPOSED CHANNEL

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3.0 AFFECTED ENVIRONMENT

This section describes resources either present in the project area that may be affected by the Proposed Action, or those required to be assessed. Existing conditions of each resource in this section constitute conditions under the No Action Alternative, and are used as baseline for environmental comparison against the Proposed Action and Alternative 1, as discussed in Section 4, Environmental Consequences.

3.1 THREATENED AND ENDANGERED SPECIES

The ESA of 1973 (16 United States Code [USC] §§ 1531–1544, as amended) established measures for the protection of plant and animal species that are federally listed as threatened and endangered, and for the conservation of habitats that are critical to the continued existence of those species. Compliance with the ESA requires communication with the NMFS and the USFWS in cases where a federal action could affect listed threatened or endangered species, species proposed for listing, or candidates for listing. Federal agencies must evaluate the potential effects of their Proposed Actions.

There are no federally listed threatened or endangered species residing within JBER boundaries (JBER, 2011); however, CIBW do exist in marine habitats directly adjacent to JBER and have been observed within JBER boundaries via Eagle River. The CIBW makes seasonal forays into JBER waters. Other federally listed species that may potentially move on or within close proximity to JBER, but occur infrequently, include the Steller sea lion (*Eumetopias jubatus*), Steller's eider (*Polysticta stelleri*), yellow-billed loon (*Gavia adamsii*), Kittlitz's murrelet (*Brachyramphus brevirostris*), and some salmon and steelhead species. Note: there is no favorable habitat for Kittlitz's murrelet in the in the Knik Arm.

The CIBW was listed as endangered under the ESA on October 22, 2008. The CIBW is also designated as depleted and strategic under the Marine Mammal Protection Act (MMPA). The beluga whale is a small, toothed whale in the *Monodontidae* family, a family shared with only the narwhal (*Monodon monoceros*). The beluga whale is a northern hemisphere species, ranging primarily over the Arctic Ocean and some adjoining seas, where it inhabits fjords, estuaries, and shallow water in Arctic and subarctic oceans. Five distinct stocks of beluga whales are currently recognized in Alaska: Beaufort Sea, eastern Chukchi Sea, eastern Bering Sea, Bristol Bay, and the CIBW. The CIBW population is numerically the smallest of these, and is the only one of the five Alaskan stocks occurring south of the Alaska Peninsula in waters of the Gulf of Alaska.

Belugas generally occur in shallow, coastal waters, and while some populations make long seasonal migrations, CIBWs reside in Cook Inlet year round, concentrating in the upper Inlet at rivers and bays in the summer and fall, and dispersing into deeper waters in mid-Inlet locations in the winter (NMFS, 2009).

Dense concentrations of prey appear essential to beluga whale feeding behavior, but the relationship between beluga whale concentrations and salmon concentrations is not fully known (NMFS, 2008). Salmon escapement numbers and commercial harvest have fluctuated widely throughout the last 40 years and there is no clear correlation between changes in salmon runs and

beluga whale population numbers. Because beluga whales do not always feed at the streams with the highest runs of fish, water depth and fish density may be more important than sheer numbers of fish in their feeding success (NMFS, 2008).

Very little is known about beluga whale breeding behavior, and it is difficult to identify beluga breeding habitat with any certainty. It is thought that the shallow waters of upper Cook Inlet may provide important calving and nursery areas. The shallow tidal flats provide warmer water temperatures, which may benefit newborn beluga calves that lack the thick insulating blubber layer of adults. Alaska Natives described calving areas within Cook Inlet as the northern side of Kachemak Bay in April and May, off the mouths of the Beluga and Susitna rivers in May, and in Chickaloon Bay and Turnagain Arm during summer (Huntington, 2000).

CIBWs are opportunistic feeders and feed on a wide variety of prey species, focusing on specific species when they are seasonally abundant. Pacific eulachon (locally referred to as hooligan or candlefish) is an important early spring food resource for CIBW. In the summer, as eulachon runs begin to diminish, belugas rely heavily on several species of salmon as a primary prey resource. In the fall, as anadromous fish runs begin to decline, belugas again return to consume the fish species found in nearshore bays and estuaries. This includes cod (*Gadus spp.*) species as well as other bottom-dwellers, such as Pacific staghorn sculpin (*Leptocottus armatus*), and flatfishes, such as starry flounder (*Platichthys stellatus*) and yellowfin sole.

3.2 FISH AND WILDLIFE

JBER streams are spawning habitat for all five Pacific salmon species (Chinook/king, chum/dog fish, sockeye/red, pink/humpies, and coho/silver). Sixmile Creek has natural runs of four salmon species, with reds and pinks comprising the bulk of the returning fish, followed by silvers and infrequent chums. The Sixmile Lake system supports a native trout fishery; non-fertile triploid rainbows were stocked in Upper Sixmile Lake through 2006. Otter Lake was stocked with rainbow trout for decades by ADF&G until 2006, when it was determined that northern pike, illegally introduced into the lake around 2000, were consuming the majority of the stocked fish. Three-spine stickleback are common in most JBER lakes, and serve as an important food source for rainbow trout, Dolly Varden (*Salvelinus malma*), grebes, loons, terns, and other birds. Nine-spine stickleback (*Pungitius pungitius*) and slimy sculpin (*Cottus cognatus*) also occur. Starry flounder (*Platichthys stellatus*), Pacific staghorn sculpin (*Leptocottus armatus*), saffron cod (*Eleginus gracilis*), eulachon (*Thaleichthys pacificus*), snailfish (*Careproctus spp*), rainbow smelt (*Osmerus mordax*) have been caught in the mouth of Eagle River.

Numerous bird species are found on JBER and several nest within the Otter Lake and Sixmile Lake watersheds. Red necked grebes (*Podiceps grisegena*) are the most common waterbird on JBER lakes with up to 10 pairs each nesting on Otter and Sixmile Lakes. While horned grebes (*Podiceps auritus*) utilize the lakes in migration, records of them nesting are rare. Three pairs of common loons (*Gavia immer*) have nested on Otter, Upper and Lower Sixmile Lakes during recent years. Pacific loons (*Gavia pacifica*), while observed on Otter and Sixmile Lakes, have nested recently only at Oval Lake, north of Lower Sixmile. Mallards (*Anas platyrhynchos*), ringnecked ducks (*Aythya collaris*), and American wigeon (*Anas Americana*) are the most common waterfowl nesters on both lakes followed in abundance by green-winged teal

(*Anas carolinensis*), common (*Bucephala clangula*) and Barrow's goldeneye (*Bucephala islandica*) and northern shoveler (*Anas clypeata*). Canada geese (*Branta canadensis*) nest in the Otter Lake area but nesting pairs are uncommon at Sixmile as a result of an aggressive bird air strike hazard (BASH) program near the Elmendorf Airfield. Up to two pairs of trumpeter swans (*Cygnus buccinator*) have nested in this lake system, with the pair at Otter Lake being consistently present. Shorebirds nesting within the Otter and Sixmile Lakes, watershed include greater (*Tringa melanoleuca*) and lesser (*Tringa flavipes*) yellowlegs, Wilson's snipe (*Gallinago delicata*), spotted sandpipers (*Artitus macularia*), and solitary sandpipers (*Tringa solitaria*). Sandhill cranes (*Grus canadensis*) have nested adjacent to Otter Lake in recent years and are seasonally present at the floatplane runway area at Lower Sixmile Lake. Bonaparte's gull (*Chroicocephalus Philadelphia*) and Arctic terns (*Sterna paradisaea*) are nesters at both lakes. While mew gulls (*Larus canus*) were once common nesters at both lakes they are now just common visitors along with herring (*Larus argentatus*) and glaucous-winged (*Larus glaucescens*) gulls.

Bald eagles (*Haliaeetus leucocephalus*) are year-round residents of the base, heavily utilizing lakes during open water months for feeding. During 2012 there were 2 active bald eagle nests within one mile of either lake and six active nests within three miles. Oneosprey (*Pandion haliaetus*) pair nests near Green Lake and fish in all nearby lakes, including Sixmile and Otter. Red-tailed hawks (*Buteo jamaicensis*), northern goshawks (*Accipiter gentilis*), northern harrier (*Circus cyaneus*) and merlins (*Falco columbarius*) also nest within or near the watersheds. Owl species are found at JBER, including the great horned (*Bubo virginianus*), northern saw-whet (*Aegolius acadicus*), and boreal (*Aegolius funereus*). The great gray owl (*Strix nebulosa*) and northern hawk owl (*Surnia ulula*) are occasionally observed, mostly during winter, while the short-eared owl (*Asio flammeus*) is observed during migration. Spruce grouse (*Falcipennis canadensis*) are common nesters on base, The recently introduced ruffed grouse (*Bonasa umbellus*) has been observed in base lowlands, however nesting has not been confirmed. Willow ptarmigan (*Lagopus lagopus*) are residents of alpine and subalpine areas but may visit the watershed during winter months.

About 40 species of passerines and neo-tropical birds are common nesters on base. Common nesting passerines in forest habitat include the Swainson's thrush (*Catharus ustulatus*), American robin (*Turdus migratorius*), yellow-rumped warbler (*Setophaga coronata*), dark-eyed junco (*Junco hyemalis*), alder flycatcher (*Empidonax alnorum*), black-capped chickadee (*Poecile atricapillus*), and ruby-crowned kinglets (*Regulus calendula*). In more open shrub and developed habitats robins, dark-eyed juncos, white-crowned sparrows (*Zonotichia leucophrys*), and common redpolls (*Acanthis flammea*) are common nesters. Important/unique nesting passerines associated with the Otter/Sixmile wetlands include the rusty blackbird (*Euphagus carolinus*), American dipper (*Cinclus mexicanus*), olive-sided flycatcher (*Contopus cooperi*), tree (*Tachycineta bicolor*) and violet-green (*Tachycineta thalassina*) swallows, varied thrush (*Ixoreus naevius*), northern waterthrush (*Parkesia noveboracensis*), gray jay (*Perisoreus canadensis*), black-billed magpie, and common raven (*Corvus corax*).

Some 37 species of mammals are believed to occur on JBER. However several species are associated with alpine habitats. In the Sixmile-Otter Lake watersheds common species include meadow and red-backed voles (*Microtus pennsylvanicus* and *Clethrionomys rutilus*), meadow

jumping mouse (*Zapus hudsonicus*), red squirrels (*Tamiasciurus hudsonicus*), (*Microtus pennsylvanicus* and *Clethrionomys rutilus*), common and dusky shrews, snowshoe hares (*Lepus americanus*) and porcupines (*Erithizon dorsatum*). More aquatic mammals include beaver (*Castor canadensis*), muskrat (*Ondatra zibithica*), river otter (*Lutra canadensis*) and mink (*Mustela vison*). At least three beaver dams have been in place for many decades, impeding anadromous fish passage in the Otter Creek watershed; up to four active lodges have been recorded in a single year in the Sixmile drainage. Short-tailed weasels (*Mustela erminea*), and marten (*Martes americana*) likely visit the watershed, and possibly wolverines (*Gulo gulo*) which are commonly found on base southeast of the Glenn Highway. Lynx (*Lynx Canadensis*), red fox (*Vulpes vulpes*); coyotes (*Canis latrans*) and gray wolves (*Canis lupis*) frequent the watershed. Moose (*Alces alces*) are common throughout the base. with a basewide population approaching 300 total prior to the winter of 2011. Both brown (*Ursus arctos*) and black bear (*Ursus americanus*) are common seasonal residents.

The current steep-pass fish ladder at the Lower Sixmile Lake outlet is perched and extends beyond a concrete spillway. While adult salmon and trout can negotiate the ladder, it serves as a velocity barrier for most juvenile salmon and small trout. Additionally, the existing configuration exposes juvenile fish to excessive aerial predation.

3.3 SOILS, VEGETATION, AND WETLANDS

JBER is situated across rolling upland plains near the head of the Cook Inlet of Knik Arm. The area is characterized by spruce-hardwood forests, bottomlands of spruce-poplar forests along major drainages, and dense stands of alder and willow along riparian corridors. Wet tundra communities bracket the coast.

Otter Lake is surrounded by soils of glacial origin and varying degrees of drainage. The eastern lake shorelines are typically very poorly-drained saturated organic peats susceptible to frost action, and are covered by low ericaceous shrub-shrub birch scrub, stunted black spruce woodland and open forest, and sedge-grass meadows. The southern and western shorelines of Otter Lake, as well as the Otter Creek corridor, are generally well drained with a depth to high water table of greater than 72 inches. These soils contain a high gravel and sand content, and are susceptible to frost action. The western lakeshore is covered by mixed paper birch and white spruce forest; the southern shoreline also contains stunted black spruce woodlands and open forests.

Otter Lake is a freshwater lacustrine lake with an approximately 84-acre limnetic zone with a combination of an unconsolidated muddy bottom and aquatic bed vegetation. Otter Lake also has an approximately 43 acre littoral zone comprised of rooted vascular vegetation. Adjacent to Otter Lake, within the same moraine depression, there are approximately 54 acres of emergent wetlands, 17 acres of forested wetlands, and 19 acres of shrub/scrub wetlands (**Figure 6**).

Most of the wetlands associated with Otter Lake share hydrologic dependence with the lake and are considered to be in their natural state. However, the northwestern edge of the lake is maintained for public access and on the northern edge of the littoral zone there is a maintained impoundment which likely has a localized effect on hydrology.

Soils adjacent to Sixmile Creek, immediately downstream from Lower Sixmile Lake, are well-drained to very poorly-drained mucky silt loams with high gravel and sand content and are susceptible to frost action. These soils support mixed paper birch-white spruce and quaking aspen forests, as well as stunted black spruce woodlands and open forest. Further downstream from the lake, soils are very poorly-drained saturated organic peats with low ericaceous shrub-shrub birch scrub, stunted black spruce woodland and open forests, and sedge-grass meadows. No wetlands are located in the area of the Proposed Action in the Sixmile Creek watershed, although some freshwater forested/shrub wetlands exist downstream and west of the project area.

3.4 WATER RESOURCES

Water supply at JBER is provided primarily by the Ship Creek reservoir, which impounds approximately 6.5 million gallons of water at maximum capacity. A water treatment plant located near the reservoir is used for extraction of sediments and minor chemical processing with chlorine and fluoride. Three groundwater wells, each approximately 100 feet deep, augment production from the water treatment plant whenever additional flow is required, or there is an operational need.

The Otter Creek watershed is a tributary to Eagle River. The spring-fed stream flowing into Otter Lake enters an historic channel of Eagle River and flows north into the lake. The creek outflows from the lake through a weir, continues to the north and into the Eagle River flats, Eagle River, and ultimately Knik Arm.

Otter Creek has been dammed below the lake by beavers since the 1960s. There are currently at least three known beaver dams along the creek between the lake and the Eagle River flats, each of which has created an area of reduced water flow and ponding. The largest of the three dams is approximately 8 to 9 feet high.

The Sixmile Creek watershed encompasses approximately 1,770 acres and is fed by up to 30 springs. The creek was dammed in two locations in 1951, creating two road crossings and Lower and Upper Sixmile Lakes. The original stream channel is visible in the shallow waters of the lakes.

A fish ladder was constructed at the Lower Sixmile Lake outlet sometime in the 1970s or 1980s to allow anadromous fish access into the Sixmile system. The Lower Sixmile Lake water surface is approximately 42 inches above Sixmile Creek at the lake outlet. The current steep-pass fish ladder at the outlet is perched and extends beyond a concrete spillway.

Sixmile Creek and Lakes are 3 miles in total length and generate a water flow of 1.0 to 6.0 cubic feet per second, measured at the lower lake fish ladder. Because of the watershed's small size and being primarily spring fed, flow variations are low. Peak flows are at spring break-up and during late summer/early fall rainy periods. Water temperatures at the fish ladder range from 0.6 degrees Celsius (°C) to 20°C (33°F to 68°F).

No Federal Emergency Management Agency (FEMA)-mapped floodplains are located on JBER. EO 11988 defines a floodplain as: “. . . the lowland and relatively flat areas adjoining inland and coastal waters including, at a minimum, that area subject to a one percent or greater chance of flooding in any given year.” By definition, the Proposed Action is located in the floodplains of Otter and Sixmile Creeks.

3.5 AIR QUALITY

Federal regulations delineate Air Quality Control Regions (AQCR). JBER is located within the Cook Inlet Intrastate AQCR (AQCR 8), which encompasses 44,000 square miles – including the Municipality of Anchorage (MOA), the Kenai Peninsula Borough, and the Matanuska-Susitna Borough (40 CFR 81). Anchorage is in attainment of National Ambient Air Quality Standards (NAAQS) for all criteria pollutants (USAF, 2011). The community of Eagle River, located north of JBER, was designated in attainment for PM₁₀ in 2010. A portion of Anchorage, adjacent to JBER’s southern boundary, was in nonattainment for carbon monoxide in 2001, but has been in attainment since that time.

Air emissions at JBER result from stationary and mobile sources. Stationary sources include boilers, emergency generators, and aircraft maintenance operations. Mobile sources include ground-based vehicles and aircraft. JBER is considered to be a major source of air emissions, but no stationary sources and relatively few mobile sources (vehicles) are located in the area of the Proposed Project.

3.6 CULTURAL RESOURCES

Cultural resources can be any prehistoric or historic building, site, district, structure, or object significant in history, architecture, archeology, culture, or science. These may include such items as artifacts, records, structures and human remains. Cultural resources investigations have been conducted on JBER since 1978, with most work concentrated along the northwest border of the base property. A total of 34 identified archeological sites are under JBER management. These are primarily homesteader or military sites, two of which have been determined eligible for listing on the National Register of Historic Places (NRHP), and eight of which require further investigation. Fifty World War II-era properties are grouped into three historic districts: Flight Line, Alaska Air Depot, and Generals’ Quad. Twenty-six historic properties in the Nike Site Summit Historic District and 12 other significant Cold War-era buildings and structures are located at JBER (JBER, 2012b).

Sites relevant to the Proposed Action include an abandoned homestead site located southwest of the Otter Lake shoreline, and another abandoned homestead site located near the lower reach of Otter Creek, upstream of where Otter Creek enters the Eagle River flats. Neither of these sites have been determined as eligible for the NRHP (SHPO, 2012).

There are two additional homestead sites associated with along the lower portion of Sixmile Creek. The sites are located on either side of the creek approximately 650 feet upstream from the mouth (Daugherty and Saleeby, 1998).

An Alaska Native site is located near Otter Lake; however, it is not located in the area of the proposed action (JBER 2011). The location of this site is not revealed to preserve site integrity; however, past surveys of this area explain that further investigation of Otter Lake area was not warranted (JBER 2011).

Ongoing government-to-government consultation between the Air Force and the federally-recognized Eklutna Native Village and Knik Tribe have identified concerns regarding the possibility of Alaska Native burials located on JBER.

3.7 RECREATION

Outdoor recreation opportunities at JBER are extensive and accessible to both military and civilian residents of Anchorage. Available activities include: fishing, hiking, off-road vehicle (snow machine and all-terrain vehicle) trails, winter sports, wildlife viewing, camping, boating, hunting, and weekend chalets available to rent for private functions. Non-motorized watercraft (e.g., canoes, float tubes, etc.) are allowed on all JBER lakes. Motorized boating is restricted to electric trolling motors, except at Lower Sixmile Lake, where gas motors up to 10 horsepower (hp) are permitted. A military recreational development has been maintained on the west side of the Otter Lake since the 1950s.

Lower Sixmile Lake is used as a base by the Elmendorf Aero Club and the Civil Air Patrol. Aero Club facilities along the southwest shoreline of the lake include docks, a briefing building, and a tool storage shed. Privately-owned floatplanes are docked in slips; wheeled aircraft are parked onshore in the same area. Floatplane fueling operations are conducted in the lake by fuel truck in accordance with Elmendorf Aero Club SOPs (2010), and include the use of containment boom. A 3,000-gallon aboveground fuel storage tank operated by the Sixmile Sportsmen's Club is located in the same area, and provides additional floatplane refueling capabilities. Floatplane engine servicing activities are also conducted on the lake in accordance with Elmendorf Aero Club SOPs (2010).

The primary recreational activity in the area of the Proposed Action is fishing. Otter Lake and Upper and Lower Sixmile Lakes are frequented year round by military and civilian anglers. A Watchable Wildlife site is located at the entrance to Lower Sixmile Lake, where visitors can see spawning and migrating salmon from July through September.

3.8 AESTHETICS AND VISUAL RESOURCES

Aesthetics and visual resources in the area of the Proposed Action are characterized by the natural spaces, lakes, riparian corridors, forests, and semi-remote atmosphere of the area. Military and civilian residents utilizing Otter Lake, Otter Creek, Upper and Lower Sixmile Lakes, and Sixmile Creek areas are typically present for some primary recreational activity (e.g., fishing, boating, camping, etc.) other than visual resources, except in the case of the Watchable Wildlife platform located at the entrance to Lower Sixmile Lake.

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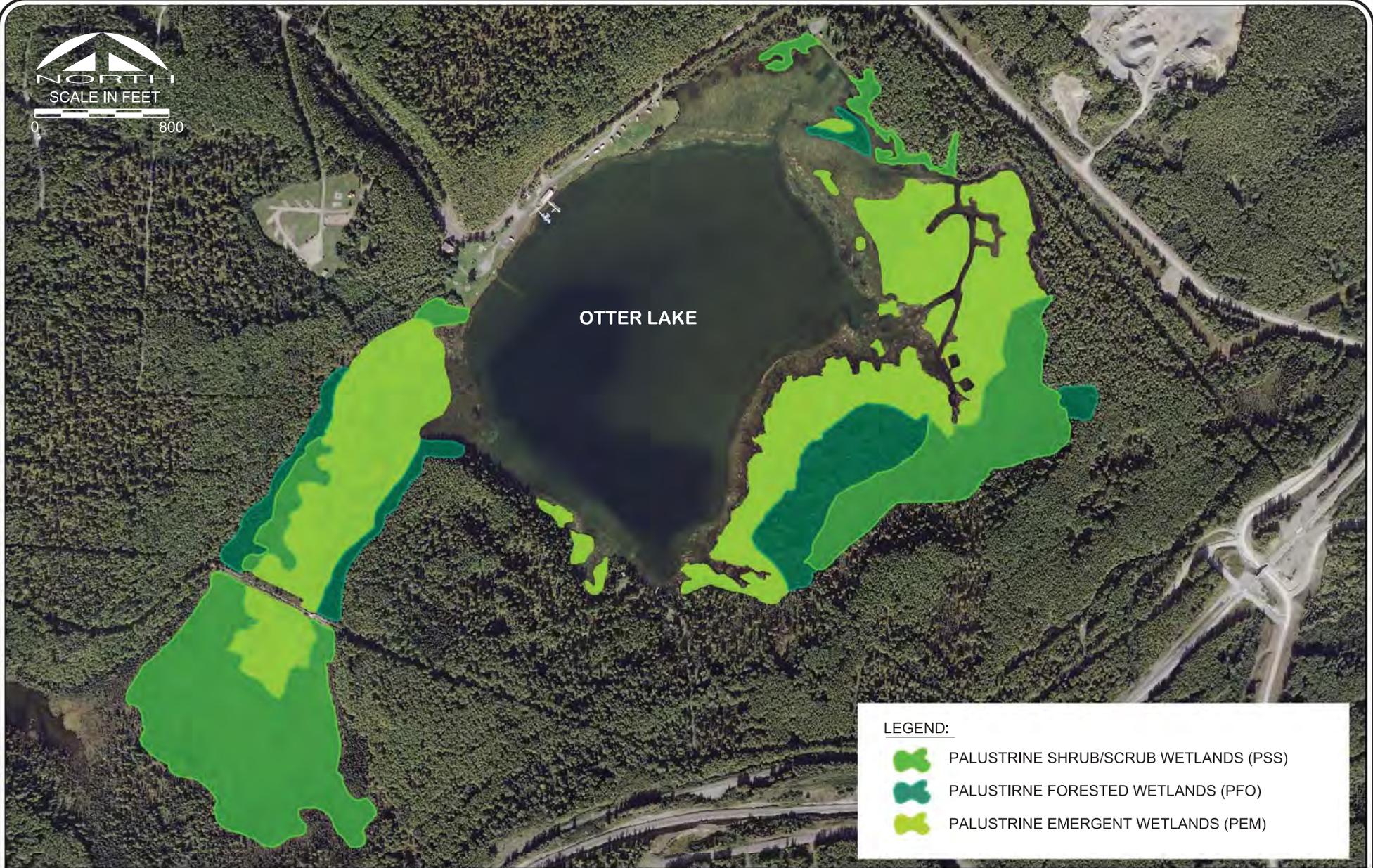


FIGURE 6

JOINT BASE ELMENDORF - RICHARDSON, 673d CIVIL ENGINEERING SQUADRON
WATERSHED ENHANCEMENT ENVIRONMENTAL ASSESSMENT

OTTER LAKE WETLANDS



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4.0 ENVIRONMENTAL CONSEQUENCES

This section presents the potential environmental consequences to resources in the area of the Proposed Action and Phase II Option. Effects from the Proposed Action are organized by location: Otter Lake and Sixmile Creek watershed. Phase II impacts are inclusive of those for the Proposed Action; therefore, potential impacts presented under “Phase II Option” include only those associated with the additional activities in the Otter Creek watershed: stocking of coho salmon and removal of physical barriers to fish passage.

4.1 THREATENED AND ENDANGERED SPECIES

4.1.1 Proposed Action

Otter Creek Watershed Enhancements

The Proposed Action at Otter Lake is not expected to directly impact the CIBW. All mammals contain gastrointestinal enzymes which neutralize rotenone when ingested orally, so no effects to CIBWs from rotenone are expected. The likelihood of indirect adverse impacts to CIBWs from consuming fish that survive the rotenone treatment is low because:

- Rotenone deactivation measures would be employed to prevent a lethal dose of rotenone from migrating beyond the largest beaver dam on Otter Creek and reaching downstream areas where CIBW prey species exist.
- Residues of rotenone in tolerant fish that survive a rotenone treatment do not last for more than several days, because the bioaccumulation potential for rotenone is low and the half-life of rotenone in fish is approximately one day (Finlayson et al., 2000). If CIBWs did consume prey species that survived the treatment, naturally-occurring enzymes present in all mammals would neutralize the rotenone.

Indirect effects could benefit the CIBWs by minimizing the likelihood of pike escapement from the Otter Lake system into other Cook Inlet watersheds, reducing potential pike predation on CIBW prey species.

Consultation with NMFS has been completed to ensure no adverse effects to CIBWs from the Proposed Action. State and federal permits are required for rotenone application, as well as a Pesticide Discharge Management Plan and Treatment Plan, which will be submitted to the appropriate authorities (i.e., ADEC) if this action is selected. Once submitted, the pesticide permit application and Treatment Plan will be available for public review in accordance with Alaska Administrative Code (AAC) 18 AAC 15.020, 18 AAC 15.050, and 18 AAC 90.520.

Sixmile Creek Watershed Enhancements

The Proposed Action in the Sixmile Creek watershed is expected to directly benefit the CIBW by enhancing anadromous fish productivity in the system, which is currently diminished due to aerial predation on juvenile fish as they navigate the existing steep-pass fish ladder. Belugas feed at river mouths in the Cook Inlet area, but since they do not always feed at the streams with the

highest runs of fish (NMFS, 2008), increasing the availability of salmon would not likely impact CIBW feeding habits to any large degree.

4.1.2 Phase II Option – Additional Otter Creek Watershed Enhancements

The Phase II Option, stocking Otter Lake with coho salmon and removing physical barriers to anadromous fish passage along Otter Creek, would directly benefit the CIBWs by restoring the system to a productive salmon fishery and increasing the availability of CIBW prey species. Belugas feed at river mouths in the Cook Inlet area, but since they do not always feed at the streams with the highest runs of fish (NMFS, 2008), increasing the availability of salmon would not likely impact CIBW feeding habits to any large degree.

4.1.3 No Action

Otter Creek Watershed Enhancements

Rotenone would not be applied to Otter Lake and therefore pike removal would not occur at Otter Lake. As a result, no beneficial impacts would accrue to the CIBW. The threat of escape invasive northern pike, with potential subsequent adverse impacts to Eagle River salmonid populations, would still remain. It is possible that increased predation could occur if the pike population increases over time at Otter Lake. It is possible that adverse impacts to the CIBW could result in the future.

Sixmile Creek Watershed Enhancements

No improvements, for the benefit of juvenile fish, would be made to the existing fish ladder or channel of Sixmile Creek. As a result, no beneficial impacts would accrue to the CIBW. Aerial predation of juvenile fish would continue at Sixmile Creek and could result in diminished returns of anadromous fish (e.g., salmon), if rate of predation increases in the future. It is likely that Sixmile Creek would continue to sustain anadromous fish populations; however, the strength of those returns could be diminished if aerial predation increases. It is possible that adverse impacts to the CIBW could result in the future.

Phase II Option – Additional Otter Creek Watershed Enhancements

No improvements will be made at Otter Creek to facilitate fish passage. Since pike and salmon are known to be in the Otter Creek watershed, the existing barriers may prevent quicker colonization by pike, although excluding salmon species at the same time. Also, no stocking of Otter Lake with coho salmon would occur to attempt to augment the salmon population. As a result, no increase to prey for the CIBW is anticipated.

4.2 FISH AND WILDLIFE

4.2.1 Proposed Action

Otter Creek Watershed Enhancements

All animals, including fish, insects, birds, and mammals, have natural enzymes in the digestive tract that neutralize rotenone when ingested orally. Fish (and some forms of amphibians and aquatic invertebrates) are more susceptible because the rotenone is absorbed directly into the bloodstream through the gills, and prevents oxygen in the blood from being utilized during respiration. Although rotenone has some toxicity to all oxygen-breathing animals, it is selective to fish and other gill-breathing organisms.

In general, most common aquatic invertebrates are less sensitive than fish to rotenone. Some types of zooplankton (cladocerans and copepods) are equally sensitive, but can survive the treatment during some life stages. Snails and clams are quite tolerant. Shad, pike, trout, and salmon are among the most sensitive fish species. The risk of terrestrial animal mortality is considered low, since there are not likely to be rotenone residues on terrestrial animal forage items (Finlayson et al., 2010).

The rotenone application is intended to eradicate invasive northern pike from Otter Lake. Eliminating northern pike and restocking the lake with rainbow trout will encourage the system to return to a healthy, functioning fishery, as well as reduce the probability of pike migrating out of the system and into nearby watersheds. It is anticipated that all fish in the lake at the time of the treatment will be killed, including incidental species other than pike. Dead fish will likely sink to the bottom of the lake in approximately 1 to 4 days. The process of decomposition will release nutrients back into the water, directly stimulating phytoplankton production and indirectly stimulating insect and zooplankton production. During decomposition, the biological oxygen demand may increase in the lake, which may have an effect on other aquatic species by decreasing the availability of dissolved oxygen (USFWS, 2008).

Fish- or invertebrate-eating birds and mammals may experience a temporary reduction in food sources from Otter Lake, and may consume dead or dying fish after the initial rotenone treatment. There is no indication that this temporary reduction results in any significant impacts to most bird or mammal populations, because most animals can utilize other water bodies and sources for food. Animals that consume rotenone-killed fish will not be affected, since rotenone residues in dead fish are generally very low (<0.1 ppm), unstable like those in water, and not readily absorbed through the gut of the animal eating fish (Finlayson et al., 2000). A bird weighing ¼ pound would have to consume 100 quarts of treated water or more than 40 pounds of fish and invertebrates within 24 hours to receive a lethal dose. This same bird would normally consume 0.2 ounces of water and 0.32 ounces of food daily; thus, a safety factor of 1,000- to 10,000-fold exists for birds and mammals (Finlayson et al., 2000).

The action of lowering the water level in Otter Lake surface to a level such that shallow, vegetated shoreline areas are exposed, and any fish inhabiting those areas are forced into the deeper portion of the lake. Lowering the lake level will minimize the chance of pike escaping or avoiding the rotenone treatment, maximizing its effectiveness. The lake would remain lowered for the remainder of the winter so that any fish that may have escaped to shoreline pool areas (and evaded the treatment) do not survive the winter. It is likely that pike already inhabit the

creek; however, if not, pike migrating into the creek increases the chances of their movement further downstream, potentially impacting prey species for creek-dependent fish and wildlife.

Sixmile Creek Watershed Enhancements

Removal of the existing steep-pass fish ladder at the outlet of Lower Sixmile Lake will beneficially affect anadromous fish populations in the Sixmile system by increasing the likelihood of smolt passage from Sixmile Creek into the lake. The current configuration not only physically impedes fish passage, but subject's juvenile fish to aerial predation. The new meandering, gradually-grading channel configuration will allow juveniles to enter the lake with a significantly reduced chance of predation by birds, and is expected to increase sockeye salmon smolt production from the Sixmile system by 100 to 200 percent.

Enhancing the salmon population in the Sixmile system may have the potential to attract bears that currently utilize the Sixmile corridor. It is unlikely that this would increase the potential for human-bear encounters. Sport fishing is prohibited within 300 feet of any fish weir or fish ladder (5 AAC 75), and access is further restricted by JBER in the Sixmile corridor downstream to the mouth of the creek where it flows into Cook Inlet.

4.2.2 Phase II Option – Additional Otter Creek Watershed Enhancements

If Phase II is conducted, coho salmon will be stocked in Otter Lake and physical barriers to anadromous fish passage will be removed or modified. Restoring the Otter Creek watershed to a functioning anadromous system is considered to be a positive outcome, as invasive northern pike have adversely impacted the fishery by reducing anadromous fish populations. It is likely that coho salmon introduced into Otter Lake would reach Otter Creek and other areas downstream after the beaver dams are removed. Eagle River and Eagle River Flats are already utilized by existing salmon populations, so introduction of a new population from the Otter Creek system would not likely impact the ecology of the area. Other salmon species, in addition to coho, may pioneer the Otter Creek watershed if physical barriers are removed. These salmon species already inhabit other nearby watersheds which feed the Eagle River system, and their introduction is not expected to adversely affect the system.

Enhancing the salmon population in the Otter Creek system may have the potential to attract bears that currently utilize the Otter Creek corridor. It is unlikely that this would increase the potential for human-bear encounters. Sport fishing is prohibited within 300 feet of any fish weir or fish ladder (5 AAC 75) , and the project area is further restricted by JBER – all property north of Loop Road, including Otter Creek and its drainage to Eagle River Flats, is off limits. A lack of access to Otter Creek also limits the potential for human-bear interactions.

Removal of physical barriers from the Otter Lake/ Otter Creek system could provide a potential pathway for pike from other watersheds to migrate into the system. This could put pike in direct competition with CIBW for salmon, but could be mitigated through ongoing pike management efforts. Phase II would only be conducted if the pike eradication portion of the Proposed Action at Otter Lake is successful; therefore, Phase II is not anticipated to result in pike entering the Eagle River watershed from Otter Lake. Beaver dam removal can negatively affect fish and fish

habitat by dewatering the upstream pond, stranding fish, and releasing sediment and large volumes of water (that can be devoid of oxygen, particularly in winter) downstream (FOC, 2012). Temporary impacts may include ground disturbance and the loss of small fish or mammals dependent on habitat created by beaver dams. Beavers would likely have to be either relocated or eradicated to prevent rebuilding of the dams.

4.2.3 No Action

Otter Creek Watershed Enhancements

Same as Section 4.1.3 for Otter Creek Watershed Enhancements.

Rotenone would not be applied to eradicate pike. As a result, fish and invertebrates in Otter Lake would not be exposed to Rotenone, which could be adversely affected. Scavenging birds and other wildlife would not be attracted to the shores of Otter Lake. The threat of escape of invasive pike, with potential subsequent adverse impacts to Eagle River salmonid populations, would still remain.

Sixmile Creek Watershed Enhancements

Same as Section 4.1.3 for Sixmile Creek Watershed Enhancements.

Juvenile fish would continue to have difficult negotiating the fish ladder and would continue to be subjected to aerial predation with the potential for diminished returns of anadromous fish in the future if predation increases. As a result, adverse impacts to anadromous fish would continue.

Phase II Option – Additional Otter Creek Watershed Enhancements

Same as Section 4.1.3 for the Phase II Option.

It is anticipated that pike and salmon species would continue to exist within the Otter Creek watershed. The threat of escape of invasive pike, with potential subsequent adverse impacts to Eagle River salmonid populations, would still remain. Also, the beaver dams and beavers would remain, which would continue as an obstruction to fish passage. As a result, adverse impacts to anadromous fish would continue.

4.3 SOILS, VEGETATION, AND WETLANDS

4.3.1 Proposed Action

Otter Creek Watershed Enhancements

The ability of rotenone to move through soil is low to slight (Finlayson et al, 2000). Rotenone, rotenolone, and semi-volatile organic compounds (naphthalene and methyl naphthalene) are transient in sediment from treatment areas. The reduction of concentrations of these compounds in sediments appears to lag about one to two weeks behind the reduction of concentrations in water. Rotenone is not expected to be biologically active in sediments, or upon resuspension of sediments (Finlayson et al., 2000), and no major long-term impacts to soils or sediments are

expected. Some vegetation in littoral areas may be affected, because project personnel may be required to walk through and would temporarily flatten some plants.

Rotenone's toxicity is related to inhibiting mitochondrial electron transport, which hinders the utilization of oxygen in respiratory animals, therefore; the treatment itself is not expected to have direct impacts on wetland vegetation. Potential impacts to wetlands could result from changes in hydrology related to the Otter Lake water level drawdown prior to rotenone application. Reducing the water level in Otter Lake will alter both the degree and duration of inundation for fringe wetlands that are dependent on Otter Lake hydrology. The drawdown will be initiated in mid-fall and will last through the winter until the lake naturally recharges the following spring and summer. The fall and winter water level changes will reduce the level of inundation and expose submerged vegetation to increased oxygen levels and freezing conditions.

The 54 acres of emergent wetlands that fringe Otter Lake would experience the largest changes in hydrology, and would likely exhibit the biggest impacts. Emergent vegetation is dependent on the water column for physical and chemical support and will likely senesce in its absence. Freezing of emergent vegetation and its soil would also likely cause widespread mortality. The 19 acres of shrub/scrub wetlands and 17 acres of forested wetlands would experience a smaller change in hydrology and are expected to experience only minor vegetation mortality. Changes in soil chemistry would be temporary. Wetland vegetation mortality would also be short term, and is expected to recover over time.

Wetlands. Executive Order 11990 requires federal agencies to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands. The Proposed Action at Otter Lake would not involve new construction in wetlands or the destruction or modification of wetlands. Although wetland vegetation would be temporarily disturbed or lost during the drawdown of Otter Lake, the loss of wetland vegetation would not result in the loss of a wetland as the wetland would still retain the characteristics of hydrology and soil.

Sixmile Creek Watershed Enhancements

Impacts at Sixmile Creek from construction activities include removal/modification of streambed material and streambank vegetation and soils in order to realign and grade the channel downstream of the fish ladder (to be removed). Gravel fill, concrete, and embedded stone will be placed in the channel; banks will be revegetated and stabilized with alder and willow. These impacts to Sixmile Creek are unavoidable, because the nature of the Proposed Action is intended to change this portion of the creek in order to improve fish passage. No tree clearing is anticipated as there is generally good access to Sixmile Creek. No major adverse impacts to Lower Sixmile Lake are expected from the Proposed Action.

Wetlands. The Proposed Action at Sixmile Creek would not involve new construction in wetlands or the destruction or modification of wetlands. Wetlands are not located in the project area.

4.3.2 Phase II Option – Additional Otter Creek Watershed Enhancements

Environmental impacts from Phase II to soils, vegetation, and wetlands would be similar to those expected for the Proposed Action; however, it is possible that tree clearing may be required to create access road to Otter Creek. Currently, the location and method of constructing the step-pools and reconfiguring the channel are not known and therefore quantity of trees that could be affected is not estimated. One additional effect may be the loss of a small wetland area created by the largest beaver dam (furthest downstream) if the dam is removed. However, the positive effects from removal of physical barriers, and beavers, as well as the introduction of coho salmon, from an ecological perspective, are expected to outweigh the potential adverse impacts from the loss of a small wetland area.

Wetlands. The Phase II Option would not involve new construction in wetlands, but loss of a small wetland is anticipated from removal of the beaver dams. This is an unavoidable loss that is believed to be offset by the benefits of restoring the watershed. Removal of the beaver dam and removal of pike (via application of rotenone prior to dam removal) that compete with the CIBW for salmon species may result in benefits to the endangered CIBW. No other alternatives are available to implement the Phase II option as the deficiencies with fish passage are specific to Otter Creek.

4.3.3 No Action

Otter Creek Watershed Enhancements

Rotenone would not be applied to Otter Lake and the drawdown of Otter Lake would not be conducted. No adverse impacts to soil or wetland vegetation would result under the No Action.

Sixmile Creek Watershed Enhancements

No work within the channel of Sixmile Creek would occur and the channel would remain in its natural state. No adverse impacts to soil or wetland vegetation would result under the No Action.

Phase II Option – Additional Otter Creek Watershed Enhancements

No work within the channel of Otter Creek would result. The channel would remain in its natural state, the beaver dams and beavers would remain, and loss of a small wetland would be avoided. No tree clearing would occur to provide site access. No adverse impacts to soil or wetland vegetation would result under the No Action.

4.4 WATER RESOURCES

4.4.1 Proposed Action

Otter Creek Watershed Enhancements

Otter Lake is not a drinking water source, and no drinking water intakes are located in the lake. Any water resource impacts at Otter Lake are not expected to be more than minor and short term.

The ability of rotenone to move through soil is low to slight; rotenone is strongly bound to organic matter in soil, so it is unlikely that rotenone would enter groundwater.

The concentrations of rotenone used for fish management are well below water quality levels considered toxic for human ingestion. Estimates of a single lethal dose to humans are 300 to 500 milligrams of rotenone per kilogram of body weight; a 160-pound person would have to drink over 23,000 gallons of water at the highest allowable piscicide treatment concentrations at one sitting to receive a lethal dose (Finlayson et al., 2000). The U.S. Environmental Protection Agency (USEPA) estimates the drinking water level of concern (DWLOC) to be 40 ppb for the most sensitive population subgroups (infants and children), and believes that under certain limited circumstances – e.g., drinking water intakes near lentic (standing) cold water treatment areas with no oxidative raw or finished water treatment – residues of rotenone in drinking water could exceed the DWLOC for up to several weeks (USEPA, 2007). Since Otter Lake is not a drinking water source, this potential risk is low. Project measures in place to mitigate for this potential include signage at Otter Lake informing visitors of rotenone application activities.

The metabolite of rotenone, rotenolone, persists longer than rotenone, particularly in cold lakes. Rotenolone can persist for up to six weeks in water temperatures below 10°C (50°F) at high elevations. Rotenolone is approximately one-tenth as lethal as rotenone. In the event that either rotenone or rotenolone persists, fish stocking should be delayed until both rotenone and rotenolone residues have declined to nondetectable (less than 2 ppb) levels (Finlayson et al., 2000).

Otter Lake outflows into Otter Creek, so it is possible that rotenone could migrate beyond the intended lake treatment area. If rotenone deactivation is required, KMnO_4 would be utilized as described in Section 2.1.1. It would be unlikely that rotenone in lethal concentrations would reach distances significantly downstream from Otter Lake, such as Eagle River Flats, because rotenone dissipates in flowing waters relatively quickly (less than 24 hours) due to dilution and increased rates of hydrolysis and photolysis (Finlayson et al., 2000). Additionally, there are numerous pools along the Otter Creek stream course in which the rotenone would have time to degrade.

Lowering the lake level could potentially result in ponding on the upstream side of the Otter Lake Road culvert, but this could be avoided or minimized by lowering the weir and releasing the lake water over a specified period of time.

Floodplains. EO 11988 requires federal agencies to avoid long- and short-term adverse impacts to floodplains as a result of construction in and modification of said floodplains (44 CFR 9). The application of rotenone at Otter Lake is not an action that will require construction in or modification of the floodplain, but the drawdown of the lake surface may temporarily increase flows in Otter Creek, potentially impacting the floodplain. The drawdown is necessary to reduce the lake volume, and any impacts are expected to be temporary and minor. Mitigation measures include controlling the release of water from Otter Lake into Otter Creek over a specified time period in order to reduce the potential for flooding downstream. There are no structures within the floodplain that would be impacted by the drawdown, and once the drawdown is completed, flow levels will stabilize and the potential for flooding will diminish. The Proposed Action at

Otter Lake would not involve floodplain development or result in adverse impacts to the floodplain such that the natural and beneficial values served by the floodplain are impaired or that the risk of flood loss (e.g., property and human health and safety) is increased.

State and federal permits are required to apply the piscicide rotenone to Otter Lake as part of the Proposed Action to remove northern pike. A Pesticide Discharge Management Plan and Treatment Plan have been prepared for the Proposed Action and will be submitted to the appropriate authorities (ADEC) if this action is selected. Once submitted, the pesticide permit application, along with the Treatment Plan, will be available for public review in accordance with 18 AAC 15.020, 18 AAC 15.050, and 18 AAC 90.520.

Sixmile Creek Watershed Enhancements

Sixmile Creek will be temporarily rerouted during removal of the fish ladder and reconfiguration of the creek channel. Activities will be conducted in the floodplain, but this is unavoidable, because the waterway itself is the location of construction. Minor construction impacts to water quality may occur as a result of concrete or other construction materials entering the waterway, as well as mobilization of sediments. These impacts are unavoidable and temporary, and will be mitigated through adherence to the ESCP and other required regulatory permits. Sixmile Creek is not used as a drinking water source, and the Proposed Action is not expected to adversely affect Sixmile Creek or Lower Sixmile Lake.

Floodplains. The Proposed Action at Sixmile Creek would not involve floodplain development, but would result in modification of the creek channel within the floodplain. The intent of the modification is to facilitate fish passage, not construction that would result in adverse impacts to the floodplain such that the natural and beneficial values served by the floodplain are impaired or that the risk of flood loss (e.g., property and human health and safety) is increased. There is no alternative to the Proposed Action at Sixmile Creek as the existing deficiencies pertaining to fish passage are specific to Sixmile Creek.

4.4.2 Phase II Option - Additional Otter Creek Watershed Enhancements

Environmental impacts from Phase II are similar to those from the Proposed Action at Sixmile Creek. Construction in a floodplain would occur at Otter Creek for the creation of the step-pools and reconfigure the creek channel. The Phase II Option would potentially include potential tree clearing to provide access to Otter Creek for the construction. No effects to water resources are expected from stocking coho salmon in Otter Lake.

Removal of beaver dams can negatively affect water quality by releasing sediment and large volumes of water (that can be devoid of oxygen, particularly in winter) downstream, potentially causing flooding, damage, and re-entry of dam material into the water body (FOC, 2012). These impacts could be mitigated to the extent possible through method selection and close coordination with ADF&G and any other appropriate regulatory agencies.

Similar to the drawdown of Otter Lake in the Proposed Action, Phase II activities have the potential to cause short-term flow increases downstream as the beaver dams are removed. However, impacts will be short term and the benefits associated with removal of the barriers

outweigh the potential for impacts to the floodplain. Monitoring of Otter Creek downstream of the dams may be necessary during dam removal.

Floodplains. The Phase II Option at Otter Creek would not involve floodplain development, but would result in work within the floodplain, namely: removal of the beaver dams and modification of the creek channel to include step-pools, which would facilitate fish passage. The intent of these modifications is to facilitate fish passage, not construction that would result in adverse impacts to the floodplain such that the natural and beneficial values served by the floodplain are impaired or that the risk of flood loss (e.g., property and human health and safety) is increased. There is no alternative to the Phase II Option at Otter Creek as the existing deficiencies pertaining to fish passage are specific to Otter Creek.

4.4.3 No Action

Otter Creek Watershed Enhancements

Rotenone would not be applied to Otter Lake and the drawdown of the lake surface would not occur. No water quality impacts or impacts to the floodplain would result under the No Action.

Sixmile Creek Watershed Enhancements

No work within the channel of Sixmile Creek would occur and the channel would remain in its natural state. No water quality impacts or impacts to the floodplain would result under the No Action.

Phase II Option – Additional Otter Creek Watershed Enhancements

No work within the channel of Otter Creek would occur and the channel would remain in its natural state. Beaver dams will remain in place preventing the release of stored sediments and dammed water. Loss of the small wetland discussed in Section 4.3.2 would be avoided and tent to preserve water quality. No water quality impacts or impacts to the floodplain would result under the No Action.

4.5 AIR QUALITY

4.5.1 Proposed Action

Otter Creek Watershed Enhancements

No major adverse effects to air quality are expected from the Proposed Action as no construction would occur under this component. However, the application of liquid rotenone formulations is sometimes associated with an aroma (similar to the smell of mothballs), which is likely due to airborne concentrations (greater than 40 ppb) of naphthalene and methylnaphthalene. This smell may last for several days, depending on air and water temperatures and wind direction. These relatively “heavy” organic compounds tend to sink in the air column and move downwind. These air quality effects are temporary, and have shown no adverse health effects, despite odor complaints (Finlayson et al., 2000). Objectionable odors may also occur as a result of decaying wetlands, vegetation, and fish; however, the area immediately surrounding Otter Lake is not densely populated, and is typically used only by recreationists.

Sixmile Creek Watershed Enhancements

Temporary impacts from construction of the newly configured stream channel may include airborne dust and noise disturbance. Activities will be conducted under the provisions of an ESCP, and fugitive dust mobilized as a result of construction is not expected to have long term effects.

4.5.2 Phase II Option – Additional Otter Creek Watershed Enhancements

Environmental impacts to air quality from Phase II are similar to those from the Proposed Action at Sixmile Creek, although more dust may be released as a result of dam removal. No substantially different effects are expected.

4.5.3 No Action

Otter Creek Watershed Enhancements

Rotenone would not be applied to Otter Lake and therefore no objectionable odors would occur. No negative impacts to air quality would result under the No Action.

Sixmile Creek Watershed Enhancements

No construction would occur at Sixmile Creek and therefore no air emissions or fugitive dust would occur. No negative impacts to air quality would result under the No Action.

Phase II Option – Additional Otter Creek Watershed Enhancements

No construction would occur at Otter Creek and therefore no air emissions or fugitive dust would occur. No negative impacts to air quality would result under the No Action.

4.6 CULTURAL RESOURCES

4.6.1 Proposed Action

Otter Creek Watershed Enhancements

An adverse impact on cultural resources occurs when an activity may alter, directly or indirectly, any of the characteristics of a historic property that qualify it for inclusion on the NRHP in a manner that would diminish the integrity of a property's location, design, setting, materials, workmanship, feeling, or association. Adverse effects may include: physical destruction; alteration of a property in any manner; removal of a property from its historic location; or a change in the character or surroundings of the property that contribute to its historic significance.

Two properties near Otter Lake have been identified by JBER archaeologists as former homestead sites. However, neither of the properties has been determined to be NRHP eligible. The application of rotenone itself will have no impact on the structures, since they are not located in Otter Lake or Otter Creek, and the structures will not be directly exposed to rotenone. Exposure to rotenone is not known to impact buildings or structures. During rotenone application, there is potential to encounter one or both of the two homesteads while walking the shoreline southwest of Otter Lake or walking along the bank of Otter Creek. However, it is

unlikely that there will be any direct or indirect impacts to the properties from the presence of humans walking nearby. The weir at Otter Lake is located in a developed area. Personnel will be working in this area during the drawdown of Otter Lake.

An archaeological survey of the project area has not been conducted. As a result, the presence or absence of archaeological sites is unknown at this time. Ground disturbing activities generally pose the greatest threat to archaeological sites. However, no ground-disturbing activities are planned for the Proposed Action at Otter Lake.

All project personnel will be instructed to avoid the homestead properties and to report if any new potential historic properties or cultural resources are encountered while in the field.

Sixmile Creek Watershed Enhancements

The two homestead sites located on either bank of Sixmile Creek, like those near Otter Lake, are not NRHP eligible. Removal of the fish ladder and reconfiguration of the stream channel are not expected to impact the structures downstream. There are no known archaeological sites located near the Sixmile Lake and Sixmile Creek project area. The fish ladder is located in a developed area. Personnel would be working in this area during the fish ladder removal and stream channel configuration. All project personnel will be instructed to avoid the homestead properties and to report if any new potential historic properties or cultural resources are encountered while in the field. Any digging, clearing, trenching, or other ground disturbing activity that has the potential to uncover prehistoric or historic archeological resources will be conducted in a manner that allows for work stoppage if cultural resources are discovered.

4.6.2 Phase II Option – Additional Otter Creek Watershed Enhancements

If Phase II is conducted, there is potential for increased ground disturbing activities and additional personnel to be in the vicinity of the homestead sites on Otter Lake. As a result, there is an increased likelihood that there will be impacts to cultural resources that may be present in the project area. However, the level of potential impact is still relatively low. As with the Proposed Action, all project personnel will be instructed to avoid the homestead properties and to report if any new potential historic properties or cultural resources are encountered while in the field. An archaeological survey will be conducted prior to ground disturbing activities, which would occur during beaver dam removal and step-pool construction/stream channel reconfiguration downstream from the Otter Lake Road culvert. Digging, clearing, trenching, or other project activities with the potential to uncover prehistoric or historic archeological resources will be conducted in a manner that allows for work stoppage if cultural resources are discovered. If human remains are encountered, notification procedures would proceed under JBER policy on the Inadvertent Discovery of Human Remains.

4.6.3 No Action

Otter Creek Watershed Enhancements

Rotenone will not be applied to Otter Lake and therefore no personnel will be conducting work in the area of Otter Lake. No known or unknown cultural resources will be disturbed. Personnel

would not be working near the identified homestead sites. No negative impacts to cultural resources would result under the No Action.

Sixmile Creek Watershed Enhancements

No construction would occur in the channel of Sixmile Creek. No known or unknown cultural resources will be disturbed. Personnel would not be working near the identified homestead sites. No negative impacts to cultural resources would result under the No Action.

Phase II Option – Additional Otter Creek Watershed Enhancements

No construction would occur in the channel of Otter Creek. No known or unknown cultural resources will be disturbed. No negative impacts to cultural resources would result under the No Action.

4.7 RECREATION

4.7.1 Proposed Action

Otter Creek Watershed Enhancements

No adverse effects to the health and safety of recreationists are expected from the rotenone application at Otter Lake, although certain recreational activities may be temporarily impacted. Rotenone does not cause birth defects, reproductive dysfunction, gene mutations, or cancer (Finlayson et al., 2000). When used according to label instructions for the control of fish, rotenone poses little, if any, hazard to public health. The use of rotenone for fish control does not present a risk of unreasonable adverse effects to humans (Finlayson et al., 2000). A reentry interval, or waiting period, for persons who swim or conduct primary recreation activities in waters treated with rotenone has not been shown to be necessary (Finlayson et al., 2000). Swimming in Otter Lake is not permitted. However, it may be perceived positively to post informational signs for recreationists visiting the lake. Recreationists would be able to utilize other nearby JBER lakes for any other activities that might be restricted at Otter Lake.

Since all species of fish in the lake at the time of treatment are expected to be killed, conditions for winter ice fishing, a common activity at the lake, will likely be very poor. The presence of dead fish in and near the lake may also deter recreationists and anglers from using the lake, as well as increase the potential to attract bears. Informational signs could include this information, and provide warnings and JBER contact information for any concerns. Fishing and recreational conditions would improve after restocking is conducted.

Lowering the lake surface will reduce the area and volume of water available for other activities at the lake, including boating (prior to freeze up), and skiing and skating (after freezing).

Sixmile Creek Watershed Enhancements

Enhancing fish populations in the Sixmile Lake system is not expected to affect existing recreational uses (e.g. fishing, boating, and floatplane usage) for any period beyond construction activities. Out-migrating salmon smolt were at record levels in 2012 (JBER, 2012a), and have shown steady increases under the existing recreational usage regime at the lakes. It is assumed

that current uses of the lake, including floatplane refueling and servicing operations, as well as motorized boat usage will continue. Since existing salmon numbers have increased despite these activities, the introduction (through fish passage enhancement) of additional salmon is not expected to be negatively impacted by continued usage of the lake.

Removal of the fish ladder and reconfiguration of the channel immediately downstream will impact the Watchable Wildlife platform, as it will be removed during construction. The platform will be replaced after construction, and the more natural aesthetics of the new stream channel configuration could be considered a positive effect. Recreational activities could be impacted if construction activities at the fish ladder require or result in lowering of the lake surface; however, any impacts are expected to be temporary and minor. Other JBER lakes are available for most recreational activities – except floatplane and motorized boat use. Impacts to these users could be minimized by posting informational signs informing user groups of expected dates of activity restrictions. Fishing conditions are expected to improve as a result of the Proposed Action, providing additional opportunities for recreationists. No other major negative impacts to recreation at Lower Sixmile Lake or Sixmile Creek are expected from the Proposed Action.

4.7.2 Phase II Option - Additional Otter Creek Watershed Enhancements

Impacts on recreation from the Phase II Option are similar to those for the Proposed Action at Sixmile Creek and Otter Lake. Phase II is expected to benefit the Otter Creek/Otter Lake system through the introduction of coho salmon and restoration to a functioning anadromous system. Fishing opportunities may increase as the overall health of the system is restored; salmon are a more highly sought fish than pike.

4.7.3 No Action

Otter Creek Watershed Enhancements

Rotenone would not be applied to Otter Lake. No impacts to recreation would occur as Otter Lake would remain open to authorized recreational activities. Fish would not be killed and act as an attractant for bears. No negative impacts to recreation would result under the No Action.

Sixmile Creek Watershed Enhancements

No improvements would be made to facilitate fish passage into Lower Sixmile Lake. Enhancement of fish populations would not result, although fish population would continue to exist in Sixmile Creek watershed and continue to support existing recreational opportunities. No negative impacts to recreation would result under the No Action.

Phase II Option – Additional Otter Creek Watershed Enhancements

No improvements would be made to facilitate fish passage into Otter Lake and no stocking of Otter Lake with coho salmon would occur. Enhancement of fish populations would not result, although fish population would continue to exist in Otter Creek watershed and continue to support existing recreational opportunities. No negative impacts to recreation would result under the No Action.

4.8 AESTHETICS AND VISUAL RESOURCES

4.8.1 Proposed Action

Otter Creek Watershed Enhancements

Adverse impacts on aesthetics and visual resources at Otter Lake are expected to be relatively minor and short term. Temporary impacts may include the visibility of dead or decaying fish for up to 4 days after the rotenone treatment, as well as the potential for dead and/or dying vegetation along the shoreline of the lake that will be exposed during the period of lowered water surface.

Sixmile Creek Watershed Enhancements

Sixmile Creek immediately downstream from Lower Sixmile Lake will experience temporary aesthetic and visual resource impacts as a direct result of the Proposed Action. The Watchable Wildlife platform will be removed during construction, and the creek will be rerouted to facilitate reconfiguration and grading of the channel. Removal of the existing fish ladder and reconfiguration to the meandering channel design is expected to enhance the visual experience of the area.

4.8.2 Phase II Option – Additional Otter Creek Watershed Enhancements

Impacts to aesthetic and visual resources from Phase II are similar to those as described for the Proposed Action at Sixmile Creek and Otter Lake. Removal of the beaver dams downstream from Otter Lake may result in dead and dying vegetation that will be visible along the banks of the creek (in the beaver pond areas), but these locations are not located along any major trails or viewing areas, are expected to recover over time. Construction during summer or fall may result in temporary impairment to aesthetics and visual resources. Construction work would likely occur during times when recreationists would likely be in the area.

4.8.3 No Action

Otter Creek Watershed Enhancements

Removal of pike would not occur in Otter Lake. No dead or decaying fish would litter the shores of the lake. Vegetation would not be affected incidentally. No negative impacts to aesthetics and visual resources would result under the No Action.

Sixmile Creek Watershed Enhancements

No construction would occur in the Sixmile Creek. The Watchable Wildlife platform would not be removed and remain available for observers. No negative impacts to aesthetics and visual resources would result under the No Action.

Phase II Option – Additional Otter Creek Watershed Enhancements

Same as Sixmile Creek and Otter Creek Watershed Enhancements. No construction would occur in the Otter Creek and therefore no disruption to aesthetics and visual resources would result.

No dead or dying vegetation would occur along the banks of Otter Creek. No negative impacts to aesthetics and visual resources would result under the No Action.

5.0 CUMULATIVE EFFECTS

CEQ regulations require that cumulative effects consider the potential environmental consequences from “the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions” (40 CFR 1508.7).

Anchorage is the most highly industrialized area of Alaska, and JBER is a developed military installation within the Anchorage municipal boundaries. Both areas regularly conduct actions that contribute to cumulative impacts on the greater Anchorage area. Past, present, or reasonably foreseeable future actions which may contribute to cumulative impacts with respect to the Proposed Action include:

- POA expansion
- Proposed Resumption of Year-round Firing Opportunities (RYFO)
- Forestry and Invasive Species Management

POA Expansion. The POA expansion has been underway since 2004 and, when combined with the Proposed Action and Phase II Option, may have a cumulative effect on air quality during construction activities. However, the Proposed Action and Phase II Option are of a much smaller scale, and is being conducted as mitigation for adverse impacts to wetlands and fish habitat resulting from POA expansion activities. Since the Proposed Action and Phase II Option are intended to offset POA expansion impacts, major cumulative impacts are not expected,

Proposed RYFO. The RYFO is currently in the NEPA process. The key overlapping areas between the RYFO and the Proposed Action and Phase II Option are the Eagle River Flats and the lower reach of Otter Creek. If the RYFO project moves forward, it may, when combined with the Proposed Action and Phase II Option, have a cumulative effect on water resources, fish and wildlife, and the CIBW in the Eagle River Flats area. Impacts to water resources, fish, and wildlife from the Proposed Action and Phase II Option are expected to be temporary and minor; potential impacts to the CIBW are considered beneficial, because the Proposed Action and Phase II Option will be enhancing a key CIBW prey species. Belugas feed at river mouths in the Cook Inlet area, including Eagle River and Eagle River flats, but since they do not always feed at the streams with the highest runs of fish (NMFS, 2008), increasing the availability of salmon would not likely impact beluga feeding habits to any large degree. Watershed enhancement activities at Otter Creek, under the Phase II Option, is compatible with the proposed RYFO, because activities are not expected to greatly change the existing CIBW feeding habits in the Eagle River Flats area.

Alternative 2 (preferred alternative) of the RYFO Environmental Impact Statement (EIS – USAGFR, 2010) proposes a habitat protection buffer (no-fire zone) in and along open waters of Otter Creek and the Eagle River Flats to protect habitat and wildlife during times when wildlife abundance is high (e.g., summer). Salmon use Eagle River primarily as a travel corridor and, under existing conditions, firing only occurs in the winter when salmon populations are lower; however, buffers do not currently exist along the river channel banks as proposed under Alternative 2 of the RYFO EIS. Existing information does not suggest that current uses of the

Eagle River Flats have adversely impacted salmon populations. Additionally, the Proposed Action and Phase II Option are expected to have no mission impacts on proposed Army training activities (JBER, 2012c). It has been noted that salmon may be sensitive to noise impacts. Although noise may affect salmon, the proposed habitat protection buffers in the RYFO EIS (Alternative 2) are expected to provide an acceptable buffer distance to minimize noise impacts to salmon and/or other marine mammals that may be present in the waterways. If Alternative 2 is selected, potential noise impacts to existing salmon populations would affect any future increased salmon runs (as a result of the Proposed Action and Phase II Option) to the same extent. Additionally, implementation of Alternative 2 is not expected to affect the continued use of Eagle River and Otter Creek by salmon.

Forestry and Invasive Species Management. The proposed Forestry and Invasive Species Management project at JBER would involve the application of chemicals for management of some invasive species throughout the installation, primarily beyond the Main Cantonment Area. This project is in the early planning stages, and a NEPA analysis would occur sometime in the future to assess for potential cumulative impacts.

Summary. No major adverse cumulative impacts to the natural or human environment are expected from the Proposed Action and Phase II Option. Though temporary effects to recreation, fish, vegetation, and wetlands are expected, they do not represent a large decrease in the health of the environment in the project area. The eradication of pike populations at Otter Lake is considered a positive effect, because they are an invasive species and have negatively-impacted anadromous species in Southcentral Alaska.

Temporary air and water quality impacts from construction at the Sixmile Creek/Lower Sixmile Lake interface and Otter Creek (Phase II Option) represent a cumulative impact when considered in relation to past, present, and reasonably foreseeable future actions. However, these effects are likely negligible when compared against the environmental benefits of the Proposed Action and Phase II Option.

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APPENDIX A

Informal Consultation

Analysis of Potential Effects of JBER Watershed Enhancements on the Cook Inlet Beluga (CIB) and its Critical Habitat

Joint Base Elmendorf-Richardson, Alaska- 2012



Submitted to:

National Marine Fisheries Service (NMFS)
Protected Resources Division
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Analysis of Potential Effects of JBER Watershed Enhancements on the Cook Inlet Beluga (CIB) and its Critical Habitat

Project overview: JBER is proposing watershed enhancement projects that would enhance salmon productivity in Sixmile Creek and restore anadromous habitat in the Otter Creek watershed. These projects, outlined in the document “Watershed Enhancement Environmental Assessment”, consist of the following components: 1) Sixmile enhancements- removal of existing fish ladder and replacement with more effective fish passage system; and 2) Otter Creek enhancements-elimination of invasive northern pike from Otter Lake using gill netting and rotenone (Phase I), restocking Otter Lake with rainbow trout (Phase I), removal of beaver dams in Otter Creek (Phase II option) and modification of Otter Creek stream channels to create spawning habitat and enable anadromous fish passage through the creek and into the lake (Phase II option).

Action area and species effected: The action area for this proposed action includes Sixmile Creek, from the outlet of lower Sixmile Lake to its terminus in Knik Arm and the Otter Creek watershed to include Otter Lake and Otter Creek. While no listed endangered species are known to occur in this action area, the endangered Cook Inlet beluga whale does use the waters immediately adjacent to these action areas to include the waters of Knik Arm at the mouth of Sixmile Creek and the Eagle River at its confluence with Otter Creek. Similarly, designated Cook Inlet beluga critical habitat does not occur in the project action area but is rather adjacent to the Sixmile portion of the project. Additionally, fish species identified in the critical habitat designation as primary prey items of the CIB (PCE2), to include four species of Pacific salmon, do occur in the project area.

Effects of the action on the CIB and its prey species: The following brief discussion outlines the potential effects to the CIB and those prey species (Pacific salmon) found in the action area, as a result of the proposed action. The discussion is organized per major component of the action with an analysis of the potential effects to CIB critical habitat immediately following.

Sixmile Creek fish ladder removal and construction of fish passage system: Temporary effects from construction to include ladder removal and replacing it with a more effective fish passage system has the potential to increase stream turbidity and downstream sedimentation but these are expected to be minor and confined to the construction period itself which will occur in the spring when impacts to salmon during critical life stages are greatly reduced (e.g. after eggs have hatched and before spawning begins). A more effective fish-passage system is expected to increase salmon productivity in the Sixmile drainage and therefore should provide a benefit to the CIB that use Knik Arm. The potential for an adverse affect to the CIB from this component of the proposed action are unlikely and therefore insignificant.

Otter Lake rotenone application: Rotenone could theoretically directly affect individual belugas through either direct toxicity (i.e. direct exposure to chemical in water) or indirect toxicity (i.e. secondary exposure to chemical through ingestion of rotenone-containing prey items). Potential indirect effects include reduction of prey species populations and degradation of water quality.

Effects to belugas: Direct exposure to the chemical is not likely to occur as detectable concentrations of rotenone are not expected to reach the areas where belugas could be feeding (e.g. confluence of Otter Creek and Eagle River) due to the relatively quick rate of dissipation in flowing waters both from dilution and from increased rates of hydrolysis and photolysis (summarized in Finlayson et al., 2000). This potential is further lessened by built-in conservation measures such as caged sentinel fish in Otter Creek and deactivation of rotenone with KMNO_4 as required.

In the unlikely event of beluga exposure to detectable concentrations of rotenone as a result of this project, it is even more unlikely that these levels of the chemical would have an adverse impact on a whale. While there are no studies available on the potential effects to marine mammals from exposure to rotenone, studies on terrestrial mammals have shown that dermal exposure to rotenone in water is not very efficient (Turner et al, 2007) and that it is poorly absorbed in the gastrointestinal tract of mammals (Finlayson et al, 2000). Additionally, it has been found that the mammalian digestive system has enzymes that neutralize rotenone (Finlayson et al, 2000). Studies directed at humans, for instance, have indicated that a 160 lb person (roughly the same size as a newborn beluga calf) would have to drink over 23,000 gallons of water containing rotenone at the highest allowable piscicide treatment concentrations at one sitting to receive a lethal dose (Finlayson et al., 2000).

It is highly unlikely that belugas would have access to fish killed by rotenone as the majority of fish carcasses in Otter Lake would sink to the bottom of the lake and would thus not be available to belugas in Eagle River. It is theoretically possible that a fish surviving rotenone exposure could migrate to an area where belugas are foraging. Since rotenone has low bioaccumulation potential in fish and a short fish-tissue half-life (about 24 hours) (Finlayson et al, 2000), however, it is unlikely that ingestion of a fish that survived rotenone exposure would result in any adverse effects to a beluga. Additionally, due to the rotenone-neutralizing enzymes in the mammalian digestive system, any rotenone that may be present in a surviving fish would be broken down during digestion.

Based on the reasons given above, JBER has determined that the potential for direct effects on the CIB from exposure to rotenone either through contact in the water or ingestion during prey consumption is unlikely and therefore insignificant.

Effects to beluga prey: While rotenone does indeed kill fish, including CIB prey species, it is unlikely that rotenone, in concentrations lethal to fish, would reach ERF due to a relatively high dissipation rate in flowing water (less than 24 hours). As previously discussed, this potential is further lessened by built-in conservation measures such as caged sentinel fish in Otter Creek and deactivation of rotenone with KMNO_4 . Additionally, rotenone does not kill fish eggs and thus would not impact any salmon eggs residing in Otter Creek (Finlayson et al, 2000). JBER has thus determined that the potential for a significant direct reduction of beluga prey species from this component of the project is unlikely and therefore insignificant.

Effects to water quality: Impacts to water quality in the Otter Lake watershed are expected to be minor and short term. As mentioned previously, detectable concentrations of rotenone are not expected to reach Eagle River. While rotenone and its metabolite, rotenolone (approx $1/10^{\text{th}}$ as lethal as rotenone)

are expected to last for a maximum of six weeks in cold water temperatures such as those found in Otter Lake in the fall (Finlayson et al, 2000), it is expected that monitoring and deactivation as described above will keep levels of the chemicals at a sublethal level in Otter Creek.

Additionally, rotenone binds strongly to organic matter found in soil and sediment (Turner et al, 2007), a characteristic that further decreases concentrations of the chemical in water. JBER has thus determined that the potential for degradation of water quality in the Otter Creek watershed to adversely affect the CIB or its prey is unlikely and therefore insignificant.

Removal of beaver dams in Otter Creek and modification of Otter Creek stream channels: Temporary effects from removal of the beaver dams and modification of Otter creek stream channels include the potential for increases in stream turbidity and downstream sedimentation but these are expected to be minor and confined to the construction period itself which will occur in the spring when impacts to salmon during critical life stages are greatly reduced (e.g. after eggs have hatched and before spawning begins). Note that while rotenone from the pike removal is likely to adsorb to the sediment interned behind and within the beaver dams, the proposed dam removal and consequent disturbance of this sediment would occur months after the application of rotenone and thus dissipation of rotenone in the sediment is expected to be complete. These modifications to the stream are expected to restore the system to an anadromous status and thus potentially result in an increase in salmon productivity in this watershed and therefore should provide a benefit to the CIB that use Knik Arm. The potential for an adverse affect to the CIB from this component of the proposed action are unlikely and therefore insignificant.

Effects of the action on CIB critical habitat:

PCE1: Intertidal and subtidal waters of Cook Inlet (depths <30 ft at MLLW) that are within 5 miles of high and medium flow anadromous fish streams. No component of this proposed action would result in change to the waters of Knik Arm. JBER has determined that the potential for an adverse affect to this PCE as a result of this project is highly unlikely and therefore discountable.

PCE2: Fish species deemed to be the primary prey species of the CI beluga including Chinook salmon, sockeye salmon, chum salmon, coho salmon, Pacific eulachon, Pacific cod, walleye Pollock, saffron cod, and yellowfin sole. As outlined above, this project will not result in a significant reduction in either the quantity or quality of beluga prey. On the contrary, this project is designed to enhance natural runs of salmon in Sixmile Creek and to restore anadromous habitat in the Otter Lake watershed. JBER has thus determined that the potential for an adverse affect to this PCE as a result of this project is unlikely and therefore insignificant and that this project will be beneficial to beluga prey species in these two drainages.

PCE3: The absence of toxins or other agents of a type or amount harmful to beluga whales. As outlined above, the concentration of rotenone in either the water or prey accessible to the CIB resulting from the removal of pike in Otter Lake are not expected to rise to a level that would be harmful to a beluga. As such, JBER has determined that the potential for adverse affect to this PCE as a result of this project is unlikely and therefore insignificant.

PCE4: Unrestricted passage within or between critical habitat . The proposed action does not coincide with designated critical habitat and would not restrict beluga passage within or between critical habitat. JBER has thus determined that the potential for adverse affect to this PCE as a result of this project is highly unlikely and therefore discountable.

PCE5: The absence of in-water noise at levels resulting in the abandonment of habitat by CI beluga whales. The only noise-generating components of this proposed action would be the potential operation of heavy equipment used in construction phases of the project. All construction during this proposed action would be located well inland such that noise from heavy equipment would attenuate to background levels prior to reaching beluga-accessible waters. JBER has thus determined that the potential for adverse affect to this PCE as a result of this project is highly unlikely and therefore discountable.

Determination of effects summary: This document considers the potential effects, both direct and indirect, on the Cook Inlet belugas and their critical habitat from proposed watershed enhancements on JBER, Alaska. All direct and indirect effects of this action on the Cook Inlet beluga and its critical habitat were determined to be either beneficial, discountable or insignificant. Therefore, JBER has determined that the proposed watershed enhancements may affect, but are not likely to adversely affect the Cook Inlet beluga whale or its critical habitat. JBER requests that NMFS concur with this determination.

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APPENDIX B

Letter of Concurrence



**UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration**

National Marine Fisheries Service
P.O. Box 21668
Juneau, Alaska 99802-1668

February 20, 2013

Mr. Allan D. Lucht
Deputy Director
673 CEG/CD
3646 Arctic Warrior Drive
JBER, Alaska 99506-3221

Re: Watershed Enhancement Environmental Assessment

Dear Mr. Lucht:

The National Marine Fisheries Service (NMFS) has completed informal consultation under section 7(a)(2) of the Endangered Species Act of 1973, as amended (ESA), regarding the Joint Base Elmendorf-Richardson's (JBER) proposal to conduct watershed enhancement activities in the Otter Creek and Sixmile Creek watersheds. The proposed action in the Otter Creek watershed includes: 1) eliminating northern pike (*Esox lucius*) from Otter Lake via gill netting and applying piscicide rotenone; and 2) restocking the lake with rainbow trout. The proposed action in the Sixmile Creek watershed includes removing the existing fish ladder at the Lower Sixmile Lake outlet and replacing it with a modified stream channel design to facilitate fish passage. A Phase II option includes additional enhancements in the Otter Creek watershed, based on the efficacy of pike eradication efforts. If conducted, Phase II activities include stocking Otter Lake with coho salmon (*Oncorhynchus kisutch*) and removing/modifying physical barriers impeding anadromous fish passage between Eagle River and Otter Lake. Based on our analysis of the information provided to us in JBER's letter (October 9, 2012) and Biological Assessment (November 2012), NMFS concurs with JBER's determination that the proposed actions in the Otter Creek and Sixmile Creek watersheds may affect, but are not likely to adversely affect, the endangered Cook Inlet beluga whale (*Delphinapterus leucas*) or its critical habitat. In fact, indirect impacts could benefit Cook Inlet beluga whales by reducing pike predation on their prey species.

A complete administrative record of this consultation is on file in this office. While the proposed action may affect Cook Inlet beluga whales and its critical habitat, our assessment finds that any such effects do not rise to the level of 'take' as defined in the ESA, are insignificant (such effects could not be meaningfully measured or detected), discountable (such effects would not reasonably be expected to occur), or beneficial (such effects are contemporaneous positive effects with no adverse effects to listed species). The rationale for this determination is discussed below.



Listed Species and Critical Habitat Affected by the Action

Two marine mammal species listed under the ESA could occur in Knik Arm: 1) endangered Cook Inlet beluga whales exist in marine habitats directly adjacent to JBER and have been observed within JBER boundaries via Eagle River; and 2) endangered western distinct population segment (DPS) Steller sea lions (*Eumetopias jubatus*) may potentially be within close proximity to JBER, but occur infrequently. There are only two reports of an individual Steller sea lion in upper Knik Arm: 1) one Steller sea lion in transit in Eagle Bay during fall 2009; and 2) a lone Steller sea lion observed just north of the Port of Anchorage during spring 2011. Given the rarity of Steller sea lion observations in Knik Arm and the fact that sea lions have no designated critical habitat in upper Cook Inlet, JBER considered only the potential impacts to Cook Inlet beluga whales and associated critical habitat.

Cook Inlet Beluga Whales

Cook Inlet beluga whales are a small, isolated population generally found in the shallow, coastal waters of upper Cook Inlet. The 2012 abundance estimate for this endangered whale population is 312 animals, with a ten year trend (2002-2012) of -0.6 percent (Hobbs et al. 2012). Information from aerial surveys, satellite tagged beluga whales, and opportunistic sightings indicate these whales remain in Cook Inlet year round (Hobbs et al. 2005). During summer and fall, beluga whales concentrate near coastal mudflats and river mouths. In the winter their distribution changes, most likely because of sea ice that makes inhabiting shallow waters hazardous for whales. By December, whales begin to move offshore away from the concentrated areas in upper Cook Inlet and their range widens as they begin using the central offshore waters (around East and West Forelands). This pattern continues through March.

Within Knik Arm, beluga whale abundance is highly variable. During 19 years of aerial surveys (1994-2012) conducted by NMFS during the first weeks of June, beluga whale abundance in Knik Arm ranged from 263-0 whales (NMFS 2008; Hobbs et al. 2012). During seven years of aerial surveys (2005-2012) conducted by NMFS during mid-August, beluga whale abundance in Knik Arm ranged from 95-0 whales (Rugh et al. 2006; Shelden et al. 2011), with recent estimates of 11-27 whales (Sims et al. 2012). JBER personnel conducting ground based surveys for Cook Inlet beluga whales from the mouth of Eagle River observed as many as 140 whales in Eagle Bay during August. While beluga whales may use Knik Arm to some extent during all months of the year, their use is heavily concentrated in the fall (August-November) and greatly diminished during December-July (Ezer 2011).

Beluga whales move with the tides and often retreat to lower Knik Arm during low tides, then move north of Eagle Bay in upper Knik Arm during high tides (NMFS 2008). While beluga whales were observed in Eagle Bay during all tides, beluga whales are most often observed two hours after high tide (ebb tide) until about two hours before the next high tide (flood tide).¹ Beluga whales have been observed in Eagle River from June to

¹ Garner, C. 2012. Joint Base Elmendorf Richardson, Anchorage, Alaska. Personal communication.

November, as far inland as 2.4 kilometers (km) (1.5 miles [mi]) upstream (CH2M Hill 1997). The whales gather elsewhere on the east side of Knik Arm and sometimes in Goose Bay on the west side of Knik Arm.

Critical Habitat

Beluga whale critical habitat includes two geographic areas of marine habitat in Cook Inlet that comprise 7,800 square kilometers (km²) (3,013 square miles [mi²]). This includes all of Knik Arm, except waters by the Port of Anchorage that are east of a line connecting Cairn Point (61°15.4' N., 149°52.8' W.) and Point MacKenzie (61°14.3' N., 149°59.2' W.), and north of a line connecting Point Mackenzie and the north bank of the mouth of Ship Creek (61°13.6' N., 149°53.8' W.). These areas are bounded on the upland by the Mean High Water line but do not extend into the tidally-influenced channels of tributary waters in Knik Arm, near the action area. Area 1 of critical habitat is 1,918 km² (741 mi²) of marine habitat north of a line from the mouth of Threemile Creek (61°08.5' N, 151°04.4' W) connecting to Point Possession (61°02.1' N, 150°24.3' W). Area 2 is 5,891 km² (2,275 mi²) of marine habitat, south of Area 1 to southern parts of Cook Inlet, including Kachemak Bay. The action area occurs in critical habitat Area 1, within Knik Arm.

JBER's project is planned for Otter Creek and Sixmile Creek watersheds, outside of designated critical habitat for beluga whales. JBER will prevent potential adverse effects from reaching downstream critical habitat areas in Cook Inlet (for example, rotenone deactivation measures would be employed). Therefore, JBER concluded that the proposed activities will not affect any critical habitat. As a result, this letter does not analyze critical habitat impacts.

Action Area

Federal regulations promulgated under the ESA provide that a project's "action area" includes "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." The action area is typically larger than the footprint of the action and extends out to a point where no measureable effects from the project occur.

The action area for this proposal includes those areas where direct and indirect effects from JBER's proposed activities in the Otter Creek and Sixmile Creek watersheds may occur, which includes re-establishing important prey species for Cook Inlet beluga whales.

Otter Creek Watershed Enhancements

The Otter Creek watershed (Figure 1) is a tributary to Eagle River. Otter Lake is a recreation area serving both military and civilian residents of Anchorage. A military recreational development has been maintained on the west side of the lake since the 1950s. The spring-fed stream flowing into Otter Lake enters a historic channel of Eagle River and flows north into the lake. The creek flows from the lake through a weir, continues to the north and into the Eagle River flats, Eagle River, and ultimately Knik Arm. Otter Creek has been dammed below the lake by beavers since the 1960s. Currently there are at least three beaver dams along the creek between Otter Lake and Eagle River flats (Figure 2).

The largest dam is approximately 2.4-2.7 meters (m) (8-9 feet [ft.]) high and acts as a physical barrier to anadromous fish, impeding adult salmon from moving upstream and entering the lake. Fish that are able to bypass the beaver dams and move upstream then encounter a culvert beneath Otter Lake Road, which has insufficient flow depth for fish passage. The weir itself acts as a velocity barrier, further impeding fish from entering the lake.

Otter Lake was treated with rotenone in 1973 to remove a large population of three-spined stickleback (*Gasterosteus aculeatus*) which was infected with a tapeworm and in heavy competition with rainbow trout (*Oncorhynchus mykiss gairdneri*) for food (Davis 1973). No information is available on the results from this effort, but it is assumed to have been effective because the lake recovered and functioned as a robust anadromous system until the illegal introduction of northern pike around 2000 (POA 2011).

The Alaska Department of Fish and Game (ADFG) ended its decades-long rainbow trout stocking program in Otter Lake sometime after 2000, when it determined that northern pike were consuming the majority of the stocked fish. Coho salmon commonly spawn in the Eagle River system and are found in Otter Creek below the furthest-downstream beaver dam.



Figure 1. Otter Creek and Sixmile Creek watersheds map

Sixmile Creek Watershed

The Sixmile Creek watershed (Figure 1) encompasses approximately 1,770 acres and is fed by up to 30 springs. The creek was dammed in two locations in 1951, creating two road crossings and Lower and Upper Sixmile Lakes. The original stream channel is visible in the shallow waters of the lakes.

A fish ladder was constructed at the Lower Sixmile Lake outlet sometime in the 1970s or 1980s to allow anadromous fish access into the Sixmile Lake system. The Lower Sixmile Lake water surface is approximately 1.1 m (42 inches) above Sixmile Creek at the lake outlet. The current steep-pass fish ladder at the outlet is perched and extends beyond a concrete spillway. While adult salmon and trout can negotiate the ladder, it serves as a velocity barrier for most juvenile salmon and small trout. Additionally, the existing configuration exposes juvenile fish to aerial predation by birds. Black-billed magpies are commonly observed preying on fry as they attempt to swim up the concrete apron of the spillway.



Figure 2. Otter Creek physical barriers.

Knik Arm

JBER is situated across rolling upland plains near the head of Knik Arm, Cook Inlet. The Sixmile Creek watershed, adjacent to the Otter Creek watershed, drains directly into Knik Arm, southwest of Eagle River. Salmon use, or have historically used, the Otter Creek and Sixmile Creek drainages as spawning habitat and are important to the overall ecology of Knik Arm and Cook Inlet. Although beluga whale abundance is highly variable in Knik Arm, they are observed in the area during May and typically use Knik Arm all summer to feed on various salmon runs, moving with the tides. Beluga whales use Eagle Bay and Knik Arm more intensively in August through the fall, coinciding with the coho salmon runs.

Description of the Action

The proposed action in the Otter Creek watershed is to: 1) eliminate northern pike from Otter Lake via gill nets and piscicide rotenone application; and 2) restock the lake with rainbow trout. The proposed action in the Sixmile Creek watershed is to remove the existing fish ladder at the Lower Sixmile Lake outlet and replace it with a modified stream channel design to facilitate fish passage.

Otter Creek Watershed Enhancements

Rotenone Background Information

Rotenone is used as a piscicide to eradicate targeted fish species from water bodies. Rotenone is a naturally-occurring substance, derived from the roots of tropical plants in the bean family Leguminosae. Although rotenone is very insoluble in water, other materials can be added to disperse it throughout the water column in deep lakes and flowing waters. Rotenone is used either as a powder from ground-up plant roots, or extracted from the roots and formulated as a liquid. Liquid formulations contain dispersants and emulsifiers (primarily naphthalene, methylnaphthalenes, and xylenes) that add little, if any, toxicity but disperse the rotenone throughout the water (Finlayson et al. 2010).

Fish (and some forms of amphibians and aquatic invertebrates) are susceptible because the rotenone is absorbed directly into the bloodstream through the gills, which prevents oxygen in the blood from being used during respiration. Although rotenone has some toxicity to all oxygen-breathing animals, it is selective to fish and other gill-breathing organisms at concentrations used for fish eradications. In general, most common aquatic invertebrates are less sensitive than fish to rotenone. Shad (*Alosa* spp.), pike, trout, and salmon are among the most sensitive fish species. The risk of terrestrial animal mortality is considered low because it is unlikely for rotenone residues to be found on terrestrial animal forage items (Finlayson et al. 2010).

Plants, birds, adult amphibians, and mammals are not affected by rotenone because they lack that rapid absorption route through gills that fish experience. Rotenone is much less toxic to mammals and birds because the route of ingestion is through the gut where much of the compound is broken down to less toxic components before toxic quantities can

enter the bloodstream (Ott 2006). There are no known health impacts to humans when rotenone is used in fish removal projects, according to direction on the Environmental Protection Agency approved rotenone product labels.

Typically, it takes less than 30 minutes for rotenone to affect small fish, but may require several hours to kill larger fish. Water treated with rotenone is usually nontoxic to fish within two weeks of application, depending on sunlight exposure, water temperature, and alkalinity. The optimal temperature for rotenone application to remove the target fish is 21 degrees Celsius (°C) (70° Fahrenheit [°F]). Otter Lake is typically 4.4-10 °C (40°-50°F) in the fall when the rotenone application is planned, thus the retention and degradation times will be extended.

Chemical deactivation using potassium permanganate (KMnO₄) is the standard method for rotenone neutralization. Neutralization effectiveness is measured by the ability of caged fish (i.e., sentinel fish) to survive in water downstream from the 30 minute KMnO₄ contact zone. Generally, sentinel fish are placed above the point of KMnO₄ injection and at the end of the 30 minute contact zone. KMnO₄ is toxic to fish at relatively low concentrations and is more toxic in alkaline water than soft water. However, if KMnO₄ concentrations are in balance with rotenone concentrations, then toxic levels of KMnO₄ are reduced through the oxidation of organic components and rotenone (Finlayson et al. 2010).

Prior to the rotenone application effort, the Otter Lake weir would be lowered so the water level would go down during a 1-2 week period. The objective is to lower the lake surface to a level such that shallow, vegetated shoreline areas are exposed, and any fish inhabiting those areas are forced into the deeper portion of the lake. Lowering the lake level will minimize the chance that pike will escape or avoid the rotenone treatment, maximizing its effectiveness. The lake would remain lowered for the winter so that any fish that may have escaped to shoreline pool areas (and evaded the rotenone treatment) do not survive the winter.

Gill Netting

Northern pike eradication would initiate with gill net capture techniques approximately one week prior to rotenone application. Gill nets would be set near the inflow and outflows of Otter Lake, as well as dragged throughout the lake in a systematic manner, to catch the most pike. Gill nets would again be employed a minimum of one time after the rotenone application; possibly during the winter season and again during the spring.

Rotenone Application

All rotenone applications would be conducted according to label directions and guidance and best management practices as specified in Rotenone Use in Fisheries Management: Administrative and Technical Guidelines Manual (Finlayson et al. 2000) and the Rotenone Standard Operating Procedures (SOP) Manual (Finlayson et al. 2010). All required safety measures would be adhered to as part of this project. The rotenone application would be conducted under the on-site supervision of an ADFG employee that possesses an Alaska Qualified Applicator Certificate.

Live fish bioassays will be conducted in Otter Lake the day before the rotenone treatment to determine the appropriate rotenone concentration to be used. The maximum allowable treatment concentration is 200 parts per billion (ppb) (USEPA 2009) and will not be exceeded. The volume of product required for treatment will be calculated based on bioassay results and the total volume in the lake.

Rotenone would be applied to Otter Lake by means of boats, rafts, backpack sprayers (from the shoreline), rotenone bricks, or other floatation devices. Where water is more than 4.6 m (15 ft.) deep, the rotenone mixture will be applied to lower depths using a point source delivery system. Residual pools on the lake bottom would be treated with rotenone from boats or shore, depending on the pool size, volume, and location.

Rotenone application may also occur in Otter Creek between the lake and the beaver dams, as practicable, based on the likelihood of pike in those areas. The ultimate downstream extent of the rotenone applications will be determined and conducted in coordination with ADFG. Rotenone would be applied to flowing waters by means of drip stations and hand type sprayers, backpack sprayers, or other similar devices. Small pockets of water along the creek bank, or where it becomes intermittent, would be sprayed by hand if feasible.

The potential exists for rotenone to migrate downstream beyond the intended treatment area. It is anticipated that any rotenone that moves downstream would be sufficiently diluted to a level that would not adversely impact fish species beyond Otter Creek. However, the following project elements are intended to minimize downstream migration potential, as well as maximize treatment efficacy:

- Rotenone application at a low flow period (i.e., during fall), allowing it to break down naturally within Otter Lake and Otter Creek.
- If need during the application rotenone neutralization will occur using KMnO₄ in Otter Creek.

It is expected that up to 70 percent of rotenone-killed fish will sink to the bottom of the lake (Bradbury 1986). Dead fish visible on the lake surface and shoreline will be collected daily until freeze-up by ADFG or JBER and disposed at the Anchorage Regional Landfill. Dead fish observed after break-up in the spring will also be collected and disposed.

Rotenone Degradation and Neutralization

The rotenone degradation rate in Otter Lake would be monitored via water and sediment sample laboratory analysis, as well as qualitatively through the use of sentinel fish. Composite samples from the sediment and mid-water column would be collected the day prior to, as well as after, the rotenone treatment. Periodic sampling would continue until rotenone is no longer detected.

Chemical deactivation using KMnO₄ will be conducted in accordance with the Rotenone SOP Manual (Finlayson et al. 2010) and coordinated with ADFG. Prior to the rotenone treatment, sentinel fish would be placed in the lake and monitored. During and after the rotenone treatment, sentinel fish placed in Otter Lake and Otter Creek will be used to determine if: 1) neutralization of water entering Otter Creek will be necessary; and 2) the

rotenone adequately mixed throughout the water column. Sentinel fish would be monitored every two hours for the first day, and daily thereafter for one month. If sentinel fish monitoring indicates that rotenone is migrating beyond Otter Lake and into Otter Creek, a KMnO₄ neutralization drip station would be installed. The drip station would be located either at the weir or in Otter Creek, downstream from the largest beaver dam, in order to neutralize the water before it enters the Otter Creek channel that connects to Eagle River. Neutralization concentrations would be calculated based on existing flow conditions and detected rotenone levels.

After the treatment, water samples will be tested to monitor the break down of rotenone. These samples will help indicate when the lake can be reopened for recreation and when sentinel fish should be placed in the lake to test survivability. However, two rotenone applications are often required in less than optimal conditions; if large numbers of northern pike remain after the first application, a re-application may be performed. All decisions will be coordinated with ADFG.

Lake Restocking

After all rotenone applications have been conducted, it may be necessary to verify that the lake has sufficiently detoxified prior to restocking activities. If so, live fish would be placed in a minnow bucket and suspended in the lake for up to 24 hours. If all fish survive, it would be assumed the rotenone had sufficiently degraded and the lake would be considered ready for restocking. Additional benthic macroinvertebrate and zooplankton sampling would also be conducted to assess ecosystem recovery and assure sufficient prey biomass prior to restocking. Once it is determined the rotenone is sufficiently degraded, then the lake would be stocked with rainbow trout. Stocking would be conducted using standard practices, and would be conducted in coordination with ADFG.

Sixmile Creek Watershed Enhancements

The existing fish ladder and spillway design at the outlet of Lower Sixmile Lake will be replaced with a meandering configuration that would facilitate small fish passage into Sixmile Lake without the use of a fish ladder (Figure 3). The final design for the new stream channel will be formalized with qualified hydrologists and fishery biologists familiar with optimizing stream channels for anadromous fish migrations.

Reconfiguring the existing creek segment would involve in-water grading to create a meandering channel that gradually increases in grade between the creek and Sixmile Lake, rather than the abrupt increase in grade that currently exists at the fish ladder. The final configuration is expected to produce a roughened channel that is approximately 27 m (88 ft.) long, 3 m (10 ft.) wide, and with a 4 percent slope. Gravel fill will be used to achieve the desired slope. It will be capped with concrete and embedded stone to prevent subsurface water seepage and to enforce integrity during high flows. Natural rock and gravel will be placed on the concrete and contoured into desirable habitat, configured with resting areas for fish. Areas will be designed to minimize predation opportunities. Revegetation using alder and willow species would occur along the new spillway. No heavy equipment will be used in the creek or lake during construction.

In general, removing the existing fish ladder and constructing the stream configuration is expected to be completed in the following sequence:

1. Survey and utilities identified.
2. Erosion and sediment control site prepared.
3. Relocate the observation platform and bear resistant trash receptacle.
4. Create new streambed loop to the north side of creek; concrete form constructed, rock placement, finishing, and position prewashed streambed material.
5. Stream flow diverted into new stream channel.
6. Remove existing fish ladder and fill spillway gap.
7. Site backfill and streambed reclamation.
8. Streambed and bank reclamation, include revegetation.
9. Install informational kiosk, replace observation platform and trash receptacle.
10. Additional stream bank reclamation with placing over-story vegetation.

A JBER Erosion and Sediment Control Plan will be prepared by the contractor to mitigate for potential impacts from construction activities. Additional agency coordination and permitting may occur.



Figure 3. Sixmile Creek proposed channel.

Phase II Option

Additional Otter Creek Watershed Enhancements

A Phase II option includes all activities at Otter Lake and the Sixmile Creek watershed as already described, as well as additional enhancements in the Otter Creek watershed. This option adds a consideration after the successful rainbow trout stocking in Otter Lake. At this time, JBER and ADFG would determine if stocking the lake with coho salmon is appropriate. Stocking with coho salmon would restore the Otter Creek watershed to a fully functioning anadromous fish system. The decision would be based on assessing the effectiveness of the pike eradication efforts. If it is determined that pike have been completely removed from the system, then Otter Lake would be stocked with coho salmon and physical barriers impeding anadromous fish passage between Eagle River and Otter Lake (beaver dams, weir/channel configuration at the lake outlet, and culvert beneath Otter Lake Road) would be removed or modified. Should JBER move forward with Phase II, all activities would be conducted in coordination with appropriate regulatory agencies.

Otter Creek Beaver Dam Removal

Phase II activities include removal of up to three known beaver dams on Otter Creek that currently restrict anadromous fish passage. At least one dam, the largest and furthest downstream, has been on the creek since the 1960s and is a substantial structure. The other two known dams are progressively smaller in size, moving upstream. The dam removals would be conducted in coordination with appropriate regulatory agencies and would use approved removal techniques. It is likely the beavers that inhabit the dams would need to be relocated or eradicated; the final course of action would be coordinated with ADFG. The beaver dam removals would occur only after northern pike eradication was verified, to minimize the possibility that northern pike may migrate from the Otter Creek watershed into Eagle River and Cook Inlet.

Otter Creek Fish Passage and Spawning Habitat Enhancement

Phase II includes stream channel modifications to the section of Otter Creek immediately downstream from the Otter Lake weir, to create spawning habitat and enable anadromous fish passage into the lake. A series of step-pools would be created to allow fish to bypass the weir and enter the lake, since the weir currently acts as both a height and velocity barrier. As part of the step-pool design, the stream channel immediately downstream from the weir would be modified into a meandering configuration, similar to the proposed design at Sixmile Creek, to create favorable spawning habitat. The final design would be selected in coordination with ADFG.

The culvert beneath Otter Lake Road would be modified so that through flow would be of a sufficient depth to allow for effective fish passage. This would be accomplished by installing a water level control structure on the downstream end of the culvert to increase flow depth. The stream channel immediately downstream from the culvert would then be modified into a series of step pools to allow fish easy access over the water level control structure and into the culvert.

All stream channel modifications and fish passage configurations would adhere to those outlined in NMFS Anadromous Salmon Passage Facility Design (2008a).

Effects of the Action

The ESA section 7 implementing regulations (50 CFR 402.02) define “effects of the action” as:

The direct and indirect effects of an action on the species or critical habitat together with the effects of other activities which are interrelated or interdependent with that action, that will be added to the environmental baseline. The environmental baseline includes the past and present impacts of all federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process. Indirect effects are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur.

There are three possible determinations of effects under the ESA:

No Effect: The proposed action or interrelated or interdependent actions will not affect (positively or negatively) listed species or their habitat.

May affect, not likely to adversely affect: The proposed action or interrelated or interdependent actions may affect listed species or their habitat, but the effects are expected to be insignificant, discountable, or entirely beneficial.

Insignificant effects relate to the size of the impact and should never reach the scale where a take will occur.

Discountable effects are those that are extremely unlikely to occur. Based on best judgment, one would not 1) be able to meaningfully measure, detect, or evaluate insignificant effects; or 2) expect discountable effects to occur.

Beneficial effects are contemporaneous positive effects with no adverse effects to listed species.

May affect, likely to adversely affect: The proposed action or interrelated or interdependent actions may have measurable or significant adverse effects on listed species or their habitat. Such a determination requires formal ESA Section 7 consultation.

Determinations are also required regarding the effects of a federal action on any designated critical habitat for listed species.

Otter Lake

The proposed action at Otter Lake is not expected to directly impact the Cook Inlet beluga whale. All mammals contain gastrointestinal enzymes that neutralize rotenone when ingested orally, so no direct effects to Cook Inlet beluga whales from rotenone are expected. The likelihood of indirect adverse impacts to Cook Inlet beluga whales from consuming fish that survive the rotenone treatment is low because:

- Rotenone deactivation measures would be employed to prevent the rotenone from migrating beyond Otter Lake to downstream areas where Cook Inlet beluga whale prey species exist.
- Residues of rotenone in tolerant fish that survive a rotenone treatment do not last for more than several days because the bioaccumulation potential for rotenone is low, and the half-life of rotenone in fish is approximately one day (Finlayson et al. 2000). If Cook Inlet beluga whales did consume prey species that survived the treatment, naturally-occurring enzymes present in all mammals would neutralize the rotenone.

For the reasons described above, we concur with JBER's determination that rotenone application is not likely to adversely affect Cook Inlet beluga whales. Any adverse effects can be considered discountable because they would not reasonably be expected to occur.

Sixmile Creek Watershed

The proposed action in the Sixmile Creek watershed is expected to benefit Cook Inlet beluga whales by enhancing anadromous fish productivity in the system, which is currently diminished due to aerial predation on juvenile fish as they navigate the existing steep-pass fish ladder. Beluga whales feed at river mouths in the Cook Inlet area, but since they do not always feed at the streams with the highest runs of fish (NMFS 2008), increasing the availability of salmon would not likely impact Cook Inlet beluga whale feeding habits to any large degree.

The conservation effort will allow for small fish passage into Sixmile Lake, by removing the non-working fish ladder and spillway and replacing it with a meandering stream. We concur with JBER's determination that effects from this construction are not likely to adversely affect Cook Inlet beluga whales. In fact, the passage for small fish, particularly salmon that is a preferred prey item for Cook Inlet beluga whales, could result in beneficial effects to the whales.

Phase II Option

The Phase II option, stocking Otter Lake with coho salmon and removing physical barriers to anadromous fish passage along Otter Creek, may benefit Cook Inlet beluga whales by restoring the system to a productive salmon run and increasing the availability of prey species to the whales.

With this conservation effort to stock the anadromous coho salmon in Otter Lake and remove all physical barriers that impede migration, we concur with JBER's determination that this activity is not likely to adversely affect Cook Inlet beluga whales. In fact, additional salmon in Knik Arm, a preferred prey item for Cook Inlet beluga whales, could result in beneficial effects to the whales.

Conclusion

We have considered the potential effects of JBER's watershed enhancement activities on the endangered Cook Inlet beluga whale and its critical habitat. We concur with JBER's conclusion that the direct and indirect effects associated with the watershed enhancement proposal may affect but are not likely to adversely affect Cook Inlet beluga whales or their designated critical habitat. Our assessment finds that any such effects do not rise to the level of take as defined in the ESA, are insignificant (such effects could not be meaningfully measured or detected), or are discountable (such effects would not reasonably be expected to occur); and may result in beneficial effects to the whales.

This concludes consultation for this action. Reinitiation of this consultation is required where discretionary federal agency involvement or control over the action has been retained (or is authorized by law) and if: 1) take of a listed species occurs, 2) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered, 3) the action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not previously considered, or 4) a new species is listed or critical habitat is designated that may be affected by the action.

If there are any questions please contact Barbara Mahoney in our Anchorage office at 907-271-3448.

Sincerely,



James W. Balsiger, Ph.D.
Administrator, Alaska Region

cc: Christopher Garner christopher.garner.9@us.af.mil
Brent Koenen brent.koenen@elmendorf.af.mil

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APPENDIX C

IICEP Letters and Responses



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS, 673D AIR BASE WING
JOINT BASE ELMENDORF-RICHARDSON, ALASKA

100 10

MEMORANDUM FOR SEE DISTRIBUTION LIST

FROM: 673 CES/CD
6346 Arctic Warrior Drive
JBER AK 99506-3221

SUBJECT: Environmental Assessment (EA) for Watershed and Fisheries Enhancement
Activities at Joint Base Elmendorf-Richardson (JBER), Alaska.

1. Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and its implementing regulations, the United States Air Force (USAF) intends to prepare an EA to evaluate the potential environmental consequences of a proposal to conduct watershed and fisheries enhancement activities at Sixmile and Otter Lake(s)/Creek(s) located at JBER, Alaska. The proposed action includes eradicating northern pike from Otter Lake and restocking it with rainbow trout, as well as removing the fish ladder at Lower Sixmile Lake and modifying the channel of Sixmile Creek to facilitate small fish passage. An additional aspect of the proposal (Phase II Option) includes Otter Creek watershed enhancements to facilitate anadromous fish passage into Otter Lake.
2. The USAF will publish a notice of availability (NOA) of the Draft EA in local newspaper(s) and on the JBER website (<http://www.jber.af.mil/environmental/index.asp>). The NOA will initiate the public comment period and explain the method for submitting comments on the Draft EA.
3. In an effort to analyze the potential effects of the proposed action, the USAF or its contractor, MWH Americas, Inc., may contact you in their data collection efforts. Please provide any requested information as soon as possible in order to be considered during the preparation of the Draft EA, which is anticipated to be released for public comment in August 2012.
4. If you have any specific question about the proposal, we would like to hear from you. Please feel free to contact Ms. Linda Serret, NEPA Coordinator, at (907) 384-2444 or linda.serret.ctr@us.af.mil. General questions may also be directed to Mr. Bob Hall, Public Affairs, at (907) 552-8152 or robert.hall.58@us.af.mil. In advance, we thank you for your assistance in this matter.

A handwritten signature in black ink, appearing to read "MS", is located below the main text.

MICHAEL E. SCHMIDT, GS-14
Deputy Director

1 Attachment:
Distribution List

Distribution List

Federal Agencies

U.S. Department of Agriculture
Natural Resources Conservation Service
800 W. Evergreen Avenue, Suite 216
Palmer, AK 99645-6546

Attn: Jim Fincher
U.S. Department of Interior
Bureau of Land Management
Anchorage Field Office
4700 BLM Road.
Anchorage, AK 99507-2599

Attn: Pamela Bergmann
U.S. Department of Interior
Office of Environmental Policy & Compliance
Anchorage Regional Office
1689 C Street, Room 119
Anchorage, AK 99501-5126

U.S. Department of Interior
Bureau of Indian Affairs
Anchorage Agency
3601 C Street, Ste. 1100
Anchorage 99503-5947

Attn: Sue Masica
U.S. Department of Interior
National Park Service
Alaska Regional Office
240 W 5th Avenue, Ste. 114
Anchorage, AK 99501

Attn: Bob Lewis
U.S. Department of Transportation
Federal Aviation Administration
Alaska Region
222 West 7th Avenue # 14
Anchorage, AK 99513

Attn: David Miller
U.S. Department of Transportation
Federal Highway Administration
Alaska Division
709 W. 9th Street, Room 851
Juneau, AK 99802-1648

Attn: Robert Bouchard
U.S. Department of Transportation
Maritime Administration
1200 New Jersey Ave., SE (mar-510, #w21-224)
Washington, DC 20590

Attn: Richard Krochalis
U.S. Department of Transportation
Federal Transit Administration, Region 10
Jackson Federal Building
9 15 Second Avenue, Ste. 3142
Seattle, WA 98174- 1002

Attn: Dennis McLerran
U.S. Environmental Protection Agency
Region 10
1200 Sixth Avenue, Ste. 900
Seattle WA 98101

Attn: Dianne Soderlund
U.S. Environmental Protection Agency
Region 10
EPA Alaska Operations Office
222 West 7th Avenue #19
Anchorage AK 99513-7588

Attn: Geoffrey Haskett
U.S. Fish and Wildlife Service
Alaska Regional Office
1011 East Tudor Road
Anchorage, AK 99503

Attn: Ann Rappoport
U.S. Fish and Wildlife Service
Anchorage Fish & Wildlife Field Office
Fisheries & Ecological Services
605 West 4th Avenue, Room G-61
Anchorage, AK 99501

Attn: Barbara Mahoney
National Marine Fisheries Service
Protected Resources Div/Habitat Conservation Div
222 W 7th Avenue, Box 43
Anchorage AK 99513

State Agencies

Attn: Kristin Ryan & Michelle Bonnet
Alaska Department of Environmental Conservation
555 Cordova
Anchorage, AK 99501

Attn: Alice Edwards & Larry Dietrick
Alaska Department of Environmental Conservation
410 Willoughby Ave, Ste. 303
Juneau, AK 99801

Attn: Mark Burch
Alaska Department of Fish and Game
Division of Wildlife Conservation
333 Raspberry Road
Anchorage, AK 99518- 1599

Environmental Assessment for Watershed and Fisheries Enhancement Activities at Joint Base Elmendorf-Richardson (JBER), Alaska.

Attn: Daniel S. Sullivan
Alaska Department of Natural Resources
Office of the Commissioner
550 W. 7th. Avenue, Ste 1400
Anchorage, AK 99501

Attn: Brent Goodrum
Alaska Department of Natural Resources
Division of Mining, Land and Water
550 W. 7th Ave, Ste 1070
Anchorage, AK 99501-3579

Attn: Judith Bittner
Alaska Department of Natural Resources
Office of History and Archaeology
550 W 7th Avenue, Ste. 1310
Anchorage AK 99501

Attn: Claire LeClair
Alaska Department of Natural Resources
Parks and Outdoor Recreation
550 W. 7th Avenue, Ste. 1380
Anchorage. AK 99501-3561

Attn: Robert A. Campbell
Alaska Department of Transportation & Public
Facilities
Central Region
4111 Aviation Avenue
Anchorage AK 99519

Attn: John Parrot & John Johansen
Alaska Department of Transportation & Public
Facilities
Ted Stevens Anchorage International Airport
PO Box 196960
Anchorage AK 99519

Local Agencies/Councils

Attn: Christopher Aadnesen
Alaska Railroad Corporation
327 W. Ship Creek Avenue
Anchorage AK 99510-7500

Community Councils Center
1057 West Fireweed Lane, Suite 100
Anchorage, Alaska 99503

Eagle River Community Council
13135 Old Glenn Hwy, Ste 200
Eagle River AK 99577

Fairview Community Council
1121 E. 10th Avenue
Anchorage AK 99501

Attn: Bob French
Government Hill Community Council
P. O. Box 101677
Anchorage AK 99510

Attn: Don Crandall
Mountain View Community Council
P.O. Box 142824
Anchorage AK 99514

Attn: Jerry Weaver, Jr.
Municipality of Anchorage
Community Planning & Development
4700 Elmore Road
Anchorage AK 99507

Attn: Kevin Smestad
Northeast Community Council
7600 Boundary Avenue
Anchorage AK 99504

Attn: Richard Wilson
Port of Anchorage
2000 Anchorage Port Road
Anchorage. AK 99501

Attn: Marc Van Dongen
Port MacKenzie
350 East Dahlia Avenue
Palmer AK 99645

Libraries

Alaska Resources Library and Information Services
Library Building, Ste. 111
3211 Providence Dr
Anchorage, AK 99508

Alaska State Court Law Library
303 K Street
Anchorage AK 99501

Alaska State Library
P.O. Box 110571
Juneau AK 99811

Chugiak-Eagle River Branch Library
12001 Business Blvd., Ste. #176
Eagle River Town Center
Eagle River, AK 99577

Joint Base Elmendorf-Richardson Library
123 Chilkoot Avenue
JBER AK 99505

Palmer Public Library
655 S Valley Way
Palmer, AK 99645

Wasilla Public Library
391 N. Main Street
Wasilla AK 99654

Z. J. Loussac Public Library
3600 Denali Street
Anchorage, AK 99503

Representatives/Members/Senators

Attn: Assembly Members
Anchorage Assembly
P.O. Box 196650
Anchorage, AK 99519-6650

Attn: Ernie Hall
Anchorage Assembly
632 W. 6th Avenue, Ste. 250
Anchorage, AK 99501

Attn: Mayor Dan Sullivan
632 W. Sixth Avenue, Ste. 840
Anchorage AK 99501

Attn: Congressman Don Young
2314 Rayburn House Office Building
Washington, DC 20515

Attn: Congressman Don Young
4241 B Street, Ste. 203
Anchorage, AK 99503

Attn: Senator Mark Begich
Peterson Tower
510 L St, Ste. 750
Anchorage, AK 99501

Attn: Senator Mark Begich
111 Russell Senate Office Building
Washington, DC 20510

Attn: Senator Lisa Murkowski
709 Hart Senate Building
Washington, D.C. 20510

Attn: Senator Lisa Murkowski
510 L Street, Ste. 600
Anchorage, AK 99501

Attn: Governor Sean Parnell
550 West 7th Avenue, Suite 1700
Anchorage, AK 99501



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS, 673D AIR BASE WING
JOINT BASE ELMENDORF-RICHARDSON, ALASKA

JUL 10

MEMORANDUM FOR SEE DISTRIBUTION LIST

FROM: 673 CES/CD
6346 Arctic Warrior Drive
JBER AK 99506-3221

SUBJECT: Environmental Assessment (EA) for Watershed and Fisheries Enhancement
Activities at Joint Base Elmendorf-Richardson (JBER), Alaska.

1. Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and its implementing regulations, the United States Air Force (USAF) intends to prepare an EA to evaluate the potential environmental consequences of a proposal to conduct watershed and fisheries enhancement activities at Sixmile and Otter Lake(s)/Creek(s) located at JBER, Alaska. The proposed action includes eradicating northern pike from Otter Lake and restocking it with rainbow trout, as well as removing the fish ladder at Lower Sixmile Lake and modifying the channel of Sixmile Creek to facilitate small fish passage. An additional aspect of the proposal (Phase II Option) includes Otter Creek watershed enhancements to facilitate anadromous fish passage into Otter Lake.
2. The USAF will publish a notice of availability (NOA) of the Draft EA in local newspaper(s) and on the JBER website (<http://www.jber.af.mil/environmental/index.asp>). The NOA will initiate the public comment period and explain the method for submitting comments on the Draft EA.
3. Please let us know if you have any general concerns that could be addressed in the Draft EA. If you believe this proposal will significantly affect any tribal right(s) or protected resource(s), we invite you to consult with us on a government-to-government basis, in accordance with the Department of Defense *American Indian and Alaska Native Policy* and Executive Order 13175, *Consultation and Coordination with Indian Tribal Governments*. Please write to us and explain which tribal right(s) or protected tribal resource(s) will be affected and how they will be significantly affected. To initiate consultation, please contact Mr. Jon Scudder, Cultural Resources Program Manager, at (907) 552-4157 or jon.scudder@us.af.mil to determine a time which may be mutually convenient. Please provide us a response as soon as possible in order to be considered during the preparation of the Draft EA, which is anticipated to be released for public comment in August 2012.
4. If you have any specific question about the proposal, we would like to hear from you. Please feel free to contact Ms. Linda Serret, NEPA Coordinator, at (907) 384-2444 or linda.serret.ctr@us.af.mil. General questions may also be directed to Mr. Bob Hall, Public Affairs, at (907) 552-8152 or robert.hall.58@us.af.mil. In advance, we thank you for your assistance in this matter.


MICHAEL E. SCHMIDT, GS-14
Deputy Director

1 Attachment:
Distribution List

Distribution List

Alaska Native Villages

Attn: Lee Stephan
Native Village of Eklutna
26339 Eklutna Village Road
Chugiak AK 99567

Attn: Debra Call
Knik Village
PO Box 871565
Wasilla AK 99687

Attn: Frank Standifer
Native Village of Tyonek
100 A Street
Tyonek, AK 99682-0009

Attn: Gary Harrison
Chickaloon Village Traditional Council
PO Box 1105
Chickaloon, Alaska 99674

FEDEX or UPS ONLY:

*Attn: Gary Harrison
21117 East Myers Avenue
Sutton, AK 99674*

Alaska Native Corporations

Attn: Margaret L. Brown
Cook Inlet Region, Inc. (CIRI)
2525 C Street, Ste. 500
Anchorage, AK 99503

Attn: Michael Curry
Eklutna, Inc.
16515 Centerfield Drive, Suite 201
Eagle River AK 99577



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS, 673D AIR BASE WING
JOINT BASE ELMENDORF-RICHARDSON, ALASKA

JUL 10

MEMORANDUM FOR NATIONAL MARINE FISHERIES SERVICE (NMFS)
PROTECTED RESOURCES DIVISION AND HABITAT
CONSERVATION DIVISIONS
ATTENTION: MS. BARBARA MAHONEY

FROM: 673 CES/CD
6346 Arctic Warrior Drive
JBER AK 99506-3221

SUBJECT: Request for Information regarding Environmental Assessment (EA) for Watershed
and Fisheries Enhancement Activities at Joint Base Elmendorf-Richardson (JBER),
Alaska.

1. Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and its implementing regulations, the United States Air Force (USAF) intends to prepare an EA to evaluate the potential environmental consequences of a proposal to conduct watershed and fisheries enhancement activities at Sixmile and Otter Lake(s)/Creek(s) located at JBER, Alaska. The proposed action includes eradicating northern pike from Otter Lake and restocking it with rainbow trout, as well as removing the fish ladder at Lower Sixmile Lake and modifying the channel of Sixmile Creek to facilitate small fish passage. An additional aspect of the proposal (Phase II Option) includes Otter Creek watershed enhancements to facilitate anadromous fish passage into Otter Lake.

2. In accordance with the Endangered Species Act of 1973, as amended, we would like to request information regarding any federally-listed threatened and/or endangered species in addition to candidate or proposed-to-be-listed species that occur or may occur in the potentially affected area of Sixmile and Otter Creek(s)/Lake(s) or in its immediate vicinity. Please send information to our primary point of contact Ms. Linda Serret at the address below. Please provide this requested information as soon as possible in order to be considered during the preparation of the Draft EA, which is anticipated to be released for public comment in August 2012. Additionally, we would appreciate your identifying a point of contact for any follow-up questions we may have.

3. If you have any questions or comments on this request, please contact Ms. Linda Serret, NEPA Coordinator at 673 CES/CEAOP, 6346 Arctic Warrior Drive, JBER AK 99506-3221, (907) 384-2444 or linda.serret.ctr@us.af.mil. An alternate point of contact is Mr. Brent Koenen at (907) 552-1609 or brent.koenen@us.af.mil. In advance, we thank you for your assistance in this matter.


MICHAEL E. SCHMIDT, GS-14
Deputy Director



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS, 673D AIR BASE WING
JOINT BASE ELMENDORF-RICHARDSON, ALASKA

JUL 7 0

MEMORANDUM FOR UNITED STATES FISH & WILDLIFE SERVICE (USFWS)
ANCHORAGE FISH & WILDLIFE FIELD OFFICE
ATTENTION: ANN RAPPOPORT

FROM: 673 CES/CD
6346 Arctic Warrior Drive
JBER AK 99506-3221

SUBJECT: Request for Information regarding Environmental Assessment (EA) for Watershed
and Fisheries Enhancement Activities at Joint Base Elmendorf-Richardson (JBER),
Alaska.

1. Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and its implementing regulations, the United States Air Force (USAF) intends to prepare an EA to evaluate the potential environmental consequences of a proposal to conduct watershed and fisheries enhancement activities at Sixmile and Otter Lake(s)/Creek(s) located at JBER, Alaska. The proposed action includes eradicating northern pike from Otter Lake and restocking it with rainbow trout, as well as removing the fish ladder at Lower Sixmile Lake and modifying the channel of Sixmile Creek to facilitate small fish passage. An additional aspect of the proposal (Phase II Option) includes Otter Creek watershed enhancements to facilitate anadromous fish passage into Otter Lake.
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3. If you have any questions or comments on this request, please contact Ms. Linda Serret, NEPA Coordinator at 673 CES/CEAOP, 6346 Arctic Warrior Drive, JBER AK 99506-3221, (907) 384-2444, or linda.serret.ctr@us.af.mil. An alternate point of contact is Mr. Brent Koenen at (907) 552-1609 or brent.koenen@us.af.mil. In advance, we thank you for your assistance in this matter.


MICHAEL E. SCHMIDT, GS-14
Deputy Director



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS, 673D AIR BASE WING
JOINT BASE ELMENDORF-RICHARDSON, ALASKA

OCT 11 2012

MEMORANDUM FOR SEE DISTRIBUTION LIST

FROM: 673 CES/CD
6346 Arctic Warrior Drive
JBER AK 99506-3221

SUBJECT: Environmental Assessment (EA) for Watershed and Fisheries Enhancement
Activities at Joint Base Elmendorf-Richardson (JBER), Alaska.

1. This letter was prepared in response to the recent notice we mailed you regarding the United States Air Force's (USAF) intent to prepare an EA to evaluate the potential environmental consequences of watershed and fisheries enhancement activities at Sixmile and Otter Lake(s) at JBER, Alaska. The proposed action includes eradicating northern pike from Otter Lake and restocking it with rainbow trout, as well as removing the fish ladder at Lower Sixmile Lake and modifying the channel of Sixmile Creek to facilitate small fish passage. An additional aspect of the proposed action (Phase II Option) includes Otter Creek watershed enhancements to facilitate anadromous fish passage into Otter Lake.
2. We did not receive a response from you regarding this proposed action. We consider no response to indicate that the proposed action does not have the potential to affect any tribal right(s) or protected resource(s) for which consultation is requested. Note, however, that you will still have the opportunity to comment on the Draft EA when it is issued for public comment. The USAF plans to publish a notice of availability (NOA) of the Draft EA in local newspaper(s) and on the JBER website (<http://www.jber.af.mil/environmental/index.asp>) in the following months. The NOA will initiate the public comment period and explain the method for submitting comments on the Draft EA.
3. If you feel this letter is in error, please contact us as soon as possible so that your concerns may be addressed in the Draft EA or to initiate government to government consultation in accordance with the Department of Defense *American Indian and Alaska Native Policy* and Executive Order 13175, *Consultation and Coordination with Indian Tribal Governments*. To initiate consultation, please contact Mr. Jon Scudder, Cultural Resources Program Manager, at (907) 552-4157 or jon.scudder@us.af.mil to determine a time which may be mutually convenient. Please provide a response within 15 calendar days of receiving this letter.
4. If you have any specific question about the proposed action, please feel free to contact Ms. Linda Serret, NEPA Coordinator, at (907) 384-2444 or linda.serret.ctr@us.af.mil. General questions may be directed to Mr. Bob Hall, Public Affairs, at (907) 552-8152 or robert.hall.58@us.af.mil. In advance, we thank you for your assistance in this matter.


MICHAEL E. SCHMIDT, GS-14
Deputy Director

1 Attachment:
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PO Box 871565
Wasilla AK 99687

Attn: Frank Standifer
Native Village of Tyonek
PO Box 82009
Tyonek, AK 99682-0009

Attn: Gary Harrison
Chickaloon Village Traditional Council
PO Box 1105
Chickaloon, Alaska 99674

Alaska Native Corporations

Attn: Margaret L. Brown
Cook Inlet Region, Inc. (CIRI)
2525 C Street, Ste. 500
Anchorage, AK 99503

Attn: Michael Curry
Eklutna, Inc.
16515 Centerfield Drive, Suite 201
Eagle River AK 99577

From: [Marc Lamoreaux](#)
To: [SERRET, LINDA A CTR USAF PACAF 673 CES/CEAOP](#)
Cc: [SCUDDER, JON K GS-12 USAF PACAF 673 CES/CEANC](#); brent.conan@elmendorf.af.mil
Subject: Fish habitat enhancement information request
Date: Monday, November 19, 2012 10:54:07 AM

Dear Linda,

I believe I responded to a notice RE: Environmental Assessment for Watershed and Fisheries Enhancement at JBER, specifically Sixmile and Otter Lakes. I am interested in plans and methods of proposed actions to eradicate northern pike from Otter Lake and restock it with rainbow trout, and remove the fish ladder at Lower Sixmile Lake and modify the channel of Sixmile Creek to facilitate small fish passage. I would be interested to receive draft copies of these plans and methods as they are developed, and would be interested to work with such projects, pursuant to the MOA between USAGAK (extended to JBER) and Native Village of Eklutna (NVE). NVE has similar projects in development and we could learn from your processes.

Thank You,

Marc Lamoreaux

Land & Environment Director

Native Village of Eklutna

26339 Eklutna Village Road

Chugiak, AK 99567

office (907) 688-6020

fax (907) 688-6021

cell (907) 242-6967

From: [SERRET, LINDA A CTR USAF PACAF 673 CES/CEAOP](#)
To: [SERRET, LINDA A CTR USAF PACAF 673 CES/CEAOP](#)
Subject: IICEP - W&F
Date: Tuesday, November 20, 2012 9:00:03 AM
Attachments: [Demolition EA.pdf](#)
[Watershed and Fisheries EA.pdf](#)
[Explosive Ordnance EA.pdf](#)

From: Greg Razo [<mailto:GRazo@ciri.com>]
Sent: Tuesday, November 20, 2012 8:14 AM
To: SERRET, LINDA A CTR USAF PACAF 673 CES/CEAOP
Cc: Kim Kearney; Sylvia Medina; Jace Fahnstock
Subject: FW: Department of Air Force EA documents

Dear Ms. Serret,

Thank you for each of the attached three notices. Cook Inlet Region, Inc. (CIRI) does not request "consultation" on any of these proposed actions. CIRI has the capability to perform these and future environmental assessments through its environmental contracting subsidiaries – the North Wind Group (www.northwindgrp.com). The North Wind Group of companies are 100% wholly-owned by CIRI and offer the flexibility of ANC 8(a) contracting to JBER. As the holder of tribal authority for the Anchorage area we request that you consider utilizing our companies for your needs on the land historically the home of our Cook Inlet people. Please let me know if you have any questions and thank you and your team for the notices.

Greg Razo

Gregory P. Razo - Vice President, Government Contracting
Cook Inlet Region, Inc. - (CIRI) <<http://www.ciri.com/content/home/index.cfm>>
2525 "C" Street, Suite 500; PO BOX 93330
Anchorage, AK 99509-3330
Direct Phone: (907) 263-5149/Cell: (907) 317-8281/Fax: (907) 263-5182

The Mission of CIRI is to promote the economic and social well-being and Alaska Native heritage of our shareholders, now and into the future, through prudent stewardship of the company's resources, while furthering self-sufficiency among shareholders and their families.

From: Natalie Efird
Sent: Friday, November 16, 2012 10:52 AM
To: Greg Razo
Subject: Department of Air Force EA documents

Natalie Efirm

Executive Assistant, Government Contracting

Cook Inlet Region, Inc. (CIRI)

PO Box 93330, Anchorage, AK 99509-3330

907-263-5101 (phone) / 907-263-5181 (fax)

The information contained in this CIRI email message may be privileged, confidential and protected from disclosure. If you are not an intended recipient, please notify the sender by reply email and delete the message and any attachments immediately. The use, disclosure, dissemination, distribution or reproduction of this CIRI message or the information in it or attached to it by any unintended recipient is unauthorized, strictly prohibited by the sender, and may be unlawful. Thank you.



United States Department of the Interior

FISH AND WILDLIFE SERVICE
Anchorage Fish & Wildlife Field Office
605 West 4th Avenue, Room G-61
Anchorage, Alaska 99501-2249



In reply refer to: AFWFO

July 18, 2012

Emailed to:

Linda Serret
673 CES/CD
6346 Arctic Warrior Drive
JBER AK 99506-3221

Re: Elmendorf Fish Enhancements (*Consultation Number 2012-0132*)

Dear Ms. Serret,

Thank you for your letter of July 12, 2012, regarding threatened and endangered species that may be affected by your proposal to conduct fisheries enhancements at Joint Base Elmendorf Richardson (JBER), Alaska. The U.S. Fish and Wildlife Service (the Service) is providing this species list in accordance with section 7 of the Endangered Species Act of 1973 (16 U.S.C. 1531 et seq., as amended, ESA). The United States Air Force (USAF) intends to prepare an EA to evaluate the potential environmental consequences of a proposal to conduct watershed and fisheries enhancement activities at Sixmile and Otter Lake(s)/Creek(s) located at JBER. The proposed action includes eradicating northern pike from Otter Lake and restocking it with rainbow trout, as well as removing the fish ladder at Lower Sixmile Lake and modifying the channel of Sixmile Creek to facilitate small fish passage. An additional aspect of the proposal (Phase II Option) includes Otter Creek watershed enhancements to facilitate anadromous fish passage into Otter Lake.

Our records indicate that there are no federally listed or proposed species and/or designated or proposed critical habitat within the action area of the proposed project. In view of this, requirements of section 7 of the ESA have been satisfied. However, obligations under section 7 of the ESA must be reconsidered if new information reveals project impacts that may affect listed species or critical habitat in a manner not previously considered, if this action is subsequently modified in a manner which was not considered in this assessment, or if a new species is listed or critical habitat is determined that may be affected by the proposed action.

This letter relates only to federally listed or proposed species and/or designated or proposed critical habitat under jurisdiction of the Service. It does not address species under the jurisdiction of National Marine Fisheries Service, or other legislation or responsibilities under the Fish and Wildlife Coordination Act, Migratory Bird Treaty Act, Marine Mammal Protection Act, Clean Water Act, National Environmental Policy Act, or Bald and Golden Eagle Protection Act.

For more information on the endangered species consultation process, please see <http://alaska.fws.gov/fisheries/fieldoffice/anchorage/endangered/consultation.htm>. You can use this on-line guide to determine if future projects will impact listed species. The Anchorage Fish and Wildlife Field Office consultation map is available on this website. If your project will occur within a green area of the map that has no listed or proposed species or designated or proposed critical habitat nearby, you can make the determination that the project will have "no affect", and no further consultation is necessary; simply cite the guidebook in your paperwork. However, if there are any uncertainties, or if you have any questions, please contact me at (907) 271-2066.

Sincerely,

Kimberly Klein
Endangered Species Biologist

APPENDIX D

Notice of Availability

AFFIDAVIT OF PUBLICATION

STATE OF ALASKA
THIRD JUDICIAL DISTRICT

Jada L. Nowling

being first duly sworn on oath deposes and says that he/she is an representative of the Anchorage Daily News, a daily newspaper. That said newspaper has been approved by the Third Judicial Court, Anchorage, Alaska, and it now and has been published in the English language continually as a daily newspaper in Anchorage, Alaska, and it is now and during all said time was printed in an office maintained at the aforesaid place of publication of said newspaper. That the annexed is a copy of an advertisement as it was published in regular issues (and not in supplemental form) of said newspaper on

03/31/13

and that such newspaper was regularly distributed to its subscribers during all of said period. That the full amount of the fee charged for the foregoing publication is not in excess of the rate charged private individuals.

Signed Jada L. Nowling

Subscribed and sworn to before

Me this 1 day of April
20 13

Butrus
Notary Public in and for
The State of Alaska
Third Division
Anchorage, Alaska
MY COMMISSION EXPIRES
05/18/15

DEPARTMENT OF DEFENSE

NOTICE OF AVAILABILITY OF AN ENVIRONMENTAL ASSESSMENT FOR WATERSHED ENHANCEMENTS AT JOINT BASE ELMENDORF-RICHARDSON (JBER), ALASKA.

AGENCY: U.S. Air Force (USAF), JBER, Alaska.
ACTION: Notice of Availability

SUMMARY:

The USAF is issuing this notice of availability (NOA) to advise the public that it has made available for public review and comment an Environmental Assessment (EA), Draft Finding of No Significant Impact (FONSI), and Draft Finding of No Practicable Alternative (FONPA) for proposed watershed and fishery enhancement activities in the Otter Creek and Sixmile Creek watersheds at JBER.

This NOA is published pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended (Title 42 United States Code [USC] Section 4321, et seq.); the Council on Environmental Quality Regulations for implementing procedural provisions of NEPA (40 Code of Federal Regulations [CFR] Parts 1500-1508); Executive Orders 11514 and 11991; the Environmental Quality Improvement Act of 1970, as amended (42 USC 4371 et seq.); and 32 CFR 989, the Air Force Environmental Impact Analysis Process (EIAP).

A copy of the EA and Draft FONSI/FONPA will be available for public review and comment for 30 days beginning on 1 April 2013 and ending on 30 April 2013. These documents will be available at: Z. J. Loussac Public Library, 3600 Denali Street Anchorage, AK 99503; Mountain View Branch Library, 120 Bragaw, Anchorage, AK 99508; Muldoon Branch Library, Muldoon Town Center, Suite 158, 1251 Muldoon Rd, Anchorage, AK 99504; Chugiak-Eagle River Branch Library, 12001 Business Blvd., Suite #176, Eagle River Town Center, Eagle River, AK 99577; JBER-Richardson Library (Building 7, Chilkoot Ave, JBER, AK 99505); and online at <http://www.jber.af.mil/environmental/index.asp> (under "Current NEPA Actions"). Comments on the proposed action should be submitted by mail or email and postmarked (mail) or received (email) no later than 30 days from the date of this NOA (30 April 2013). Please indicate the title of this EA in the subject line. Comments received by the Air Force will be considered in making a decision on the proposed action and will be made part of the Administrative Record. Thank you for your participation.

Please send comments to:

Attn: Bob Hall, Joint Base Elmendorf-Richardson
Public Affairs
10480 Sijan Avenue, Suite 123
Joint Base Elmendorf-Richardson, Alaska 99505-6000
or
jber.pa.3@us.af.mil

POINT OF CONTACT: Please direct verbal comments or requests for information to Mr. Bob Hall at (907) 552-8152.