EVALUATION UNDER SECTION 404(b)(1)
CLEAN WATER ACT
40 CFR PART 230
REVETMENT REPLACEMENT
NINILCHIK SMALL BOAT HARBOR NINILCHIK, ALASKA

I. PROJECT DESCRIPTION

Location: Ninilchik, Alaska, is approximately 100 miles south of Anchorage on the eastern shore of Cook Inlet, in a narrow valley formed by the Ninilchik River. The small community of Ninilchik occupies land around the mouth of the Ninilchik River and the plateau overlooking the river valley. The harbor, constructed in 1961, is designed to provide moorage for 32 vessels; however, over 100 fishing vessels are known to use the harbor during peak use in the summer. The seaward side of the harbor is protected by a revetment, constructed by the U.S. Army Corps of Engineers (USACE) in the 1960s and 1970s, comprised of timber, concrete, wire rope, and metal barrels along approximately 1,200 feet of shoreline.

Purpose and Authority: The existing revetment has exceeded its service life and is in a rapidly deteriorating state. The purpose of this project is to replace the timber/concrete revetment with a new, multi-layer rock revetment. Most of the work would be located above Mean High Water (+18.6 feet MHW), but about one-third of the fill would be located below MHW. The portion below MHW is the subject of this 404(b)(1) analysis. The portion below MHW consists of the toe of the revetment and would be covered with native beach material upon completion of construction.

Congress authorized Ninilchik Harbor under the Rivers and Harbor Act of 1958 (Public Law 85-500, 85th Congress, S.3910, July 3, 1958). As the local sponsor, the State of Alaska is to provide to the United States, without cost "… the necessary lands, easements, and right-of-ways, and spoil (i.e., dredged material) disposal areas both for new work and subsequent maintenance…" (Chief of Engineers Report, House Document No. 34, 85th Congress, 1st Session). In 1985, the Alaska Department of Transportation and Public Facilities (ADOT/PF) assumed responsibility for managing Ninilchik Harbor per an Interagency Land Management Agreement with the Alaska Department of Natural Resources (ADNR).

The March 1964 earthquake caused substantial subsidence in the vicinity of the project resulting in shoreline erosion and concerns over the long-term integrity of Ninilchik Harbor. Congress provided special legislation (1964 Amendments Alaska Omnibus Act, Public Law 88-451, Sec. 55) authorizing the Chief of Engineers to modify civil works projects in Alaska impacted by the March 1964 earthquake. Revised Supplement No. 1 to General Design Memorandum No. 1 (USACE, 1967) for Ninilchik Harbor in combination with the special legislation authorized the shoreline revetment construction. Maintenance of this project feature is also to be performed by the Federal Government.

Proposed Action: The project includes demolition of the existing timber and concrete shoreline revetment located south of the Ninilchik Harbor entrance channel (Figure 1). The estimated demolition volume is approximately 4,000 cubic yards (CY), which may be hauled to an approved landfill and/or buried in place. Some site preparation along the beach shall be required before constructing a new, multi-layer rock revetment over top an estimated 1,200 feet of the old revetment between approximately +10 feet mean lower low water (MLLW) and +35 feet MLLW.

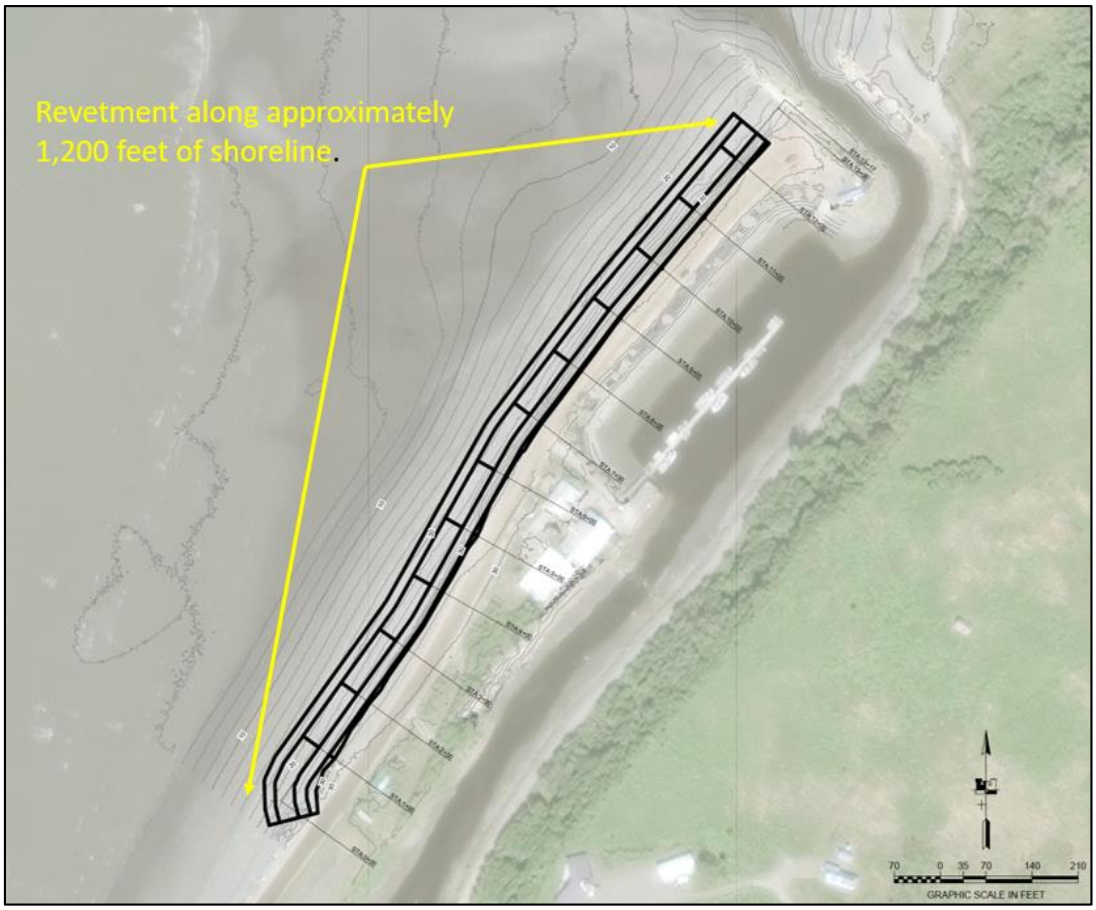

Figure 1. Ninilchik Small Boat Harbor, Ninilchik, AK (imagery from 2015).

Approximately 7,300 CY of beach material would be excavated for construction of the toe of the rock revetment and temporarily placed in the intertidal zone between +10 feet and +18.6 feet MHW during construction. Selective placement will then be required to create a well-keyed structure of A Rock (3,000 pounds) over filter layers of B Rock (300 pounds) and C Rock (15 pounds). The new rock revetment design includes a ten-foot bench at the toe of the structure to protect against scour and failure.

The USACE assumes an active and previously permitted quarry will be used by the construction contractor to produce clean rock. The overall project requires placement of 9,400 CY of A Rock, 8,900 CY of B Rock, and 5,950 CY of C Rock (Figure 2). Of

these total quantities, 1,600 CY of A Rock, 4,500 CY of B Rock, and 3,000 CY of C Rock would be placed below MHW for a total amount of 9,100 CY of rock material placed below MHW. Rock would be delivered to shore by either barge or overland by truck.

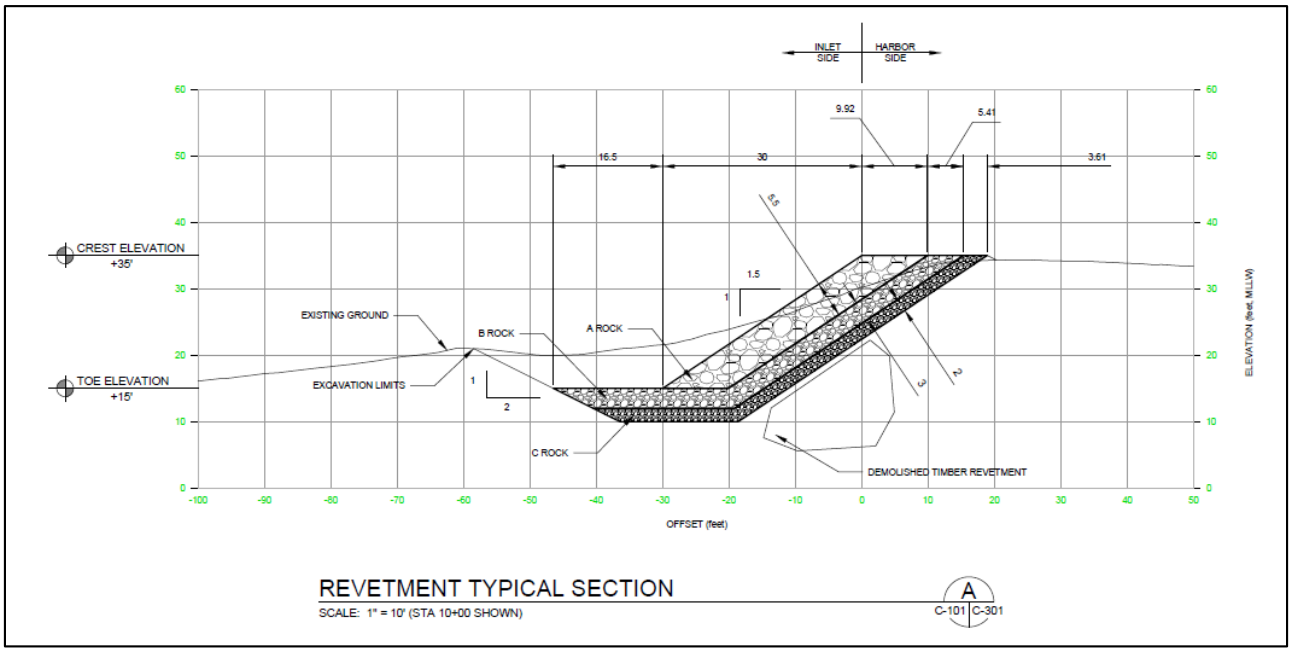

Figure 2. Typical Section of the Ninilchik Revetment

The Ninilchik shoreline consists of silts, sands, and gravels with some cobbles and boulders. The USACE often places dredged material from the Ninilchik Harbor entrance channel and basin on the shoreline for purposes of beach nourishment. As previously mentioned, some beach material will need to be excavated during the construction of the toe of the new rock revetment. Once constructed, the beach material would be placed over the toe and reshaped into a natural contour. Any excess excavation material will be used in the same manner as the harbor maintenance dredging operations, with material placed in a one-foot lift or less between +10 feet MLLW and the +18.6 feet MHW mark.

II. FACTUAL DETERMINATIONS

A. Physical Substrate Determinations

The Ninilchik Harbor revetment is constructed on the outside a barrier beach or ridge, locally called the spit. The spit and associated beach and shoreline is composed of unconsolidated overburden consisting of littoral-transported gravel and localized patches of sandy gravel, sand lenses, and a two-foot-thick silt layer exposed on the riverside of the spit. The existing revetment is composed of timber, concrete, wire rope, and metal barrels along approximately 1,200 feet of shoreline.

B. Water Circulation, Fluctuations, and Salinity Determinations

The dominant currents within Cook Inlet are tidal, which are forced externally. Two

unequal high and low (mixed semi-diurnal) tides occur per lunar day (24 hours, 50 minutes), with the mean range (height) increasing northward. Internal forcing for currents results from the regional winds and river discharge. The rivers and streams flowing directly into the nearshore environments of Cook Inlet release sediments and minerals to the marine system, affecting salinity, temperature, and other aspects of water. The presence of freshwater promotes density-driven currents that alter the phase and duration of tidal currents. Since 1970, there has been a general warming and freshening of the upper layer (0-100m) of the water column (0.9 degrees C and a salinity decrease of ~ 0.06 $^{0}/_{00}$), while in the lower water column (100-250 m), temperature increased 0.8 degrees C and salinity increased ~ 0.04$^{0}/_{00}$ (ENRI, 1995).

C. Suspended Particulate/Turbidity Determinations

Suspended sediment input from the head of Cook Inlet is very high; it is overwhelmingly comprised of very fine-grained glacial till. Deposition of sediments within the harbor and entrance channel result from freshwater river sediments, saltwater sediments by flood tides and storm events, and littoral drift. Cook Inlet turbidity measurements, offshore from Ninilchik, range between 4 and 7 nephelometric turbidity units (NTU), and total suspended solids range between 3 milligrams per liter (mg/L) to 19 mg/L (ENRI, 1995). The amount of material moved, and the net direction of that movement changes seasonally. Summer seasonal longshore currents are depositional and move from south to north, while wintertime, storm-driven currents move north to south, and are erosive.

D. Contaminant Determinations

The rock used for the revetment will be clean rock from a quarry in the region.

E. Aquatic Ecosystems and Organism Determinations

The Ninilchik River (ADFG Anadromous Fish Stream 244-20-10090) sustains spawning populations of chinook, coho, and pink salmon, and steelhead and Dolly Varden trout. Generally, anadromous fish enter the river at higher tides, pass over the existing rock sill at the mouth of the mooring basin, and hold in the deeper pools (including the mooring basin), in the lower reaches of the river. The fish then move upstream, beyond the mooring basin, to spawn. Pink salmon spawn in the lower reaches. King salmon are usually the first adult salmon to enter freshwater starting around mid-May. Pink salmon are the first juvenile out-migrants in the spring and have been known to migrate out of the river to Cook Inlet under the ice during breakup.

National Marine Fisheries Service (NMFS) managed marine mammal species in Cook Inlet include the Steller sea lion, harbor seal, beluga whale, Dall and harbor porpoise, and killer and humpback whale. However, no high concentrations of these species are known to occur in Ninilchik's nearshore marine waters. The Cook Inlet beluga whale distinct population segment (DPS), is listed as an endangered species under the Endangered Species Act (ESA), and critical habitat has been identified in three Cook Inlet areas, none of which occur in the Ninilchik River area. The Steller sea lion western

DPS is also listed as an endangered species. Still, critical habitat has not been designated in upper Cook Inlet, including the offshore marine waters from Ninilchik. The ESA-threatened Steller's eider (Alaska nesting population), managed by the USFWS, is known to occur in lower Cook Inlet. However, no individuals are known to frequent the Ninilchik area, nor has any critical habitat been designed in the Ninilchik area.

A thorough account of the Ninilchik's nearshore environment was made by the U.S. Fish and Wildlife Service (USFWS) when field data was collected to facilitate their environmental evaluation of the USACE then-proposed navigation improvements to the Ninilchik Harbor (USFWS, 1983). The USFWS found 16 marine fish taxa inhabiting the nearshore zone in May, with longfin smelt being the most abundant. Also, five species of flatfish were typically found in the area. The USFWS noted that the diversity and number of fish collected was higher adjacent to the mouth of the Ninilchik River, as opposed to collections made approximately 0.5 mile north and south of the river mouth. Essential fish habitat (EFH) species known to occur in offshore Cook Inlet waters include Pacific cod, sculpin, walleye pollock, eulachon, and all five Pacific salmon species. All of which have been found in stomach content analysis of Cook Inlet beluga whales (HDR and URS, 2006). The extreme conditions of tide, currents, icing, and beach instability in Cook Inlet severely limits the ability of intertidal areas near Ninilchik to become vegetated with periphytic algae and to become high-quality EFH for the subject species.

The same USFWS mentioned above site investigation found the Ninilchik beaches to be essentially devoid of epifauna (USFWS, 1983). The rocky alluvial fan at the river mouth and other scattered exposed rocks along the beach provided the only hard substrate for organism attachment and shelter (e.g., blue mussel, barnacles, periwinkles, sea anemone, and species of crab, shrimp, and amphipods). The single-most numerous infaunal organism sampled by the USFWS was a polychaete worm. It was found to be more abundant in the upper intertidal area, decreasing in numbers toward the lower intertidal area, a distribution trend reversed by bivalves (e.g., Nuttall's cockle, surf clam, *Macoma* sp., and razor clams).

A recreational shellfishery for razor and hard-shell clams exists along the eastern shoreline of Cook Inlet. Offshore from and adjacent to Ninilchik is the 30,000-acre Clam Gulch Critical Habitat Area (CHA), which was established by the State of Alaska in 1976, "…to ensure that the public continues to have the opportunity to enjoy its prolific razor clam beds." (AS 16.20.220.270). The Clam Gulch CHA stretches between Cape Kasilof and Happy Valley, and its habitat lies between -5.0 feet MLLW and 18.6 feet MHW. Historically, clamming efforts in the Ninilchik area concentrated on and adjacent to a sandbar located approximately 0.5 mile south of the Ninilchik River mouth (Kerkvliet and Booz, 2016). Razor clams can be dug year-round; however, most effort occurs from May through August on tides lower than -2.0 feet mean lower low water (MLLW) (Kerkvliet and Booz, 2016). Any development or activity, meeting the criteria, in the Clam Gulch CHA requires a State of Alaska Critical Habitat Permit (aka, Special Area Permit).

Razor clams are filter feeders, feeding when tides cover their beds, and their inhalant siphon takes in seawater to filter out plankton and other food particles. Now-filtered seawater is expelled through an exhalant siphon. The razor clam populations in the Ninilchik area prefer sandy nearshore habitat and occur from approximately +4 feet MLLW to depths of 30 fathoms (ADFG, 2016). Razor clam spawning in eastern Cook Inlet occurs in late July and August and larvae drift from 6 weeks to over two months (September and October) before settling to the substrate in the fall as juveniles, which live in the top few centimeters of substrate, maturing to harvestable size within 3 or 4 years at Ninilchik (Kerkvliet and Booz, 2016).

The USFWS (1983) found that the beach north of the Ninilchik river mouth was comparatively denser with razor clams than beach areas south of the river mouth; however, the south-side beaches had larger sized individuals (20 percent of the clams sampled were greater than 130 millimeters). It was thought that relatively small razor clams (60 to 80 millimeters) found north of the river mouth might occupy habitat important for recruitment. Overall, the USFWS found that few razor clams were exposed on tides less than -3.0 feet MLLW.

More recent razor clam investigations conducted by Kerkvliet and Booz (2016) in 2014 and 2015 showed that the average number of mature-sized razor clams at Ninilchik's study site south of the river mouth was roughly 80 percent lower than averages seen by ADFG between 1991 and 2012. Survey results, based on the length and age of the juvenile sized razor clams, also suggested that few individuals would reach maturity by 2017 or 2018. Consequently, ADFG closed the Cook Inlet Personal Use Clam Fishery in the Ninilchik and Clam Gulch areas because of the low density of mature and juvenile razor clams (ADFG News Release, dated February 24, 2015). The subject closure remains in effect (ADFG News Release dated January 2, 2020).

The specific cause(s) of the decline in razor clam abundance on Cook Inlet eastside beaches remains unknown. Still, ADFG believes it is related to poor spawning and/or settling success and the high natural mortality of mature razor clams (Kerkvliet and Booz, 2016). The influx of freshwater from the Ninilchik River and occasional winter storms during periods of high tides, like that which occurred in November 2010 (Redoubt Reporter, 2010), could be considered limiting factors in razor clam development and mortality also.

F. Proposed Disposal Site Determinations

No in-water disposal (placement below +10 feet MLLW) of excavated beach material will occur, although some material is expected to migrate below this elevation due to the tides and currents. The USACE believes that there is adequate justification to show that widespread dispersion by the waves and currents will result in no significant adverse environmental effects, as the discharged material is intended to be spread naturally in a thin layer over a large area of the substrate as was done during the 2017-

2019 maintenance dredging operations for Ninilchik Harbor. A mixing zone determination is not applicable to this project. The proposed action is expected to comply with applicable water quality standards. It would have no appreciable detrimental effects on municipal and private water supplies, recreational and commercial fisheries, water-related recreation, or aesthetics. All revetment construction work would occur above +10 feet MLLW (i.e., the upper portion of the intertidal zone) and thus have no effect on marine mammals or Essential Fish Habitat.

G. Determination of Cumulative and Secondary Effects on the Aquatic Ecosystem

Work for this project would occur at an existing USACE project in a portion of the upper intertidal zone and uplands that are routinely exposed to dynamic coastal forces such as wave exposure and erosion. The proposed action, in concert with past, present, and foreseeable actions, is not likely to have any significant cumulative or secondary impact on water resources or interfere with the productivity and water quality of existing aquatic resources.

III. FINDINGS OF COMPLIANCE OR NON-COMPLIANCE WITH THE RESTRICTIONS ON DISCHARGE

H. Adaptation of the Section 404(b)(1) Guidelines to this Evaluation

The proposed project complies with the requirements outlined in the Environmental Protection Agency's (USEPA) Guidelines for Specification of Disposal Sites for Dredged or Fill material, and no adaptations of the guidelines were made relative to this evaluation. The USACE released Public Notice ER-20-002 informing the public that this 404(b)(1) analysis was available for a 30-day review.

I. Evaluation of Availability of Practicable Alternatives to the Proposed Discharge Site, Which Would Have Less Adverse Impact on the Aquatic Ecosystem

As this is a revetment project, alternative placement locations are not practicable since the protection needs to be at the site that requires stabilization. The structure was designed to minimize fill, and most of the filled placed below MHW for this project is for the toe of the slope and will be covered by beach material to a natural grade at the end of construction.

J. Compliance with Applicable State Water Quality Standards

The proposed action is not expected to have a considerable adverse effect on water supplies, recreation, growth, and propagation of fish, shellfish and other aquatic life, or wildlife. Nor would the proposed project expect to introduce petroleum hydrocarbons, radioactive materials, residues, or other pollutants into the Ninilchik River or Cook Inlet. The USACE has concluded that the proposed action complies with the State of Alaska water quality standards.

K. Compliance with Applicable Toxic Effluent Standards or Prohibition under Section 307 of the Clean Water Act

No toxic effluents that would affect water quality parameters are associated with the proposed action. Therefore, the project complies with toxic effluent standards of Section 307 of the Clean Water Act.

L. Compliance with Endangered Species Act of 1973

The USACE has determined that its proposed action will have no effect on USFWS and NMFS listed or proposed-for-listing threatened or endangered species, nor destroy or adversely modify existing or proposed critical habitat. Rock delivery will be by either truck on the road system or by barge. Both road and barge traffic would along routes and in areas that are routinely used by vehicles and vessels. Construction will occur in the upper intertidal zone, and no in-water work will occur, thus reducing the potential exposure of the Cook Inlet distinct population segment of beluga whales.

M. Compliance with Specified Protection Measures for Marine Sanctuaries Designated by the Marine Protection, Research, and Sanctuaries Act of 1972

The proposed action does not include disposing material in territorial waters (3 miles from 0 MLLW) of the U.S. or Secretary of Commerce-designated National Marine Sanctuaries.

N. Evaluation of the Extent of Degradation of the Waters of the United States

There are no municipal or private water supplies or freshwater water bodies in the area that could be negatively affected by the proposed project. There would be no significant adverse impacts on plankton, fish, shellfish, wildlife, and/or special aquatic sites in the project area.

O. Appropriate and Practicable Steps Taken to Minimize Potential Adverse Impacts of the Discharge on the Aquatic Environment

The following mitigation measures shall be incorporated into the USACE proposed action to ensure that no impacts adversely affect Ninilchik River's and Cook Inlet's local fish and wildlife resources:

- The Alaska Department of Fish and Game divisions of Habitat and Sports Fish shall be contacted three days before the initiation of revetment construction and be allowed to monitor the operations for unforeseen adverse environmental impacts.

- To protect razor clam populations within the State of Alaska, Clam Gulch Critical

Habitat Area, no excavated beach material shall be disposed of on south beach below +10 feet MLLW. Excess beach material is only permitted to be placed in thin layers of 12 inches or less between +10.0 feet MLLW and 18.6 feet MHW.

- All demolition debris from the existing timber/concrete revetment shall either be transported to an approved upland landfill or fully encapsulated under the new rock revetment to protect marine habitats and the general public.

- No vehicles or other construction-related equipment leaking fuels, oils, hydraulic, or cooling fluids shall operate in the project area.

- Spill response equipment and supplies shall be readily available on-site and used immediately to contain and clean up oil, fuel, hydraulic fluid, antifreeze, or other pollutant spills.

P. Findings of Compliance or Non-compliance with the Restriction on Discharge

Based on the subject guidelines, the proposed placement sites for the discharge of dredged or fill material are specified as complying with the guideline's requirements with the inclusion of appropriate and practicable discharge conditions (see subpart H) to minimize pollution or adverse effects to the affected aquatic environment.

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