US Army Corps of Engineers
Alaska District

Environmental Assessment
and Finding of No Significant Impact

Unalakleet Erosion Control Project
Unalakleet, Alaska

January 2007

FINDING OF NO SIGNIFICANT IMPACT

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

Section 117 Expedited Erosion Control Project
Unalakleet, Alaska

The U.S. Army Corps of Engineers, Alaska District, will construct a 1,500-foot rock revetment along the shoreline fronting the community of Unalakleet. The revetment is designed to prevent current and future erosion of the beach, bluff, and river mouth at Unalakleet. The revetment will consist of armor rock (20,000 cubic yards), B-rock (10,600 cubic yards), and core rock (12,700 cubic yards). A previously constructed gabion wire basket revetment will be covered by the new construction.

The environmental assessment (EA) prepared for this action describes the proposed activities and their impacts in detail. The revetment construction plan was evaluated for its effects on fish and wildlife, subsistence activities, threatened and endangered species, and cultural and archeological resources. No excavation is anticipated for the revetment. If any excavation occurs, an archeological monitor will be present to protect cultural resources. No significant impacts were identified during public review, agency coordination, and review of pertinent data. The environmental assessment supports the conclusion that the revetment does not constitute a major Federal action significantly affecting the quality of the human and natural environment. An environmental impact statement is therefore not necessary for the proposed action.

Kevin J. Wilson
Colonel, Corps of Engineers
District Commander

Date 4/10/07

Environmental Assessment

Unalakleet Erosion Control Project
Unalakleet, Alaska

CONTENTS

CONTENTS (continued)

FIGURES

APPENDIXES

ENVIRONMENTAL ASSESSMENT

Unalakleet Erosion Protection Project
Unalakleet, Alaska

1. Purpose and Need of the Proposed Action

The U.S. Army Corps of Engineers, Alaska District, proposes to construct erosion protection measures at the community of Unalakleet. Unalakleet is threatened by both erosion and storm induced flooding. The project area is subject to both coastal and riverine erosion.

Section 117 of the 2005 Omnibus Bill (PL 108-447) authorizes structural and non-structural projects for coastal erosion of affected Alaskan communities at full Federal expense.

Throughout the years, the village has endured tremendous storms such as the 1960 storm that produced 20-foot sea swells along with 75-knot winds. Subsequent storms in 1965, 1967, 1969, and 1992 have continued to erode the spit area on which the town is constructed. The prevailing northerly shore currents of Norton Sound tend to scour the beaches south of the river mouth and transport finer gravels north to be deposited on the Unalakleet spit. Additional beach deposits are provided by the ice thrusts each winter, replenishing material leveled off by summer storms, particularly on the southerly point of the spit. At the same time that ocean waves are depositing material on the coast, the Unalakleet River is depositing silty sands on the rear of the beach and eroding the tip of the spit. The erosion is most severe during the ice free months, although ice breakup also causes erosion. In addition, during fall and winter storms prior to formation of the sheet icepack, storm surge overtops the bank, carrying floating debris, flooding the town, and further eroding the bank as the water retreats. This erosion has progressed to the point where several buildings have been undermined, and both the electrical and water distribution systems are threatened. In addition, floating debris that is cast ashore during storm events may cause property damage. Without the proposed project, it is estimated that five homes, ten outbuildings, a church, and the fish processing plant could be lost to erosion over the next 50 years.

Currently the bank is partially protected by a gabion structure constructed by the National Resource Conservation Service (NRCS) as a result of the erosion that occurred with the 1992 storm. This structure was intended to provide short term protection and is nearing the end of its design life. A 150 to 200-foot segment is failing from undercutting of the toe. The structure has also been damaged by storm events that have broken open a number of the gabion baskets, and the community does not have the financial resources to repair it.

The erosion rate on the Norton Sound (coastal segment) side averages 1 foot per year and occurs when storm surge attacks the spit, washing away beach material. The rate of erosion from the Unalakleet River (riverine segment) is more severe and averages 2 feet per year.

1.1 Historical Background

Native Alaskans have occupied the area around Unalakleet for at least 2,000 years and have lived a mostly subsistence lifestyle. Archeologists have dated the remains of houses near Unalakleet from about 200 BC to 300 AD. Unalakleet has long been a major trade center as the terminus for the Kaltag Portage, an important winter travel route connecting to the Yukon River. The

Russian-American Company built a trading post at Unalakleet in the 1830s, and reindeer herding was introduced in 1898.

1. 2 Previous Actions

The NRCS constructed 1,400 feet of wire basket gabion revetment in 2000 to provide short term erosion control.

2. Alternatives Considered

The coastal and river erosion processes have different design requirements in the alternatives. Storm events may also result in flooding. In addition, storm surges may deposit debris that may cause damage to residents' property and/or injury. Storm water levels and wave energy is greater in the coastal segment resulting in a higher top elevation, while toe erosion is greater in the riverine segment resulting in a more substantial rock toe section. Some personal property in the project alignment may need moving at Government expense. All the structural alternatives protected the same general area.

Action alternatives identified and evaluated for feasibility included:

- Repair or replace the existing gabion structure. Discarded for lack of durability and high maintenance.
- Construct a rip-rap section. Carried forward
- Construct a concrete mat section. Discarded as not cost effective in Alaska based on previous projects.
- Construct a sheet-pile wall section. Carried forward.
- Construct underwater deflection structures. Discarded as not cost effective because both coastal and riverine structures would be needed.
- Relocation of endangered structures. Carried forward.

The following alternatives were carried forward for detailed analysis: (1) No Action; (2) Riprap Revetment; (3) Sheet-pile Wall; and (4) Relocation of Selected Structures. At the request of the City of Unalakleet, alternative 3 is subdivided into sheet-pile and concrete panel wall alternative. Under the Federal 117 Coastal Erosion Program, the selected structural alternative will be the least cost solution to meet the project objectives. The selected plan is the Riprap Revetment alternative.

2.1 No Action Alternative.

The no-action alternative would leave the beach in its present condition. The existing gabion revetment would continue to deteriorate providing less and less protection to the community. The no-action alternative has no environmental consequences other than the impact on the community due to the loss of private residences and public facilities, and introduction of debris and possibly contaminants into the environment. However, this alternative does not meet the objective of reducing erosion damage at Unalakleet.

2.2 Riprap Revetment Alternative.

This is the proposed action and was the least cost at 12.8 million. The existing erosion project constructed by the NRCS consists of 1,400 feet of a gabion basket structure that is long enough to protect the erosion susceptible area, but is not high enough to prevent overtopping and the resulting outwash of bank material.

The proposed alternative would be 1,500 feet in length and would be constructed along the alignment of the existing NRCS project. The proposed structure would extend beyond the north end of the existing project due to observed erosion at the end of the gabion basket structure and would tie into high ground west of the Beach Road embankment. The proposed project alignment is shown in Figure 1. Figures 2 through 5 are the cross-section views.

The proposed alternative may use some of the existing gabion structure as core material for a riprap revetment section. The riprap section would extend above the existing gabion structure to prevent overtopping. For the first 500 feet of the revetment, i.e., from station 0+00 in the riverine segment, the top elevation would be approximately 18 feet MLLW and would have an extended toe to control river induced erosion. The top elevation would then transition to approximately 23 feet MLLW to prevent overtopping of the rock revetment during coastal storm events. The toe section throughout the coastal segment could be reduced because the erosion in this area is less severe than in the river segment. Some utility relocation may be necessary. Cross-sections of the proposed rock revetment are shown in figure 2. Unalakleet has a nearby quarry that could provide rock for the core filter section. All other rock would have to be imported. The rock revetment was the least cost alternative among all the alternatives. The rock slope also has the advantage of dissipating wave energy and wave run up onto the shoreline during storm waves, is more durable, and has less operation and maintenance costs than the other alternatives.

2.3 Wall Alternatives.

Either the sheet-pile or the concrete panel wall would be constructed immediately adjacent to, and landward of, the existing gabion basket structure. The community has expressed concern that the toe of the structure could be undercut resulting in a failure of the erosion protection structure. They believe that a sheet-pile wall would not fail in this manner and have expressed a preference for the sheet-pile alternative1. During the study phase, the community stated that they have local capability to provide concrete and requested that we include a concrete wall alternative. A vertical wall could cause more run up during high wave conditions, and may have more operation and maintenance costs. .

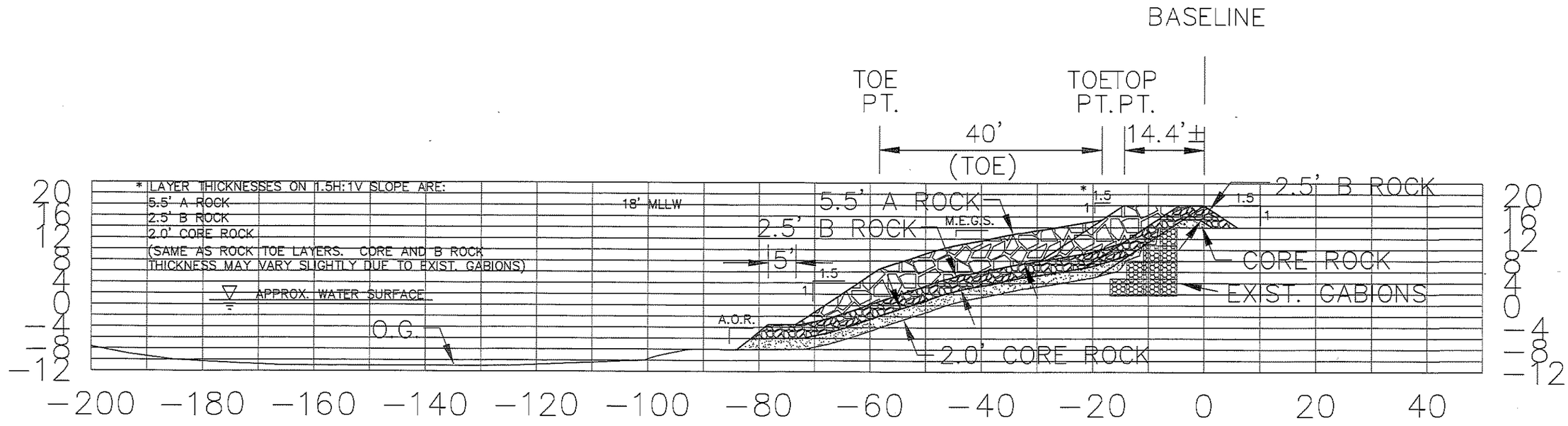
[1] This concern was thoroughly discussed at the April 2, 2006, public meeting. As a result of the discussion, the community understands that the rock toe is designed to provide for undercutting, and now accepts the rock revetment alternative.

ALASKA DISTRICT
CORPS OF ENGINEERS
CIVIL WORKS BRANCH

SITE PLAN – COASTAL EROSION CONTROL (REVETMENT FOOTPRINT)

UNALAKLEET, ALASKA

1



LEGEND:

A.O.R. ANGLE OF REPOSE
M.E.G.S. MATCH EXISTING GROUND SLOPE

DISTANCE (FT.)

NOTE: EXACT LOCATION, ELEVATION, AND ALIGNMENT OF EXISTING GABIONS IS UNKNOWN. SETTLEMENT, DAMAGE, AND MOVEMENT OF THE GABIONS MAY HAVE OCCURRED SINCE THE SURVEY WAS CONDUCTED. THE CONTRACTOR SHALL FIELD VERIFY THE LOCATION AND CONDITION OF THE EXISTING GABIONS PRIOR TO PLACEMENT OF CORE ROCK LAYERS.

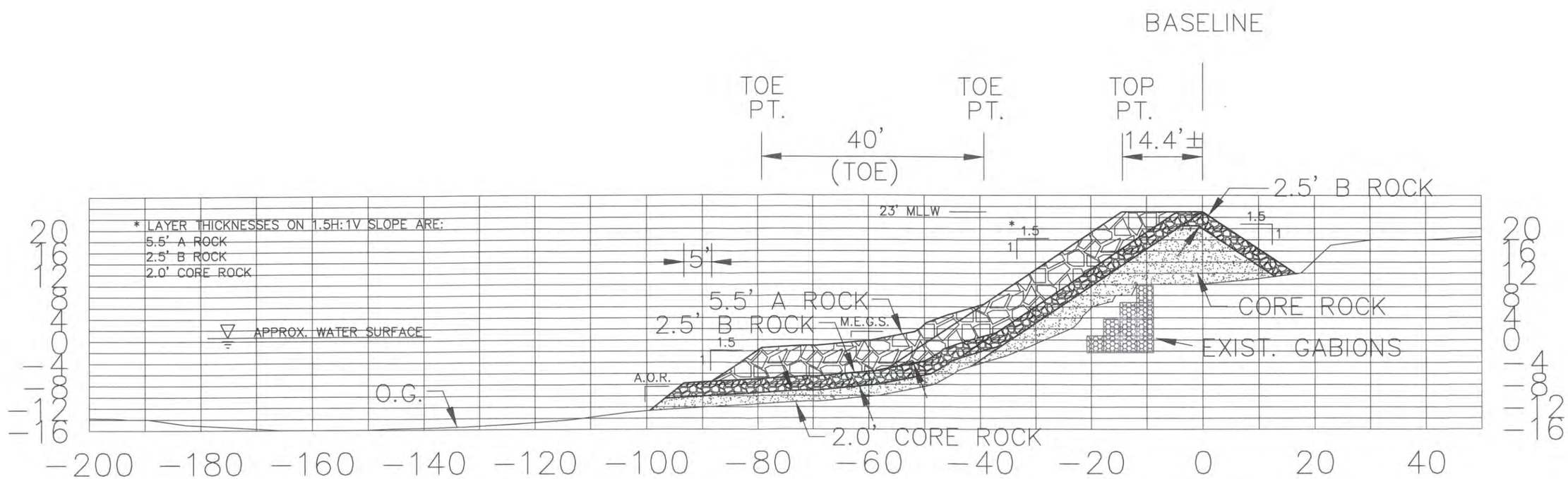
TYPICAL SECTION

STA 1+00.00 TO 4+56.11

A
W-2 | W-3

ALASKA DISTRICT
CORPS OF ENGINEERS
CIVIL WORKS BRANCH

TYPICAL SECTIONS – COASTAL EROSION CONTROL
UNALAKLEET, ALASKA



LEGEND:

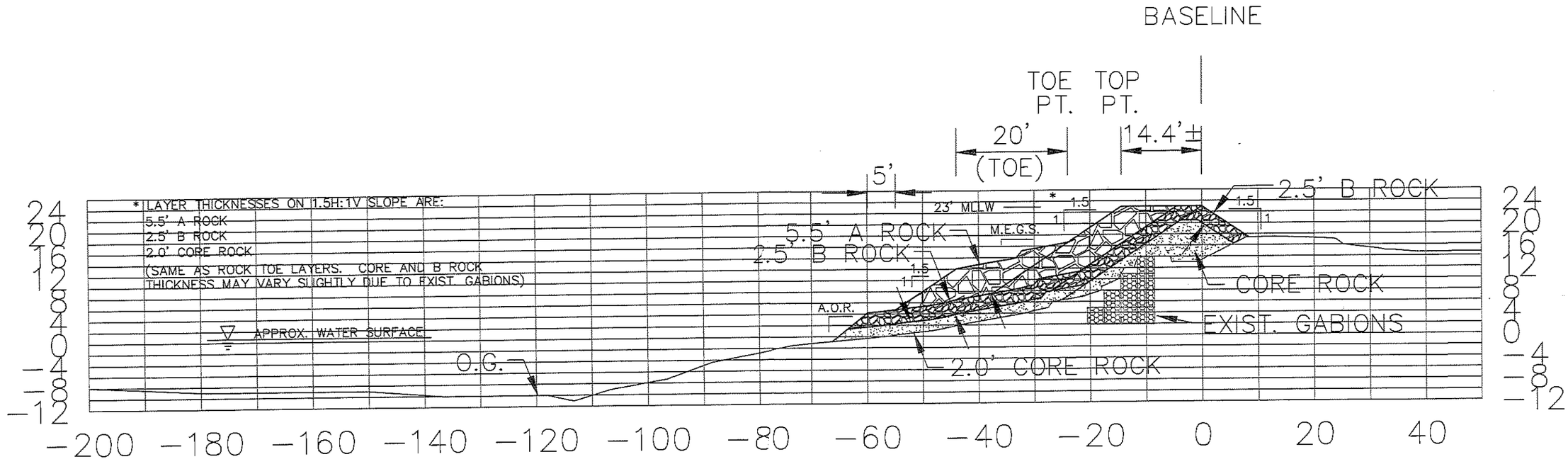
A.O.R. ANGLE OF REPOSE
M.E.G.S. MATCH EXISTING GROUND SLOPE

NOTE: EXACT LOCATION, ELEVATION, AND ALIGNMENT OF EXISTING GABIONS IS UNKNOWN. SETTLEMENT, DAMAGE, AND MOVEMENT OF THE GABIONS MAY HAVE OCCURRED SINCE THE SURVEY WAS CONDUCTED. THE CONTRACTOR SHALL FIELD VERIFY THE LOCATION AND CONDITION OF THE EXISTING GABIONS PRIOR TO PLACEMENT OF CORE ROCK LAYERS.

TYPICAL SECTION

STA 5+56.11 TO 8+08.04

B
W-2 W-3



LEGEND:

A.O.R. ANGLE OF REPOSE
M.E.G.S. MATCH EXISTING GROUND SLOPE

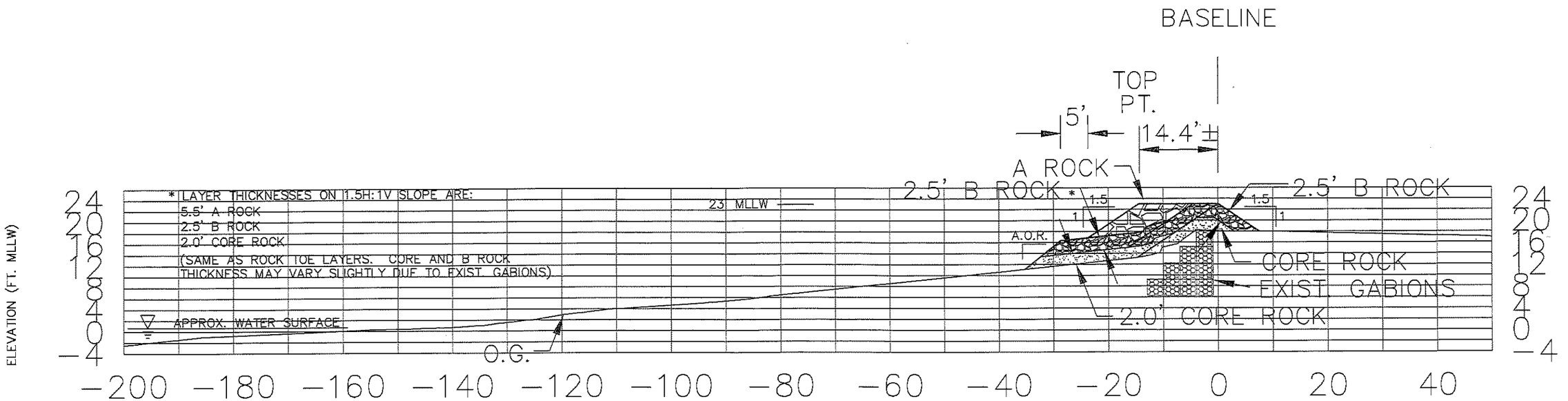
DISTANCE (FT.)

NOTE: EXACT LOCATION, ELEVATION, AND ALIGNMENT OF EXISTING GABIONS IS UNKNOWN. SETTLEMENT, DAMAGE, AND MOVEMENT OF THE GABIONS MAY HAVE OCCURRED SINCE THE SURVEY WAS CONDUCTED. THE CONTRACTOR SHALL FIELD VERIFY THE LOCATION AND CONDITION OF THE EXISTING GABIONS PRIOR TO PLACEMENT OF CORE ROCK LAYERS.

TYPICAL SECTION

STA 9+08.04 TO 14+33.07

C
W-2 | W-3



LEGEND:

A.O.R. ANGLE OF REPOSE
M.E.G.S. MATCH EXISTING GROUND SLOPE

DISTANCE (FT.)

NOTE: EXACT LOCATION, ELEVATION, AND ALIGNMENT OF EXISTING GABIONS IS UNKNOWN. SETTLEMENT, DAMAGE, AND MOVEMENT OF THE GABIONS MAY HAVE OCCURRED SINCE THE SURVEY WAS CONDUCTED. THE CONTRACTOR SHALL FIELD VERIFY THE LOCATION AND CONDITION OF THE EXISTING GABIONS PRIOR TO PLACEMENT OF CORE ROCK LAYERS.

TYPICAL SECTION

STA 14+33.07 TO 14+73.23

D
W-2 | W-3

2.3.a.) **Sheet-pile Wall Alternative.** A sheet-pile wall with rock revetment to prevent erosion of the toe was developed. The sheet-pile would be driven just inland from the existing gabion basket wall. The existing gabion basket structure would be removed and could provide material for the core filter layer. The rock toe protection for the wall alternatives provides less attenuation of wave energy than the rock revetment section; therefore, to prevent overtopping, the wall sections in the coastal segment are approximately 1 foot higher than the rock revetment alternative. In the river segment there is no difference in overtopping potential between the wall and rock revetment alternatives, and the top elevation would be the same for both. This alternative is also compatible with the new access road. Sheet-pile may have more operation and maintenance costs because of the corrosion potential. The cost was 22.8 million.

2.3.b.) **Concrete Panel Wall Alternative.** A concrete panel wall could be constructed in the same location and alignment as the sheet-pile wall. In this alternative a trench would be excavated behind the existing gabions, and concrete wall panels supported by H-piles would replace the sheet-pile wall. A rock toe protection would be constructed as described in paragraph 3.a. An advantage of this construction is that there is a local concrete fabrication facility, and sections could be custom designed and constructed in Unalakleet. The cost was 23.5 million.

2.4 Relocation of Threatened Structures.

Based on the average historic erosion rates observed at Unalakleet, five homes, ten outbuildings, a church, and the fish processing plant are threatened over the 50-year life of the project. Available land in Unalakleet town proper is at a minimum. While there may be land available for the residences and the church in the existing town footprint, there is not a large enough parcel to accommodate the fish plant. Conversations with the Norton Sound Economic Development Corporation (NSEDC) suggest that a suitable site may be available east of town across the Kouwegoki Slough. Moving the fish plant to the south of town across the mouth of the river was rejected due to lack of road or bridge access and the community's unwillingness to relocate to the site of the 1838 influenza epidemic. Across the slough appears to be the only viable option for the plant to remain in Unalakleet. However, the site across the slough is in the flood plain. Relocation of the plant across the slough would require significant expenditures for a road, utilities, new dock, and an elevated building pad. The cost was 17.5 million.

3. Affected Environment

3.1 Community Profile

The Native village of Unalakleet is on the Unalakleet River where it empties into Norton Sound on the west coast of Alaska. Unalakleet is 148 miles southeast of Nome and 395 miles northwest of Anchorage. It lies at approximately 63° 52' North latitude and 160° 47' West longitude. Unalakleet is in Section 3, Township 19 South, Range 11 West, of the Kateel River Meridian (ADCED, 2001). Unalakleet is in the Cape Nome Recording District. The city was incorporated as a 2nd Class City in 1974 and encompasses 2.9 square miles of land and 2.3 square miles of water. Unalakleet is not within an organized borough government. . The community of Unalakleet is on a 4-mile-long sand and gravel spit and is separated from the mainland by Kouwegoki Slough and the tidelands of the Unalakleet River. The slough is on the east side of

the spit and provides protected moorage. The spit varies in elevation, but at the middle of the community, the average elevation is about 13 feet above sea level (15 feet MLLW). Unalakleet is a community of approximately 750 residents.

Alaska Natives represent 82 percent of the population, and the community has a federally recognized tribe. Unalakleet has a history of diverse cultures and trade activity. The local economy is the most active in Norton Sound, along with a traditional Unaligmiut Eskimo subsistence lifestyle, which includes fishing and the hunting of seal, caribou, moose, and bear.

Water comes from an infiltration gallery on Powers Creek and is treated and stored in a million-gallon steel tank. The majority of households are connected to the public water and sewer system. Residents haul refuse to the baler facility for transportation to the State of Alaska, Department of Environmental Conservation (ADEC) permitted landfill. Refuse collection is available for commercial customers. Matanuska Electric Association owns and operates the electrical system and the Unalakleet Valley Electric Cooperative provides electrical service.

The Unalakleet Euksavik Clinic provides health care and the clinic is qualified as an emergency care center. Public safety is provided through the Unalakleet City Police Department.

The Bering Strait School District operates the Unalakleet School. The school accommodates grades K through 12.

Commercial fishing for herring and subsistence activities are major components of Unalakleet's economy. One hundred sixteen residents hold commercial fishing permits. A fish processing plant was recently completed. Government and school positions are relatively numerous. Tourism is becoming increasingly important and there is world-class sport fishing in the area.

Unalakleet has a State-owned 6,200-foot gravel runway that recently underwent major improvements. There are regular flights to Anchorage. Cargo is lightered from Nome and there is a dock to load and unload the barges. Local overland off road travel during winter is mainly by ATV’s and snowmachines.

3.2 Physical Environment

3.2.1 Climate

Unalakleet has a subarctic climate with considerable maritime influences when Norton Sound is ice-free, usually from May to October. Winters are cold and dry. Average summer temperatures range from 47 to 62 °F; winter temperatures average from -4 to 11 °F. Extremes have been measured from -50 to 87 °F. Precipitation averages 14 inches annually, with 41 inches of snow. Winds are predominantly from the east with an average velocity of 12 knots and a maximum of about 56 knots recorded. The tidal range at Unalakleet is seldom more than 2 feet, although persistent offshore winds can cause higher tides.

3.2.2 Geology and Physiography

Unalakleet is in the Lower Yukon sub-region. Cenozoic gravel, silts, and basalt underlie this coastal area. The northern part may be underlain by granodiorite rock. The Nulato Hills consist

of folded Cretaceous graywacke and slate with Mesozoic and Paleozoic volcanic intrusions at the east and south ends. Stocks and dikes ranging in composition from monzonite to diabase locally intrude these rocks. Chiefly Paleozoic schist, Mesozoic sediments, and volcanic rocks underlie the Kaiyuh and Kuskokwim Mountains bordering the Innoko River. These rocks are intruded by Tertiary granitic plutons (AECI, 1996).

Unalakleet is on a 4-mile-long gravel spit that rises about 14 feet above sea level. The spit is composed of sand with gravel layers to a depth of approximately 15 feet over a bed of silt. The dominant soils in the Nulato Hills east of Unalakleet are generally inceptisols, while the Unalakleet River delta soils are of mineral origin or organic peat. Slopes in the surrounding hills are generally less than 12 percent and have a moderate potential for erosion.

The Kaltag Fault, a major structural feature that trends north-northwest between Unalakleet and Kaltag, transects the sub-region. Most of the rocks in the area are intensely folded and faulted (AECI, 1996). Unalakleet is in Seismic Risk Zone 3 and subject to earthquakes of magnitude 6.0 or greater.

3.2.3 Hydrology and Water Quality

Permafrost is more or less continuous north of the Alaska Peninsula but discontinuous near Unalakleet. There is no permafrost under the spit on which the village is located.

The village of Unalakleet is subject to coastal flooding and flooding from the Unalakleet River. Major floods occurred in 1968, 1971, and 1974. All houses in Unalakleet are within the 100-year flood zone. Erosion of the spit is prevalent and an ongoing process.

Throughout the Arctic and Northwest Regions, the surface water flows moderately in summer and stops in winter. Many ponds and lakes are present, but groundwater is generally not available except in limited amounts near streams (JFLPCA, 1973).

Water quality in the river and near shore waters is good without significant pollution sources. The river and near shore marine waters are very turbid.

3.3 Biological Environment

3.3.1 Aquatic-Wetland Habitat and Vegetation

Aquatic habitats in the project area include rivers, ponds, sloughs, marshes, bogs, and wetlands within the Unalakleet River drainage. Kouwegok Slough is a major aquatic feature near Unalakleet. The limits of past tide and storm surges in Kouwegok Slough are defined by windrows of logs and other flotsam including boats, cable spools, and insulated pipe lying helter-skelter across the tundra and wetland. The wet tundra areas adjacent to Kouwegok Slough, the mouth of the Unalakleet River, and the Norton Sound consists of sedges and grasses. Alpine tundra areas in the hills north and east of the community are covered with lichens, mosses, sedges, dwarf birch, lingonberry, crowberry, Labrador tea and other low-growing shrubs.

Submerged and semi-submerged aquatic vegetation in ponds, lakes, sloughs and marshes include *Potamogeton sp*., equisetum, *Myriophyllum, sp., Hippuris sp*., and other hydrophiles. The

aquatic riparian vegetation includes mostly willow, alder, low-bush berries, grasses and mosses. A film of green algae covers the mud substrate in many shallow areas of the tide flats during summer.

The upland vegetation near Unalakleet is composed of sparse forest where black and white spruce, paper birch, balsam popular, aspen, willow, and alder trees are common. Well-drained areas are covered with native tall grasses.

The revetment footprint is predominately sandy beach and submerged hard sand substrate with minimal invertebrate habitat and no aquatic vegetation.

3.3.2 Upland Habitat

Maximum elevations in the Nulato Hills approach about 3,000 feet above mean sea level (MSL), but elevations in the project area are from a few feet above sea level to approximately -20 meet Mean Lower Low water.

3.3.3 Fish and Invertebrates

The Unalakleet River enters the Bering Sea at the village of Unalakleet. The Unalakleet River has runs of five species of Pacific salmon and anadromous Dolly Varden char. Salmon species include Chinook (king) salmon, chum salmon, pink salmon, coho, and sockeye salmon. A 1998 population estimate had an escapement of 5,220 (SE= 691) Chinook salmon to the Unalakleet River (Wuttig 1999). In response to decreasing Chinook harvests, the Alaska Board of Fisheries established the Chinook salmon run in the Unalakleet River as a stock of yield concern. Salmon are an important subsistence resource for residents. All species of salmon are harvested; however, pink salmon account for a substantial portion (more than 66%) of the total salmon harvest. Resident populations of Dolly Varden char, arctic grayling, whitefish, burbot, stickleback, sheefish, Alaska blackfish, and possibly Bering cisco, also inhabit freshwaters in the Unalakleet area. In terms of numbers and biomass, the stickleback is most likely the dominant fish present in Kouwegok Slough and many local ponds near Unalakleet. Aquatic insects, including the large predatory dytistcid aquatic beetle (Dytistcidae), are found in ponds near Unalakleet.

Many species of marine fish and invertebrates inhabit the salt and brackish waters of Norton Sound and the Bering Sea. The marine species are too numerous to list but include five species of Pacific salmon, several species of smelt, Pacific herring, flatfishes, cods, and sculpins. The saffron cod is perhaps the most abundant species of marine fish in Norton Sound waters. Important marine invertebrates include king and tanner crab, and several species of shrimp.

In July 2006 biologists from the Corps of Engineers and the U.S Fish and Wildlife Service (USFWS) sampled the revetment area from a skiff to inventory the benthic habitat. The benthic habitat is very limited because of the hard substrate scoured by fast currents in the Unalakleet River and ice scour. Typical invertebrates found in the vicinity include arrow worms, copepods, amphipods, shrimp, sea stars, sea urchin, sea anemone, crab, chalky macoma, cockles, razor clams, butter clams, pinkneck clam, and softshell clam.

3.3.4 Marine Mammals

Many species of marine mammals inhabit Norton Sound and the Bering Sea. Some species are only present during the ice-covered season and some are present only during the open water season. Several species of pinnipeds including Pacific walrus, bearded seal, ringed seal, spotted seal, fur seal, Steller sea lion, and harbor seal can be found in the near and offshore waters. Whale species fairly common to northern Bering Sea waters include the bowhead whale, beluga whale, gray whale, and orca whale. Whale species less common to northern Bering Sea and Norton Sound waters include the Pacific right whale, humpback whale, minke whale, and finback whale. The harbor porpoise are also common in Bering Sea waters during the open water season.

Although a marine mammal in the legal sense, the polar bear can range far inland in some areas of its geographical range, and even remain behind to forage on land after the shorefast ice cover has retreated. The polar bear is an occasional winter visitor in the Norton Sound area when it follows the southward spread of winter ice over the Bering Sea.

3.3.5 Terrestrial Mammals

Large terrestrial mammals in the Unalakleet area include moose, caribou, brown bear, and black bear. Smaller mammals include gray wolf, red fox, lynx, beaver, muskrat, land otter, marten, porcupine, ground squirrel, tree squirrel, wolverine, weasel, hare, and several species of small rodents. Reindeer herders were brought to Alaska from Lapland in 1898 and settled at Unalakleet, where they established domestic herds that are still active today (UCS 2000). Domestic musk oxen were also once farmed for their wool at Unalakleet.

3.3.6 Avian Fauna

Waterfowl, shorebirds, gulls, and diving birds. Numerous species of waterfowl and shorebirds migrate through or are summer residents of the Norton Sound area. Waterfowl and shorebirds include several species of geese, many species of dabbler and bay ducks, swans, sandhill cranes, bristle-thighed curlews, yellow-legs, plovers, pipers, godwits, and other species of shorebirds. The general Yukon-Kuskokwim delta and Seward Peninsula area, including the Unalakleet River delta, is used by waterfowl and shorebirds for seasonal nesting and staging (Kessel 1989).

Several species of seabirds including gulls, murres, auklets, and cormorants, and sea ducks including oldsquaw, harlequin, scoters, and spectacled eiders are found in the near and offshore marine waters of Norton Sound near Unalakleet. Other eider species sometimes found there include the king, common, and Steller's eiders. These eider species may pass through the Unalakleet area, but are not listed as inclusive in their normal nesting, staging, or wintering range (AKNHP 1998a, AKNHP 1998b, FWS 2001a). The Steller eider were once considered a common breeding bird on the Yukon-Kuskokwim delta, more recent data suggest that this species now only occurs at low densities. Mew gulls were noted to be nesting on areas of Unalakleet River delta tidal flats.

Diving birds, including loons and grebes are found in both marine and freshwater habitats. These species are seasonally common in the Unalakleet area.

Raptors. Several species of raptors are found in Norton Sound and the nearby Nulato Hills areas. Most raptors are seasonally variable in abundance and can include the rough-legged hawk, sharp-shinned hawk, bald and golden eagle, northern harrier, gyrfalcon, osprey, short-eared owl, horned owl, and occasionally the snowy owl in winter.

Perching and Song Birds. Numerous species of perching and songbirds migrate through and nest on the Seward Peninsula, Norton Sound, and Unalakleet areas each spring, summer, and fall (Kessel 1989), and a few species including the snow bunting and the common raven are resident during winter. Passerine birds common to the area include the savannah sparrow, white crowned sparrow, common red poll, yellow wagtail, horned lark, common raven, and orange crowned warbler. Savannah sparrows dominate the species present in numbers.

Gallinaceous Birds. The Unalakleet area is also home to a few species of gallinaceous (chicken-like) birds including the spruce grouse, and rock and willow ptarmigan.

3.4 Endangered, Threatened and Candidate Species

The short–tailed albatross is an endangered seabird that has been sighted offshore in Norton Sound (AKNHP 1998c), but it is not expected to be present inshore near the project site. Consequently it will not be discussed further in this environmental assessment.

The marine waters of Norton Sound offshore of Unalakleet are designated as critical habitat for the endangered spectacled eider. The area of Norton Sound (Unit 3) designated as critical habitat, includes marine waters 5 to 25 meters (16 to 82 feet) deep east of 162° 47', excluding Norton Bay. This unit encompasses 10,586 km^2 (4,087.3 mi^2). The U. S. Fish and Wildlife Service determined this project would not adversely affect spectacled eiders. In 2001, the USFWS designated 2,830 mi^2 of critical habitat for Steller's eiders at breeding areas on the Yukon-Kuskokwim delta, staging area in the Kuskokwim Shoals, and molting areas near the Seal Island, Nelson Island, and Izembek Lagoon. The project would not affect either of the threatened eider species. The USFWS Final Coordination Act Report gives an overview of the fish and wildlife resources of the area and project recommendations (Appendix C).

Several species of marine mammals, including endangered whales and the western population of the Steller sea lion, inhabit the Bering Sea and Norton Sound, but no endangered species of marine mammal is expected to occur at the project site (Appendix A).

3.5 Essential Fish Habitat

Recent amendments to the Magnuson-Stevens Fisheries Conservation Management Act (MSFCMA) established provisions that directed the National Marine Fisheries Service (NMFS) to identify and describe essential fish habitat (EFH) in federal Fishery Management Plans (FMPs), and require federal agencies to consult with NMFS on activities that may adversely affect EFH. Essential fish habitat is defined as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." This bank stabilization action would not significantly affect fresh or marine waters that included EFH. Coordination documentation is contained in Appendix A.

3.6 Historical and Cultural Resources

A section of the Unalakleet River is designated as a National Wild River (BLM 1999). The Alaska National Interest Lands Conservation Act of December 2, 1980, established the upper portion of the Unalakleet River as a component of the National Wild and Scenic Rivers System to be administered by Bureau of Land Management (BLM). Approximately 80 miles (the mainstem from the headwaters in T12S, R3W, Kateel River meridian, downstream to the western boundary of T18S, R8W) have been designated as a "wild" river pursuant to the Wild and Scenic Rivers Act and are protected by a "corridor" of BLM managed land. Land within one-half mile of the upper portions of the Unalakleet River is withdrawn, subject to valid existing rights, from all forms of appropriation under the mining laws and the mineral leasing laws. A Special Recreation Use Permit is required for commercial or competitive use of the designated area.

The Iditarod National Historic Trail passes through Unalakleet and the project site and is managed by the BLM (BLM 2000). Once used by Native hunters, then by Russian explorers and early 20th century gold seekers, the Iditarod Trail is actually a network of more than 2,300 miles of trails. It takes its name from the Athabascan Indian village, Iditarod, near the site of a 1908 gold discovery. The trail was officially surveyed by the U.S. Army's Alaska Road Commission in 1908, and was heavily used until about 1924 when airplanes came into common use. The trail gained international recognition in 1925 when a diphtheria epidemic threatened the town of Nome. In the 1960's interest in sled dog racing was renewed and the Iditarod Trail sled dog race has been run between Anchorage and Nome since 1973. Cultural resources, both historical and archaeological, abound in the vicinity of Unalakleet, Alaska. Historical resources include Mary Bahr's Cabin (UKT-025), a two-story log structure associated with early 20th century Lapp reindeer herding; the Unalakleet-Nome Trail (UKT-030), part of the primary Iditarod Historic Trail; and the Bureau of Indian Affairs Unalakleet School (UKT-055), which operated from 1933 into the 1970s and is significant for its educational and social-historical themes. Prehistoric archaeological remains include Ungalaqliq (UKT-007), a huge complex of approximately 200 depressions probably representing semi-subterranean house-pits associated with the 2,500 year-old Norton culture. Another Norton settlement location is the Bridge Site (UKT-009), consisting of 20 well-defined house-pits. The Cranberry Slough site also has house-pit depressions, though no cultural artifacts have been recovered from this area. South of the Unalakleet River mouth is the Epidemic Site (UKT-011), the original village site occupied until the smallpox epidemic of 1838-1839, at which time people moved across the river mouth to the north bank of the Unalakleet River. This village was occupied when the Russians arrived in the region around 1833. Finally, the village of Unalakleet itself (UKT-004) is considered an historic property, exhibiting archaeological, historic, and contemporary sites and features.

The location of Unalakleet on Norton Sound at the mouth of a productive fishing river makes it an ideal location for settlement, both historically and today. It is obvious from the dense clustering of sites and wide range of dates that people have used Unalakleet for millennia. The Norton sites in particular are important for interpreting the settlement and subsistence patterns of these ancient maritime peoples. Any construction projects in this region, especially along the coast, will almost certainly encounter cultural resources in the form of archaeological sites, features, and/or artifacts.

Coordination with the State Historical Preservation Officer (SHPO) has been initiated (Appendix A).

At least 10 structures are close to the revetment perimeter, none of which require moving at this time. However, individuals may choose to have their structures moved away from the revetment. These structures include the fish processing plant, several fish drying racks and/or smoke houses, a raised wooden cache, a church being used as a residence, and several wooden structures. The structures are in various conditions, from fully operational to abandoned and collapsing. Changing or moving any of these structures could generate adverse effects to the properties.

The proposed implementation of erosion control and bank stabilization along the north bank of the Unalakleet River mouth, south of the present village of Unalakleet, would require cultural resource monitoring during the course of construction if ground excavations occur. Pre-construction archaeological reconnaissance and limited testing has been done and no archaeological sites were found within the project alignment (Pipkin, 2006).

3.7 Commercial Fisheries

Commercial fisheries in the Unalakleet area of Norton Sound focus on herring, salmon, and king crab. A sac-roe fishery for herring takes place from Stuart Island, south of Unalakleet, north to Point Dexter. Management for these fisheries is conducted from the Nome and Unalakleet offices of the Alaska Department of Fish and Game, Division of Commercial Fish.

Red king crab is the only shellfish harvested in Norton Sound. Blue king crab and tanner crab exist in these waters, but are seldom caught by commercial fishermen. While local residents have used red king crab for subsistence purposes for many years, the commercial fishery was not initiated until 1977.

Unalakleet participates in the Norton Sound Economic Development Corporation (NSEDC), Community Development Quota program (CDQ). The CDQ is a federal initiative that allocates a portion of the total-allowable-catch for all federally managed Aleutian Island and Bering Sea groundfish species to eligible communities in western Alaska (NSEDC 2001). The program was initialized through the Magnuson-Stevens Act, authorized by U.S. Congress in 1996, and is administered by State of Alaska. Allocations of managed Pacific fish resources tie the economic benefits of extraction to the communities within the bioregion. Such managed harvest allocations are aligned with programmatic requirements for local hire, shoreside infrastructure development, biological research, and sustainable management techniques. The NSCED has an office in Unalakleet.

3.8 Subsistence Activities

A year-round subsistence culture is widespread in the Unalakleet area and includes hunting and gathering of land and marine mammals, marine and freshwater fish and invertebrates, birds, and plants. Extensions of local subsistence practices include processing foods, hides, and other animal parts or resources for consumption and utilization. Other practices of the local subsistence culture include bartering, sharing, and selling harvested foods; carving, sewing, beading and basket making; and boat and sled building.

Subsistence hunting of beluga whales is an important part of the Native culture in Unalakleet and nearby Norton Sound villages such as Egavik and Shaktoolik, about 15 and 50 miles north of Unalakleet, respectively. These villages are connected by a winter trail that facilitates cultural travel between the villages.

Subsistence fishing with sport tackle and gill net is commonly practiced in the Unalakleet area. Subsistence nets are set for salmon, Dolly Varden, and other species in the lower Unalakleet River and in marine waters along the beach near the village. Subsistence fishing with sport tackle also occurs during winter and summer.

3.9 Sport Fishing and Tourism

The Unalakleet River provides world-class sport fishing and sport fishing guide services; motels, restaurants, and a catered fishing lodge are available for tourists in Unalakleet. The BLM and commercial businesses publish information describing recreation opportunities on the Unalakleet River. Sport fishing on the Unalakleet River generally begins in June with the return of Chinook salmon.

4. Environmental Consequences of Alternatives

4.1 No-Action Alternative

The no-action alternative would leave the project site in its present state. No work would be conducted and conditions causing the erosion would continue.

4.2 Proposed Action- Rock Revetment Alternative

This alternative would cover 1,500 linear feet of beach encompassing 3.25 acres of land. The revetment would cover the existing gabion structure and some of the beach used as a thoroughfare by residents. The revetment would be constructed from the ocean side by barge and crane or the rock could be brought in by barge and delivered to the commonly used barge landing beach near the airport then trucked to the project site for placement.

4.2.1 Physical Environment.

The revetment would alter the river mouth and near shore bottom conditions within the revetment area. The beach would not be usable for walking or beach combing by the residents. At some points the revetment would block resident's view of the sea. The revetment on average

would be between 5 and 8 feet above the ground surface. Members of the community have considered this and concluded during a public meeting that the benefits of the erosion protection outweigh these drawbacks. The revetment would not be expected to significantly change the river flow dynamics causing erosion of the adjacent river bank or sedimentation in the river mouth, although the water velocity through the river mouth may increase. The rock revetment into the river mouth may be a navigation hazard. Navigational aids would be needed. The revetment would deflect storm wave energy on the upper beach and prevent the drift wood from entering the community. Drift wood would become lodged in the revetment and require periodic maintenance. The revetment would block an access easement used by 4-wheelers from the community to the beach. A ramp over the revetment may be considered by the local sponsor. Several structures would be very near the revetment.

.

Water quality during construction could become more turbid because of the rock fill and disturbance of the bottom sediments. The proposed action is water dependent and can be authorized under the Clean Water Act. A 404 (b)(1) evaluation for the revetment is contained in Appendix B.

4.2.2 Terrestrial and Riparian Habitats.

The revetment project would not affect terrestrial habitats. The revetment would extend into the mouth of the Unalakleet River but would not cover important benthic habitat or fish spawning or rearing habitat. The river is a migratory pathway for salmon however the revetment would not disturb migration patterns.

4.2.3 Fish and Wildlife

The revetment would also cover sandy beach extending into the subtidal zone. The furthest extension seaward is to approximately -20 MLLW. The revetment footprint covering the intertidal is 2.01 acres. The subtidal footprint coverage is 1.24 acres. Benthic habitat is minimal near shore because of ice scour. The near shore is used by migrating juvenile salmon. The revetment would not block migration but may act as additional cover for fish. Construction impacts near the river mouth could disturb the salmon outmigration. Timing windows to minimize this affect have been recommended by the Alaska Department of Fish and Game (ADF&G). The main concern is pink, chum and Chinook salmon exiting the river throughout early spring and ending approximately June 25. Chinook salmon have been designated by ADF&G as a “Stock of Concern” in the Unalakleet River.

4.2.4 Threatened or Endangered Species. The project would not have an adverse effect on threatened or endangered species or their habitats.

4.2.5 Subsistence

The revetment would not affect subsistence.

4.2.6 Commercial Fishing

No direct impact to commercial fishing activities for herring or salmon is anticipated by the action.

4.2.7 Cultural Resources

No historic or cultural properties would be affected by this action.

4.3 Coastal Zone Management

Construction activities would take place within the boundaries of the Bering Straits Coastal Resource Service Area and are subject to consistency with the Coastal Management Program plan of 1991 (BECRSA 1991). The revetment project activities described in this document would be consistent with the goals, objectives, and policies of the Coastal Management Plan to the maximum extent practicable. This determination is based on a description of the proposed, an assessment of its effects, and a review of the Bering Straits Coastal Resource Service Area Coastal Management Program.

A Coastal Zone Questionnaire and coastal standards and enforceable policies assessment would be submitted to the State of Alaska, Department of Natural Resources Office Project Management and Permitting with this environmental assessment.

4.4 Required Coordination and Permits

A Land Use Permit is required to conduct work on state lands, including most tidelands and lands below the ordinary high water of navigable rivers.

The Corps of Engineers Regulatory Programs include Section 10 of the Rivers and Harbors Act of 1899 and Section 404 (b) (1) of the Clean Water Act of 1977. A 404 evaluation is normally required for discharges of dredged or fill materials into waters of the U.S. that result from Corps actions.

Concurrence of the Alaska Department of Environmental Conservation would be required for this action. The Alaska Department of Environmental Conservation (ADEC) would issue a Clean Water Act (CWA) Section 401 certificate after ADEC approval of the removal plan.

Work would be done below the ordinary high water level of the Unalakleet River by the construction of the revetment. Consequently, an anadromous Fish Habitat permit from Alaska Department of Natural Resources would be required.

5. Preparers

The staff of the Environmental Resources Section, Alaska District, U.S Army Corps of Engineers, prepared this environmental assessment. Ms. Lizette Boyer, biologist, was the principal preparer; Mr. Chris Hoffman conducted the field investigation; Mr. Larry D. Bartlett, general biologist, wrote the existing environment section; Mr. Aaron Wilson, archeologist, prepared the historical and cultural site evaluation; and Ms. Diane Walters edited the document.

6. Conclusion

The proposed erosion protection revetment project, as discussed in this document, is not expected to cause significant impacts to the environment or cultural sites. This assessment supports the conclusion that the proposed project does not constitute a major Federal action significantly affecting the quality of the human environment; therefore, a Finding of No Significant Impact will be prepared.

7. Literature Cited

ADCED, 2001. Alaska Department of Community and Economic Development, Unalakleet Community Overview. http://www.dced.state.ak.us.

AKNHP 1998a. Species of Concern: Pacific Common Eider. Alaska Heritage Program. Univ. of AK, Anchorage. Posted on the world-Wide-Web at http://www.uaa.alaska.edu/enri/aknhp.htm.

AKNHP 1998b. Species of Concern: King Eider. Alaska Heritage Program. Univ. of AK, Anchorage. Posted on the world-Wide-Web at http://www.uaa.alaska.edu/enri/aknhp.htm.

AKNHP 1998c. Species of Concern: Short-tailed Albatross. Alaska Heritage Program. Univ. of AK, Anchorage. Posted on the world-Wide-Web at http://www.uaa.alaska.edu/enri/aknhp.htm.

BLM 1999. Unalakleet National Wild River. Dept. Int., Bu. Land Management, Anchorage. Posted on the World-Wide-Web at http://www.anchorage.ak.blm.gov/unkriver.html.

BLM 2000. Iditarod National Historic Trail. Dept. Int., Bu. Land Management, Anchorage. Posted on the World-Wide-Web at http://www.anchorage.ak.blm.gov/inhthome.html.

Degnan, F. A. 1999. Under the Arctic Sun: The Life and Times of Frank and Ada Degnan. Cottonwood Bark, Unalakleet, Alaska.

FWS 2001a. Issues of importance: Steller's Eider. USFWS Region 7, Anchorage. Posted on the world-Wide-Web at http://www.r7.fws.gov/.

JFLPCA, 1973. Joint Federal-State Land Use Planning Commission for Alaska, Major Ecosystems of Alaska, July 1973.

NSEDC 2001. Norton Sound Economic Development Corporation Home Page. Posted on the World-Wide-Web at http://www.nsedc.com/index.html.

Pipkin, Mark, 2006. Archeological Investigations for the Unalakleet Road Improvement Project Draft report contracted by Kawerak, Inc.

UCS 2000. Unalakleet (Alaska) Community site. Posted on the World-Wide-Web at http://www.kawerak.org/village/unk/culture.html

USFWS, 2006. Final Fish and Wildlife Coordination Act Report. Unalakleet Erosion Control Project. Fairbanks Fish and Wildlife Field Office, Fairbanks, Alaska.

Wuttig, K. G. 1999. Escapement of Chinook Salmon in the Unalakleet River in 1998. AK. Dept. Fish Game, Div. Sport Fish, Anchorage. Fishery Data Series No. 99-10.

Appendix A
Public Meeting Notes and Correspondence

Unalakleet Erosion Protection Section 117

SUBJECT: Meeting 1 May 2006 with community of Unalakleet, 7-9 P.M.

PARTICIPANTS: Larry Scudder-Plan Formulation, Lizette Boyer-Environmental, Dave Mierzejewski-Hydraulics and Hydrology, Ann Volz-Real Estate, Sean McKnight-Kawerek.

NARRATIVE: Larry presented an overview of the project plans and the program that we are operating under. The 117 program is 100% Federally funded with the city acquiring the needed real estate at their expense . The Corps designs for a 50 year life and most likely the construction project lasts longer if sufficient maintenance is done. The alternatives that were explored were the offshore berm, patching the existing gabions, sheet pile or concrete wall with toe protection, rock revetment, and threatened building relocation. A 50-year erosion line was shown on a map indicating if nothing is done what buildings and land would be lost. The rock revetment proved to be the most durable and also the least cost. This is our recommended alternative. We asked the city and the audience if there were any objections to the revetment as designed. We showed a figure of where it would be placed and how high it must be to provide the maximum protection. The revetment would cover the beach preventing access and also be as high as 9 feet above ground. This would prevent views of the ocean to some residents. The consensus was that people are anxious to have their homes protected and can live with the limited access and obstructed view. The revetment will not stop the flooding but will stop most overtopping and prevent driftwood from coming into the village. Access over the riprap could be maintained by chinking the crevices of the larger rock with smaller rock to make it traversable by foot and 4-wheeler. This would not be a long term solution as storms could remove the smaller rock. People stated that the beaches in this area are not used because of the strong currents and the gabions. At the north end of the proposed revetment, there is an existing access point that should be maintained and possibly paved. Larry mentioned that the appropriated funds have not been approved at this time. It would be a good time to lobby their congressional representatives to push this project. There was a discussion on how the revetment would be constructed. The gabion wall would stay with the revetment covering it. The revetment toes would be built first to buttress the upper portion. A timing window would be imposed to protect fish in the Unalakleet River. A fish Habitat permit is required for work in the river.

We asked for questions and comments.

Q. Would revetment get undermined at river mouth? Is there a problem with rock falling into river thereby narrowing the channel and reducing navigation? The answer was that the rock is sized to not move in the velocity expected. The expectation is that the channel is deep enough so that the rocks placed will not be high enough to impeded navigation.

Q. Will there be erosion at dock face? It doesn't appear that the dock is eroding. The gabions look good. (this means that the rock revetment may not need to go all the way to the dock which would interfere with current usage).

Q. The Corps asked a question of the city. How deep does the dock sheet pile extend? The city said that PND did the planning and would find this out.

Q. If the sunken barge were removed what would happen? Dave M. said the current is not likely to change because the road blocks off the channel. There is some talk of removing the road or putting a culvert in it. This would cause currents to flow past the barge and may remove some of the mud.

Q. What is the construction schedule? If funding is obtained then construction could be let by March 30, 2007. It could be a one season job but may take 2 with fish windows.

Q. Would sediment patterns change with the revetment in the river mouth? The rock would not change the depositional patterns of the shifting sand bars. The velocity of the river during ebb and flood is very strong. The sediment movement is to the north.

Q. Another question on narrowing the channel. The toe of the revetment would be at -10 MLLW. The edge of the revetment toe would need to be marked for the fuel barge.

Q. A question from the Corps-Environmental. Is there any significant habitat in the revetment alignment? The answer from the audience was that no fish spawning near the river mouth and no clam beds near shore.

Q. Will the sheet pile prevent overtopping? Yes

Q What is the differences between sheet pile and rock revetment? Sheet pile is more expensive and less durable with more maintenance requirements.

Q. Can the local quarry be used? The contractor makes the selection. Another job called for core rock but the local quarry rock appeared too brittle to mix with asphalt.

Q. Questions on if the revetment will be undermined as the gabions did near the river mouth. The answer was that the gabions got undermined because there was no toe. The revetment toe would be sacrificial where the rock would adjust to the current and then stay in place because extra rock would fill up the deep holes and hold up the rest.

Q. Did the Corps use HEC-RES? Dave M. said yes. He came up with 18 feet per second (fps) to size rock which is very conservative.

Q. Could the construction barge filled with rock get stuck on the shoals? The construction barge possibly could land at the airport road however the cost estimate is to unload by litering.

Q. The Corps asked a question on if Pacific herring spawn on seashore beaches? The answer was that some herring spawn near Blueberry Point on seaweeds.

Q. What would happen to the point opposite the fish processing plant? The direction of the river current and channels would not change because of the revetment.

Q. Would rock migrate into river channel? Dave said we are designing the revetment to stay in place.

Q. Have we looked at satellite images to study river meanders. Dave said he has seen historical photos and it doesn't seem to be a factor in the erosion. Old aerials were used to plot the erosion rate at 2 feet per year on average.

Q. Will there be local hire during the revetment construction? Larry said we can't make this a contract condition. Even though the city has an ordinance about local hire in Federal projects. Corps can encourage contractor. Larry requested that the city provide a list of equipment, skills, and people available.

Q. A question on the construction easement map where buildings were marked in red. Some of these buildings are already gone and some may be in the easement zone which doesn't mean that they are in the way of the revetment. Some that are close may need to have a retaining wall to separate the yard from the revetment.

Q. What is the definition of permanent? The Corps uses a project of 50 years, but the rock revetment is expected to remain much longer.

Q. How many tons of rock is required? 49,000 cubic yards.

Sean McKnight was asked to discuss the road project. The road project along the beach would be on top of the revetment. **This idea has been subsequently dropped.** They will pave 2.5 miles. They will begin their survey this spring. Kawerek will also help the Corps in getting all the real estate easements and the tideland permit from the State of Alaska, Department of Natural Resources.. The roads would be designed to have drainage and would be beneficial in the revetment maintenance. It is a 6 million dollar project.

The airport project will also be occurring in 2007.

Refreshments were served and the meeting adjourned.

Boyer, Lizette P POA

From: Lawrence R. Peltz [Lawrence.Peltz@noaa.gov]
Sent: Wednesday, August 02, 2006 2:25 PM
To: Boyer, Lizette P POA
Subject: Unalakleet Shoreline Erosion Project

Attachments: lawrence.peltz.vcf

lawrence.peltz.vcf
(469 B)

Lizette,

The National Marine Fisheries Service (NMFS) has reviewed your letter concerning construction of a rubble mound revetment along the shoreline for erosion protection in the community of Unalakleet, Alaska. NMFS would not expect any listed species or critical habitat to occur within the area of this work. NMFS concurs with you determination that the construction would not have any adverse effects to those resources. In addition, no adverse impacts would be expected to Essential Fish Habitat. NMFS has no opposition to this project. Please contact me if you have any questions. Thanks.

Boyer, Lizette P POA

From: Laura Jacobs [laura_jacobs@dnr.state.ak.us]
Sent: Monday, April 03, 2006 10:38 AM
To: Boyer, Lizette P POA
Cc: Larry Bright (E-mail)
Subject: bank stabilization timing window

Lizette,
Wes Jones, Fisheries Biologist in the Nome office of ADF&G said their main concern would be pink, chum and chinook juveniles exiting the system throughout early spring and ending sometime around June 25. Chinook salmon have been designated by ADF&G as a "Stock of Concern" in the Unalakleet River. ADF&G would like to see a construction timing window of no big rocks until after June 20 and no dirt in the river until after June 25. The most sensitive area is your station number 00+00 to Station number 05+38.

Hopefully, this information will allow for a more workable construction schedule and at the same time, protect the most sensitive fish stocks. Let me know if I can be of additional help.

Laura Jacobs
Habitat Biologist
ADNR- OHMP
t) (907)459-7284
f) (907)456-3091

APPENDIX C: AGENCY COMMENT LETTERS/EMAILS

Robert F Mclean <mac_mclean@dnr.state.ak.us>
11/13/2006 15:20

To Jennifer_Jenkins@fws.gov
cc Larry_Bright@fws.gov
bcc
Subject RE: Draft Coordination Act Report - Unalakleet Erosion Control Project

The Office of Habitat Management and permitting has reviewed the draft Fish and Wildlife Coordination Act report for the Unalakleet Erosion Control Project. We concur with the Service's conclusions. Our only recommendation is to include grizzly bears as a present species under the Mammals Section.

From: Jennifer_Jenkins@fws.gov [mailto:Jennifer_Jenkins@fws.gov]
Sent: Monday, November 13, 2006 2:33 PM
To: mac_mclean@dnr.state.ak.us
Cc: Larry_Bright@fws.gov
Subject: Draft Coordination Act Report - Unalakleet Erosion Control Project

Mac,

I have attached a copy of our Draft Coordination Act Report (CAR) for the proposed Unalakleet Erosion Control Project. We invite you to review the document and welcome your comments and suggestions. If ADNR, Office of Habitat Management and Permitting agrees with the conclusions and recommendations in the report, please provide us with the short letter (or email) documenting that ADNR-OHMP has reviewed the CAR and concurs with its conclusions.

Thank you for your time. Feel free to contact me or contact Larry Bright (larry_bright@fws.gov or 456-0324) directly with questions and comments.

Jenn

Jennifer L. Jenkins
Project Planning Branch
Fairbanks Fish and Wildlife Field Office
101 12th Avenue, Room 110
Fairbanks, Alaska 99701-6267
907 456 0327 (Phone)
907 456 0208 (Fax)

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, ALASKA
P.O. BOX 6898
ELMENDORF AFB, ALASKA 99506-6898

DEC 21 2006

REPLY TO
ATTENTION OF:

Environmental Resources Section

Ms. Judith Bittner
State Historic Preservation Officer
Office of History and Archaeology
550 West 7th Avenue, Suite 1310
Anchorage, AK 99501-3565

Dear Ms. Bittner:

The U.S. Army Corps of Engineers, Alaska District (Corps) is proposing to build a revetment in Unalakleet, Alaska (Section 3, T19S, R11W, USGS Unalakleet D-4). The purpose of this letter is to notify you of a federal undertaking that has the potential to affect historic properties and to seek your concurrence on the assessment of effect.

Cultural resources abound in the vicinity of Unalakleet (figure 1). Historical resources include Mary Bahr's Cabin (UKT-025), a two-story log structure associated with early twentieth century Lapp reindeer herding; the Unalakleet-Nome Trail (UKT-030), part of the primary Iditarod Historic Trail; and the Bureau of Indian Affairs Unalakleet School (UKT-055), which operated from 1933 into the 1970s and is significant for its educational and social-historical themes. Prehistoric archaeological remains include Ungalaqliq (UKT-007), a huge complex of approximately 200 depressions probably representing semi-subterranean house-pits associated with the 2,500 year-old Norton culture. Another Norton settlement location is the Bridge Site (UKT-009), consisting of 20 well-defined house-pits. The Cranberry Slough site also has house-pit depressions, though no cultural

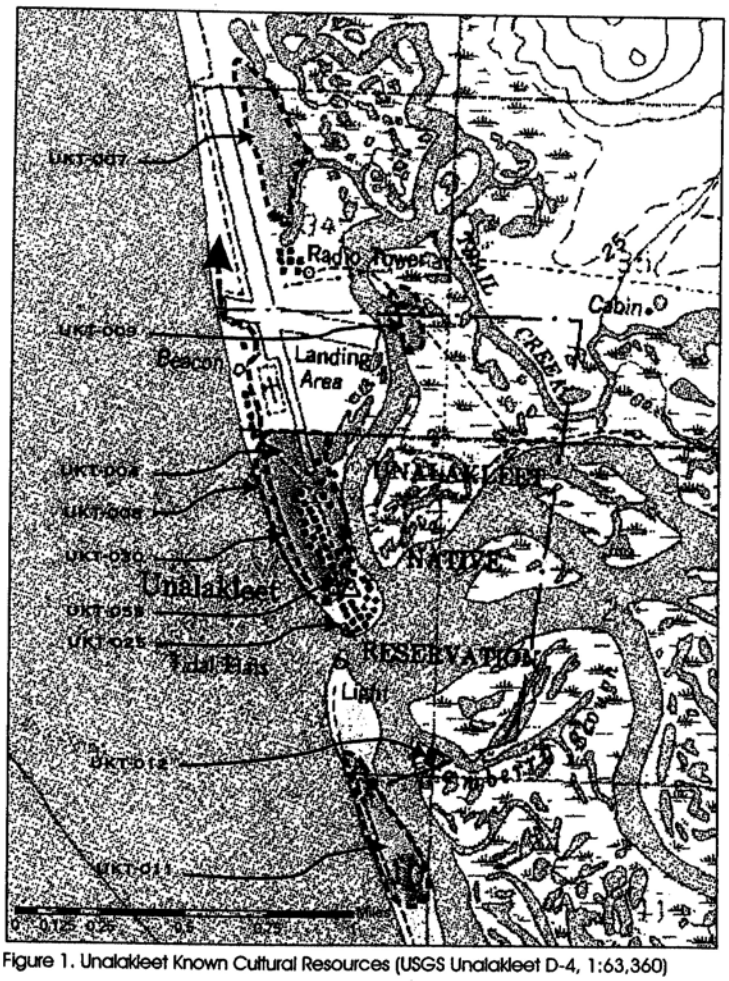


Figure 1. Unalakleet Known Cultural Resources (USGS Unalakleet D-4, 1:63,360)

artifacts have been recovered from this area. South of the Unalakleet River mouth is the Epidemic Site (UKT-011), the original village site occupied until the smallpox epidemic of 1838-1839, at which time people moved across the river mouth to the north bank of the Unalakleet River. Finally, the village of Unalakleet itself (UKT-004) is considered an historic property, exhibiting archaeological, historic, and contemporary sites and features.

Project Description

Currently the bank is partially protected by a gabion basket structure constructed by the National Resources Conservation Service (NRCS) as a result of the erosion that occurred with the 1992 storm. The proposed revetment would be 1,500 feet in length and would be constructed along the alignment of the existing NRCS project. The proposed structure would extend beyond the north end of the existing project due to observed erosion at the end of the gabion basket structure and would tie into high ground of the West Beach Road embankment (figure 2).

The proposed revetment may use the existing gabion structure as core material (figure 3). The riprap would extend above the existing gabion structure to prevent overtopping, and the height would be 18 to 23 feet above mean low lower water. The toe would reach into Norton Sound. Rock and fill could come from the quarry near Unalakleet or another established source such as Cape Nome. No excavation is expected for this structure; however, an outflow pipe and some utilities may need to be relocated.

Assessment of effects

Corps held a public meeting in Unalakleet in May 2006. When asked, residents and local representatives did not identify any cultural resource concerns. Mark Pipkin, with Walking Dog Archaeology, conducted a pedestrian survey for Kawerak Inc. in 2006. A draft of Pipkin's report was made available to the Corps, but it is being finalized. The work focused on rights-of way that will be rehabilitated and resurfaced, as well as monitoring geo-technical testing. Pipkin did not encounter any previously unknown cultural resources during his work. Eight bore-holes were drilled for geo-technical testing in the vicinity of the Corps project. Two revealed charcoal but no cultural material. No excavation will be needed to place the proposed revetment. An outfall pipe from the fish processing plant may need to be relocated. It is unknown if any utilities will be relocated also. If ground disturbing activity is required for these aspects of the undertaking, the Corps will notify your office and provide an archaeological monitor.

There are at least ten structures adjacent to the proposed revetment (enclosure 1). This includes the fish processing plant, several fish drying racks and/or smoke houses, a raised wooden cache, a former church being used as a residence, and several wooden structures. The structures are in various conditions, from fully operational to abandoned and collapsing. Each of these structures is dealt with individually below. Names have been given to the structures based on land ownership, and may need to be corrected.

Structure	Current Use	Current Status
(1) Fish Processing Plant	Commercial	Operational
(2) Koutchak cabin	Storage	Unknown
(3) Oyoumick Smoke House	Subsistence	Operational
(4) Smoke House/Drying Rack	Subsistence	Operational
(5) Bahr family raised cache	Storage	Unknown
(6) IRA Council Cabin	Unknown	Collapsing
(7) Church/House	Residential	Operational
(8) Building (Nashalook)	Unknown	Collapsing
(9) Building (Nashalook)	Unknown	Collapsing
(10) Drying Rack (Nashalook)	Subsistence	Operational

The proposed revetment has been designed to avoid impacting these structures. However, individuals may choose to have structures moved away from the revetment. If any buildings or structures are relocated in association with the proposed undertaking, we will notify your office.

Provided the Corps notifies your office if changes to the project have the potential to effect cultural resources, the Corps determines there will be no historic properties adversely affected by the proposed undertaking. We seek your concurrence for this assessment of effect. If you have any questions, please contact Margan Grover (753-2631 or e-mail margan.a.grover@poa02.usace.army.mil).

Sincerely,

20 Dec 06

Guy R. McConnell
Chief, Environmental Resources Section

cf: with enclosure
Henry Ivanoff, Sr., Mayor, City of Unalakleet
Kathy Johnson, President, Native Village of Unalakleet
Martha Aarons, President, Unalakleet Native Corporation
Landowners: Karen Nashalook, David Nashalook, Emory Nashalook, Kay Ferguson, Kenneth Bahr, George Bahr, Carol Peterson, Maryanne B. Blair, Susan B. McCloud, Clara E. Oyoumick, Jack B. Koutchak, Sr.

CONCUR
Walters
Boyer
Anderson – PM-C
Scudder – PF

TYPED: Grover/20 December 2006/x5670
FILE: g:/en-cw/en-cw-er/Grover/Unalakleet/not_action_Unalakleet_revetment.doc

Henry Ivanoff, Sr., Mayor
City of Unalakleet
PO Box 28
Unalakleet, AK 99684

Kathy Johnson, President
Native Village of Unalakleet
PO Box 270
Unalakleet, AK 99684

Martha Aarons, President
Unalakleet Native Corporation
PO Box 100
Unalakleet, AK 99684

Landowners:

Karen Nashalook
General Delivery
Unalakleet, AK 99684

David Nashalook
General Delivery
Unalakleet, AK 99684

Emory Nashalook
General Delivery
Unalakleet, AK 99684

Kay Ferguson
General Delivery
Unalakleet, AK 99684

Kenneth Bahr
General Delivery
Unalakleet, AK 99684

George Bahr
General Delivery
Unalakleet, AK 99684

Carol Peterson
General Delivery
Unalakleet, AK 99684

Maryanne B. Blair
General Delivery
Unalakleet, AK 99684

Susan B. McCloud
General Delivery
Unalakleet, AK 99684

Clara E. Oyoumick
General Delivery
Unalakleet, AK 99684

Jack B. Koutchak, Sr.
General Delivery
Unalakleet, AK 99684

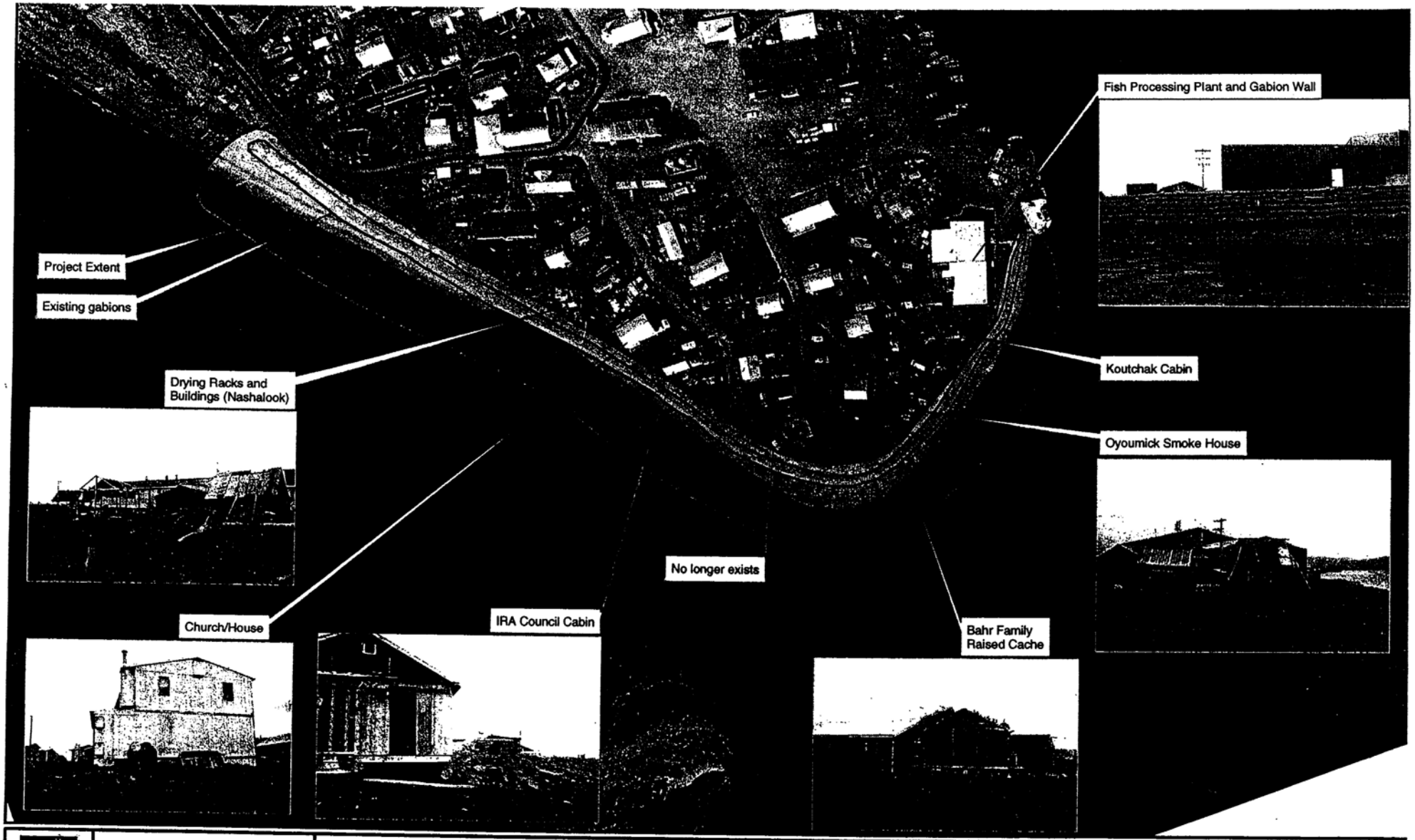
Boyer, Lizette P POA

From: Laura Jacobs [laura_jacobs@dnr.state.ak.us]
Sent: Monday, April 03, 2006 10:38 AM
To: Boyer, Lizette P POA
Cc: Larry Bright (E-mail)
Subject: bank stabilization timing window

Lizette,
Wes Jones, Fisheries Biologist in the Nome office of ADF&G said their main concern would be pink, chum and chinook juveniles exiting the system throughout early spring and ending sometime around June 25. Chinook salmon have been designated by ADF&G as a "Stock of Concern" in the Unalakleet River. ADF&G would like to see a construction timing window of no big rocks until after June 20 and no dirt in the river until after June 25. The most sensitive area is your station number 00+00 to Station number 05+38.

Hopefully, this information will allow for a more workable construction schedule and at the same time, protect the most sensitive fish stocks. Let me know if I can be of additional help.

Laura Jacobs
Habitat Biologist
ADNR- OHMP
t) (907)459-7284
f) (907)456-3091



Alaska District
Corps of Engineers
Civil Works Branch

Anticipated Project Extents

0 75 150 300 Feet

Aerial Image dated July 2004
Ground photos dated July 2006

N

Alaska Baseline Erosion

Unalakleet, Alaska

Appendix B
404 (b)(1) Evaluation

Section 404(b)(1) Guidelines for the Evaluation of the Disposal of Dredged or Fill Material 40 CFR Part 230

SUBPART A - GENERAL

Dredged or fill material should not be discharged into the aquatic ecosystem unless it can be demonstrated that such a discharge will not have an unacceptable adverse impact, either individually or in combination with known and/or probable impacts of other activities affecting the ecosystems of concern.

The Guidelines were developed by the Administrator for the Environmental Protection Agency (EPA) in conjunction with the Secretary of the Army acting through the Chief of Engineers under Section 404(b)(1) of the Clean Water Act (33 U.S.C. 1344). The Guidelines are applicable to the specification of disposal sites for discharges of dredged or fill material into waters of the United States (U.S.).

In evaluating whether a particular discharge site may be specified, the following steps should generally be followed: (a) review the restriction on discharge, the measures to minimize adverse impacts, and the required factual determinations; (b) examine practicable alternatives to the proposed discharge; (c) delineate the candidate disposal site; (d) evaluate the various physical and chemical components; (e) identify and evaluate any special or critical characteristics of the candidate disposal site and surrounding areas; (f) review factual determinations to determine whether the information is sufficient to provide the required documentation or to perform pre-testing evaluation; (g) evaluate the material to be discharged to determine the possibility of chemical contamination or physical incompatibility; (h) conduct the appropriate tests if there is a reasonable probability of chemical contamination; (i) identify appropriate and practicable changes in the project plan to minimize the impact; and (j) make and document factual determinations and findings of compliance.

SUBPART B - COMPLIANCE WITH THE GUIDELINES

The proposed revetment for shoreline protection at Unalakleet, Alaska, will involve discharges of fill material below the ordinary high tide line for placement of rock revetment along the beach in front of Unalakleet and in the Unalakleet River mouth. This will reduce erosion of the beach and bluff that the community is built on. The revetment will also afford some flood protection and present a barrier to drift wood entering the village. A description of the proposed action and alternatives considered is in Section 2 of the attached environmental assessment (EA). There are no practicable alternatives to the proposed discharge (preferred alternative) that would accomplish the project’s purpose and need and not result in a discharge below the high tide line or have a less adverse impact on the aquatic ecosystem. Therefore, the proposed action is the least damaging practicable alternative.

As determined in Subparts C through G of this evaluation and as discussed in Section 4 of the EA, the proposed project will not contribute to significant degradation of the waters of the U.S. including adverse effects on human health or welfare, life stages of aquatic life and other wildlife dependent on aquatic ecosystems, aquatic ecosystem diversity, productivity and stability, and recreational, aesthetic, and economic values. In addition, the discharge of fill materials associated with the proposed action complies with the requirements of the guidelines with the inclusion of appropriate and practicable discharge conditions (see Subpart H below) to minimize pollution and adverse effects to the affected aquatic ecosystems.

SUBPART C - POTENTIAL IMPACTS ON PHYSICAL AND CHEMICAL CHARACTERISTICS OF THE AQUATIC ECOSYSTEM

Applicable information about direct, indirect, and cumulative environmental impacts of the proposed action and alternatives related to substrate, suspended particulates/turbidity, water, current patterns and water circulation, and normal water fluctuations is contained in Section 4 of the EA. No long-term adverse impacts are expected and short-term adverse impacts are expected to be minimal. The construction activity may result in temporary increases in the turbidity of seawater in the local area, which could affect local fish, marine mammals, and benthic invertebrates. Due to the natural turbidity of the river and marine waters, organisms have adapted to turbidity and therefore a temporary increase in turbidity due to the project would have minimal adverse impacts.

SUBPART D - POTENTIAL IMPACTS ON BIOLOGICAL CHARACTERISTICS OF THE AQUATIC ECOSYSTEM

Pertinent information about direct, indirect, and cumulative impacts of the proposed action and alternatives related to threatened and endangered species, fish, aquatic organisms, and other wildlife is contained in Section 4 of the EA. Adverse impacts resulting from the discharge of dredged and/or fill materials are not expected to be significant. The rock revetment would cover or modify the existing beach habitat, but this would be expected to stabilize and re-colonize from adjacent areas, with no long term adverse impacts. Approximately 3.25 acres of intertidal and subtidal habitat would be covered by the revetment.

SUBPART E - POTENTIAL IMPACTS ON SPECIAL AQUATIC SITES

No special aquatic sites would be affected by the proposed project. Discussions about impacts on functions and values associated with marine vegetation and ecosystems are in Section 3 of the EA.

SUBPART F - POTENTIAL EFFECTS ON HUMAN USE CHARACTERISTICS

Human use characteristics affected by the proposed project are subsistence related. There would be only temporary minor disturbance to subsistence activities during construction.

SUBPART G - EVALUATION AND TESTING

The proposed construction would not be associated with any contaminant materials and would not contribute to any long term degradation of water quality in the area. Based on these discussions, the likelihood of materials to be discharged containing contaminants is remote. Therefore, the discharge materials meet testing exclusion criteria.

SUBPART H - ACTIONS TO MINIMIZE ADVERSE EFFECTS

Actions proposed to minimize potential adverse effects for the proposed action are discussed in Section 4 of the EA. No mitigation measures have been identified other than a construction timing window to avoid sensitive salmon migration periods.

Appendix C

U.S. Fish and Wildlife Coordination Act Report

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Fairbanks Fish and Wildlife Field Office
101 12th Avenue, Room 110
Fairbanks, Alaska 99701
November 27, 2006

Mr. Guy R. McConnell, Chief
Environmental Resources Section
U.S. Army Corps of Engineers, Alaska District
ATTN: CENPA-EN-CW-ER
P.O. Box 6898
Elmendorf AFB, AK 99506-0898

Dear Mr. McConnell:

Attached please find a final Fish and Wildlife Coordination Act Report for the Unalakleet Erosion Control Project. If you have any question or require additional information please contact Jennifer Jenkins (Jennifer_Jenkins@fws.gov or 907-456-0327) or Larry Bright (Larry_Bright@fws.gov or 907-456-0324).

Sincerely,

Larry Bright

Larry K. Bright
Branch Chief, Project Planning

UNALAKLEET EROSION CONTROL PROJECT

Final Fish and Wildlife Coordination Act Report

Submitted to:
Alaska District
U.S. Army Corps of Engineers
Anchorage, Alaska

U.S. Fish and Wildlife Service
Fairbanks Fish and Wildlife Field Office
101 12th Ave, Rm. 110
Fairbanks, Alaska 99701

27 November 2006

TABLE OF CONTENTS:

INTRODUCTION

Unalakleet is small community located on a narrow spit of land along the coast of Norton Sound near the mouth of the Unalakleet River (Figure 1). The position of Unalakleet relative to Norton Sound and the Unalakleet River leaves it susceptible to erosion and storm induced flooding. Coastal storm events that occur during the open water periods have the greatest potential to cause coastal erosion and flooding due to storm surge. Erosion along the southern edge of the spit occurs during high water events and during ice breakup in spring. Currently the southern edge of the spit and a section of coastline are protected by a 1400 ft gabion wall that was constructed in 2000. The wall has been subject to several storm surge events and performed well. However, the storms have resulted in damage to the structure and it is nearing the end of its design life.

Due to concerns expressed by the community, the U.S. Army Corps of Engineers (Corps) began an investigation of methods to control erosion and flooding. This investigation has resulted in the development of several alternative approaches to the problem of erosion and storm induced flooding in Unalakleet and these alternatives are collectively referred to as the Unalakleet Erosion Control Project. This report constitutes the U.S. Fish and Wildlife Service final Fish and Wildlife Coordination Act Report on the U.S. Army Corps of Engineers' proposed Unalakleet Erosion Control Project. The purpose of the report is to provide the Corps of Engineers with information regarding fish and wildlife resources and to identify the potentially significant impacts to these resources associated with this project.

This report is prepared in accordance with the Fish and Wildlife Coordination Act (48 Stat. 401, as amended: 16 U.S.C. 661 et seq.). This document constitutes the final report of the Secretary of the Interior as required by Section 2(b) of the Fish and Wildlife Coordination Act.

The following report is based on information provided by the Corps of Engineers, a literature review, a site visit made in July 2006, and an assessment of the potential impacts to fish and wildlife resources.

PROJECT AREA

The city of Unalakleet is located on a 4 mile long sand and gravel spit bound by Norton Sound to the west and separated from the mainland by Kouwegok Slough and the Unalakleet River (Figure 1). The spit varies in elevation, but the average elevation is about 13 feet above sea level (15 feet Mean Lower Low Water [MLLW]). It is approximately 148 miles southeast of Nome and 395 miles northwest of Anchorage. The community has an estimated population of 710, of which 87.7% are Alaska Natives. Commercial fishing, subsistence activities, and a growing tourism industry are major components of the local economy. The state-owned airport provides year-round access to the community. Marine and land transportation also provide access on a seasonal basis.

The climate of Unalakleet is subarctic with considerable maritime influences from Norton Sound during the ice free months. Annual precipitation averages 14 inches, with 41 inches of snow. Average summer temperatures range from 47 to 62 degrees Fahrenheit (°F) and winter temperatures average between -4 and 11 °F. Extreme temperatures have been measured from -50 and 87°F. Fall storms in the Bering Sea occasionally produce winds from the west with

velocities in excess of 43 knots (49.4 mph). The community's close proximity to Norton Sound and low elevation along the spit leaves it susceptible to flooding and coastal erosion during storm events. Furthermore, the problem of erosion is compounded by the proximity of the community to the mouth of the Unalakleet River.

Fig. 1. Location of Unalakleet, Alaska.

BIOLOGICAL RESOURCES

Information on biological resources is derived from Alaska Department of Fish and Game (ADF&G) 1986 and 2006 (wildlife species), Sample and Wolotira 1985 (wildlife species) and National Oceanic and Atmospheric Administration 1987 and 2002 (wildlife species) unless otherwise noted.

Vegetation/Habitat

The wet tundra areas adjacent to Kouwegok Slough, the mouth of the Unalakleet River, and Norton Sound consists of sedges and grasses (Dorava 1995). Alpine tundra areas in the hills north and east of the community are covered with lichens, mosses, sedges, dwarf birch, lingonberry, crowberry, Labrador tea and other low-growing shrubs (Dorava 1995)

Mammals

Large mammals in the project area include brown bear, black bear, caribou and moose. Other terrestrial mammals likely to be encountered in the area include snowshoe and Alaskan hare, porcupine, shrews, voles, lynx, marten, mink, muskrat, red fox, river otter, weasels, wolf, and wolverine.

The presence of marine mammals along the coastline is often dependent on the movement of sea ice. Gray whale and spotted seal may be present in Norton Sound between May and November. Walrus and beluga can be found in high concentrations during April, May and June. Ringed seal inhabit Norton Sound from October through June, with pupping and molting taking place between May and June. Bearded seal may be found in the project vicinity between November and June. Bowhead whale and northern fur seal may also occasionally be observed near the project area.

Birds

A breeding bird inventory conducted near Unalakleet found 69 species of birds, 36% of which were identified as confirmed or probable breeders (Andres and Brann 1997). Bird species identified as being fairly common include northern shoveler, red-breasted merganser, western sandpiper, mew gull, glaucous gull, tree swallow, raven, gray-cheeked thrush, yellow warbler, Wilson's warbler, savanna sparrow, white-crowned sparrow, and common and hoary redpolls (Anders and Brann 1997). Other birds present near the project area include ptarmigan, tundra swan, brant, greater white-fronted geese, Canada geese, long-tailed duck, spectacled eider, common eider, king eider, red phalarope, glaucous-winged gull, black-legged kittiwake, Arctic tern, murres, horned puffin, bald eagle, and parakeet auklet. Birds are an important component of subsistence activities. Bird species most commonly harvested include mallard, northern pintail, Canada geese, snow geese, sandhill crane, and willow ptarmigan (ADF&G 2001).

Fish

The Unalakleet River and its tributaries are important for all five species of Pacific salmon; Chinook, chum, pink, coho, and sockeye. In response to decreasing Chinook harvests, the Alaska Board of Fisheries established the Chinook salmon run in the Unalakleet River as a stock of yield concern. Salmon are an important subsistence resource for residents. Estimates from the subsistence surveys in 2003 indicate over 32,000 salmon were harvested by residents

(ADF&G 2005). All five species of salmon are harvested for subsistence, however pink salmon account for a substantial portion (over 66%) of the total salmon harvest (ADF&G 2005). In addition to salmon, the Unalakleet River contains arctic grayling, Dolly varden, sheefish, and whitefish. Marine waters near the project area support salmon, Dolly varden, rainbow smelt, saffron cod, starry flounder, pacific herring, capelin, yellowfin sole, Alaska plaice, arctic cod, and walleye pollock. Pacific herring are known to spawn in the in the vicinity of the proposed project.

Marine invertebrates

Marine invertebrate species found in the vicinity of Unalakleet include arrow worms, copepods, amphipods, shrimp, sea stars, sea urchin, sea anemone, crab (red king crab, Opilio tanner crab, helmet crab), chalky macoma, cockles (Greenland cockle and Iceland cockle), and clams (Alaska razor clams, butter clams, pinkneck clam, softshell clam).

Biologists from the Army Corps of Engineers and the Fish and Wildlife Service conducted benthic invertebrate surveys along the proposed project alignment on 13 July 2006. Biologists attempted to obtain benthic grab samples using a $1m^3$ dredge. No valid samples (i.e., full load in the dredge) were collected. This was most likely due to the nature of the substrate (compacted gravel) and the high water velocity along the riverine portion of the project.

Threatened and Endangered Species

Marine Mammals

Bowhead whales, listed as endangered under the Endangered Species Act of 1973, could be sighted in the project area. This species is not under the jurisdiction of the Fish and Wildlife Service.

Plants

There are no plants listed as threatened or endangered in the project area.

Birds

The proposed project is within the range of two threatened eider species: Steller's eider (*Polysticta stelleri*) and spectacled eider (*Somateria fischeri*).

Steller's eider

The Steller's eider is the smallest of the four eider species. The Alaska-breeding population of Steller's eider was listed as threatened on June 11, 1997 due to a decrease in nesting range (within Alaska) and reduced numbers of Steller's eiders nesting in Alaska.

Steller's eiders breed along the coast of the Arctic Ocean in Russia and, to a lesser extent, Alaska (reviewed by Fredrickson 2001, Jones 1965). In Alaska, Steller's eiders breed in two areas: western Alaska on the Yukon-Kuskokwim delta (Y-K delta), and in northern Alaska. Although Steller's eiders were once considered a common breeding bird on the Y-K delta (Kertell 1991), more recent data suggests that this species now only occurs at low densities (Flint and Herzog 1999). In northern Alaska, Steller's eiders historically occurred from Wainwright east across the

Arctic Coastal Plain to Demarcation Point, near the United States-Canada Border (Brooks 1915, Quakenbush et al. 2002). In recent decades, most sightings of Steller's eiders have occurred east of Point Lay and west of the Colville River, with the highest densities near Barrow (Quakenbush et al. 2002).

After the breeding season, Steller's eiders migrate to molting areas along on the Russian Chukchi and Bering seacoast, near St. Lawrence Island, and in lagoons, principally Nelson Lagoon and Izembek Bay, along the Alaska Peninsula (Kistchinski 1973, Fay 1961, Jones 1965, and Petersen 1981). During winter, large numbers of Steller's eider concentrate along the Alaska Peninsula from the eastern Aleutian Islands, including marine waters surrounding Kodiak Island, to southern Cook Inlet (reviewed by Fredrickson 2001).

In 2001, the Service designated 2,830 mi^2 (7,329.6km^2) of critical habitat for Steller's eiders at breeding areas on the Y-K delta, staging area in the Kuskokwim Shoals, and molting areas near the Seal Islands, Nelson Island, and Izembek Lagoon.

Spectacled eider

The spectacled eider is a medium-sized sea duck. The entire population was listed as threatened on May 10, 1993, due to population declines on the Y-K delta.

Spectacled eiders breed in Alaska and in arctic Russia (reviewed by Petersen et al. 2000). In Alaska, there are two breeding populations: a population that nests in western Alaska on the Y-K delta, and a population nesting across the North Slope. From the early 1970's to the early 1990's, the breeding population of spectacled eiders in western Alaska declined by 96% (Stehn et al. 1993). The northern population is thought to have declined, although survey data are not conclusive (Petersen et al. 2000).

Males spend little time on the breeding grounds and depart near the start of incubation (Petersen et al. 1999). Those males present on breeding grounds east of Barrow make little use of marine habitats in the Beaufort Sea and move directly to molting and staging areas (TERA 2003). Departure of females from the breeding grounds is dependant on the success or failure of the breeding attempt. Females with broods may remain on the breeding grounds into September (Petersen et al. 1999).

After leaving the breeding grounds, spectacled eiders migrate to molting and staging areas off the coast of Alaska (Ledyard Bay and eastern Norton Bay) or off the coast of Russia (Petersen et al. 1999). Ledyard Bay and Mechigmenskiy Bay (eastern Chukotka Peninsula of Russia) are the principle molting and staging area for female spectacled eiders nesting on the North Slope. Eastern Norton Sound serves as the principle molting and staging area for female spectacled eiders breeding in western Alaska (Petersen et al. 1999). Satellite telemetry and aerial survey data suggest that spectacled eiders molting and staging in eastern Norton Sound make use of waters between 21.7 km (13.48 mi) and 30.9 km (19.2 mi) offshore (Petersen et al. 1999). The only known wintering range of the spectacled eider is within polynyas (areas of open water surrounded by sea ice) and open leads south of St. Lawrence Island in the Bering Sea (Petersen et al. 1999).

In 2001, the Service designated 38,991 mi^2 (100,986.2 km^2) of critical habitat for spectacled eiders at molting areas in Norton Sound and Ledyard Bay, breeding areas in central and southern Y-K delta, and wintering areas south of St. Lawrence Island (see Appendix A for maps of spectacled eider critical habitat).

ALTERNATIVE PLANS FOR REDUCING EROSION

The Corps investigation was initiated to address potential methods of reducing erosion, from coastal and riverine processes, and flooding in the Unalakleet area. The alternatives listed below were identified by the Corps:

Alternative 1 – No action
This alternative could result in continued erosion, flooding from storm surge, damage to community infrastructure, residential housing units, and commercial property.

Alternative 2 – Riprap revetment (preferred alternative)
Alternative 2 would result in the construction of a revetment 1500 feet in length (Figure 2). The structure would be constructed along the alignment of an existing 1400 foot gabion basket structure and may use some of the existing gabion structure as core material. The proposed project is divided into a 'riverine' section (stations 00+00 through 08+00) and a 'coastal' segment (stations 08+00 through 15+00). The first 500 feet of the revetment (i.e., riverine portion of the revetment) would have a top elevation of 18 feet above MLLW and a toe 75 feet in length. The coastal portion of the revetment would have a top elevation of 23 feet above MLLW to prevent overtopping of the rock revetment during coastal storm events. The revetment toe along the coastal segment (stations 08+00 to 15+00) would be reduced from 75 feet to 35 feet in length because erosion in this section is less severe than along the riverine portion. The revetment may be incorporated into an access road linking West Beach Road and the fish processing plant. A local quarry will likely provide rock for the core filter section. Armor and "B" rock would likely be imported from the Cape Nome quarry. Total estimated cost of construction of the riprap revetment is $11 million. Rock replacement would occur approximately every 25 years at a cost of approximately $1.9 million.

Alternative 3 – Sea wall
Alternative 3 would involve placement of either a sheet-pile or concrete panel sea wall immediately adjacent to and landward of the existing gabion structure. The toe of the sea wall would be protected from erosion by a rock revetment. The existing gabion basket structure would be excavated and may be used as a source of core material for the rock revetment. The top elevation of the wall along the riverine segment would vary in height. Between stations 00+00 and 04+50, the top elevation would be approximately 18 feet above MLLW. The top of the wall would increase from +18' to +24' MLLW between stations 04+50 and 05+50. Top elevation of the wall would remain constant +24' MLLW beyond station 05+50. The rock revetment at the toe of the wall would be approximately 11 feet above MLLW throughout the entire length of the riverine segment (stations 00+00 through 08+00). The coastal segment of the wall (stations 08+00 through 15+00) would have top elevation of approximately 24 feet MLLW and the rock revetment at the toe would be approximately 14 feet above MLLW.

Alternative 3a – Sheet-pile wall

A sheet-pile wall would be placed inland of the existing gabion structure. Total estimated cost is $16.5 million.

Fig. 2. Location of proposed Alternative 2-Riprap revetment.

Alternative 3b – Concrete panel wall
Concrete wall panels supported by H-piles would be placed inland of the existing gabion structure. The concrete panels used for the wall could be produced at a local fabrication facility. Total estimated cost is $16.9 million.

Alternative 4 – Relocation of threatened structures
Alternative 4 would require moving five homes, ten outbuildings, a church, and a fish processing plant. While it may be possible to relocate homes and the church, this alternative is complicated by the lack of suitable land within Unalakleet to which the fish processing plant could be relocated. It is possible that the processing plant could be moved to a location east of the community and across Kouwegok Slough. Relocation of the plant across the slough would require significant expenditures for road construction, installation of utilities, construction of a new dock, and an elevated building pad. Total estimated cost is $17.5 million.

PROJECT IMPACTS

Alternative 1 - No action
Under this alternative erosion of the coastline and flooding associated with storm events would be allowed to continue. Although these natural processes would not be expected to significantly impact biological resources, that are presumably adapted to a dynamic coastal environment, the potential impacts on community infrastructure could have negative consequences for the surrounding biological resources. For example, if erosion and flooding events compromised sewage lines or fuel storage structures, contaminants could enter adjacent waters and could affect fish, birds, benthic organisms, and marine mammals.

Alternative 2 – Riprap revetment (preferred alternative)
Under this alternative, a riprap revetment would be placed along the southern edge of the spit and along a section of coastline. Construction of the revetment might decrease the habitat value for some shoreline invertebrate species and could diminish feeding opportunities for some shorebirds. Given that the revetment would be constructed along a section of coastline heavily impacted by human activity it would not be expected to have a significant effect on fish or wildlife.

Alternative 3 – Wall alternatives
Under this alternative, erosion of the coastline and flooding associated with storm events would be controlled by constructing a sea wall using either sheet pile or custom fabricated concrete panels. Placement of a wall is not expected to have significant impacts to fish or wildlife species.

Alternative 4 – Relocation of threaten structures
Relocation of structures is unlikely to have significant impacts to fish and wildlife resources provided that structures are moved to existing gravel pads or previously disturbed areas. Under

this alternative the fish processing plant would be placed in the flood plain of the Unalakleet River. Although moving the fish plant across Kouwegok Slough would result in the loss terrestrial habitat, the impact is expected to be minor.

Activities associated with project construction

Underwater Noise

Increased underwater noise would result from barge and boat traffic transporting materials to the project site. Underwater noise can cause pronounced short-term behavioral reactions and temporary local displacement in cetaceans (Richardson and Würsig 1997). Exposure to underwater noise can also alter behavior in diving birds. For example, Ross et al. (2001) demonstrated that underwater recordings of boat engines could reduce predation by common eiders at mussel farms by 50% to 80%. As with birds, the effects of anthropogenic underwater noise on fish are not well understood. Underwater noise, such as that associated with seismic surveys, can affect fish distribution, local abundance, and catch rates (Engås et al. 1996). Smith et al. (2004) concluded that noise exposure could produce a significant reduction in hearing sensitivity in goldfish. This suggests that loud sounds, such as boat traffic, can have a detrimental effect on hearing in fish. Additionally, exposure to ship noise can elicit a stress response (e.g. increased levels of cortisol) in fishes regardless of their hearing sensitivity (Wysocki et al. 2006). While there may be some temporary behavioral changes in marine mammals, birds, and fish in response to the noise from barge traffic associated with this project, the long-term impacts to fitness are probably not measurable.

Seawater turbidity

Construction of the in-water portion of the revetment may result in a temporary increase in water turbidity. Schamel et al. (1979) suggest that increased turbidity could obscure food items for loons, seaducks, phalaropes, and gulls. In addition to hindering the ability of predators to feed, increased turbidity can directly affect prey species. Marine invertebrates can also be negatively impacted by increased turbidity and sedimentation. Additionally, some fish species could be impacted by increases in turbidity. Presumably fish and invertebrate species found in the nearshore environment would also be tolerant of widely varying turbidity. Given the highly variable conditions of the nearshore marine waters and given that it is likely that water condition would return to pre-construction conditions at the end of the construction season, the Service does not expect long-term impacts to fish and wildlife.

RECOMMENDATIONS

The Service provides the following recommendations for minimizing the potential impacts of the Unalakleet Erosion Control Project on fish and wildlife:

1. Should relocation of structures be needed, we recommend that those structures be placed on existing gravel pads or in previously disturbed areas.

2. Staging areas for construction materials should be designated prior to construction. The Service recommends that staging areas be located on existing gravel pads or in previously disturbed areas.

As this project proceeds through its final design phase, the Service may have further recommendations for minimizing impacts to fish and wildlife.

SUMMARY

The Service believes the Unalakleet Erosion Control Project, as currently proposed, will have minimal impacts on fish and wildlife, and will not likely affect threatened Steller's and spectacled eiders.

The Corps is advised to contact the Fairbanks Fish and Wildlife Field Office (Larry Bright 907-456-0324 or Ted Swem 907-456-0441) when construction plans have been formalized to determine if further review and/or consultation will be needed.

LITERATURE CITED

Alaska Department of Fish and Game. 2005. Alaska subsistence fisheries 2003 Annual Report. Division of Subsistence. Juneau, Alaska. p. 17.

Alaska Department of Fish and Game, Division of Habitat. 1986. Alaska Habitat Management Guide Arctic Region Volume I: Life histories and habitat requirements of fish and wildlife. Alaska Department of Fish and Game, Division of Habitat, Juneau. 465 pp.

Alaska Department of Fish and Game, Division of Subsistence. 2001. Community Profile Database. http://www.subsistence.adfg.state.ak.us/geninfo/publctns/cpdb.cfm.

Alaska Department of Fish and Game, Division of Wildlife Conservation. 2006. Wildlife Notebook Series. http://www.adfg.state.ak.us/pubs/notebook/notehome.php.

Andres, B.A. and D.L. Brann. 1997. Inventory of breeding birds on Alaska Army National Guard Training Areas, Nome region, 1996 progress report. Legacy Resources Management Program. Nongame Migratory Bird Management, U.S. Fish and Wildlife Service, Anchorage, Alaska. 42 pp.

Brooks, W. 1915. Notes on birds from east Siberia and Arctic Alaska. *Bulletin of the Museum of Comparative Zoology* 59: 359-413.

Dorava, J.M. 1995. Overview of environmental and hydrological conditions at Unalakleet, Alaska. USGS Open-File Report 95-347, Anchorage, Alaska. 8 pp.

Engås A., S. Løkkeborg, E. Ona, and A.V. Soldal. 1996. Effects of seismic shooting on local abundance and catch rates of cod (*Gadus morhua*) and haddock (*Melanogrammus aeglefinus*). *Canadian Journal of Fisheries and Aquatic Science* 1996: 53: 2238-2249.

Fay, F. H. 1961. The distribution of waterfowl to St. Lawrence Island, Alaska. *Wildfowl* 12:70-80.

Flint, P.L. and M.P. Herzog. 1999. Breeding of Steller's eiders, Polysticta stelleri, on the Yukon-Kuskokwim Delta, Alaska. *Canadian Field-Naturalist* 113(2): 306-308.

Fredrickson, L.H. 2001. Steller's eider (*Polysticta stelleri*). In: The Birds of North America, No. 571 (A. Poole and F. Gill, eds). The Birds of North America, Inc., Philadelphia, PA.

Jones, R.D. 1965. Returns from Steller's eider banded in Izembek Bay, Alaska. *Wildfowl* 16: 83-85.

Kertell, K. 1991. Disappearance of the Steller's eider from the Yukon-Kuskokwim Delta, Alaska. *Arctic* 44(3): 177-187.

Kistchinski, A.A. 1973. Waterfowl in north-east Asia. *Wildfowl* 24: 88-102.

National Oceanic and Atmospheric Administration. 2002. Environmental sensitivity index: Northwest Arctic, Alaska. U.S Department of Commerce, NOAA, National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division. Seattle, Washington.

National Oceanic and Atmospheric Administration. 1987. Bering, Chukchi, and Beaufort Seas Coastal and Ocean Zones Strategic Assessment: Data Atlas. Pre-publication edition, U.S. Department of Commerce, NOAA, National Ocean Service, Strategic Assessment Branch, Washington D.C.

Petersen, M.R. 1981. Populations, feeding ecology and molt of Steller's eiders. *Condor* 83: 256-262.

Petersen, M.R., W.W. Larned, and D.C. Douglas. 1999. At-sea distribution of spectacled eiders: a 120-year-old mystery resolved. *Auk* 116(4): 1009-1020.

Petersen, M.R., J. B. Grand, and C.P. Dau. 2000. Spectacled eider (*Somateria fischeri*). In: The Birds of North America, No. 547 (A. Poole and F. Gill, eds). The Birds of North America, Inc., Philadelphia, PA.

Quakenbush, L.T., R.H. Day, B.A. Anderson, F.A. Pitelka, B.J. McCaffery. 2002. Historical and present breeding season distribution of Steller's eiders in Alaska. *Western Birds* 33:99-120.

Richardson, W.J. and B. Würsig. 1997. Influences of man-made noise and other human actions on cetacean behaviour. *Marine and Freshwater Behaviour and Physiology* 29: 183-209.

Ross, B.P., J. Lien, and R.W. Furness. 2001. Use of underwater playback to reduce the impact of eiders on mussel farms. *Journal of Marine Science* 58: 517-524.

Sample, T.M. and R.J. Wolotria, Jr. 1985. Demersal fish and shellfish resources of Norton Sound and adjacent waters during 1979. NOAA Technical memorandum NMFS F/NWC-89. U.S. Department of Commerce, NOAA, Nation Marine Fisheries Service, Seattle, WA. 208 pp.

Schamel, D., D. Tracy, P.G. Mickelson, and A. Sequin. 1979. Avian community ecology at two sites on Espenberg Peninsula in Kotzebue Sound, Alaska. Environmental Assessment of the Alaskan Continental Shelf. Final Reports of Principal Investigators. Volume 5: Biological Studies, NOAA, Environmental Research Laboratories, Outer Continental Shelf Environmental Assessment Program, Boulder, CO. p 289-607

Smith, M.W., A.S. Kane, and A.N. Popper. 2004. Noise-induced stress response and hearing loss in goldfish (*Carassius auratus*). *Journal of Experimental Biology* 207: 427-435.

Stehn, R. A., C.P. Dau, B. Conant, and W.I. Butler Jr. 1993. Decline of spectacled eiders nesting in western Alaska. *Arctic* 46(3): 264-277.

Troy Ecological Research Associates (TERA). 2003. Spectacled eiders in the Beaufort Sea: distribution and timing of use. Unpublished report prepared for BP Exploration (Alaska) Inc., Anchorage, Alaska. 17 pp.

Wysocki, L.E., J.P. Dittami, F. Ladich. 2006. Ship noise and cortisol secretion in European freshwater fishes. *Biological Conservation* 128: 501-508.

APPENDIX A: SPECTACLED EIDER CRITICAL HABITAT

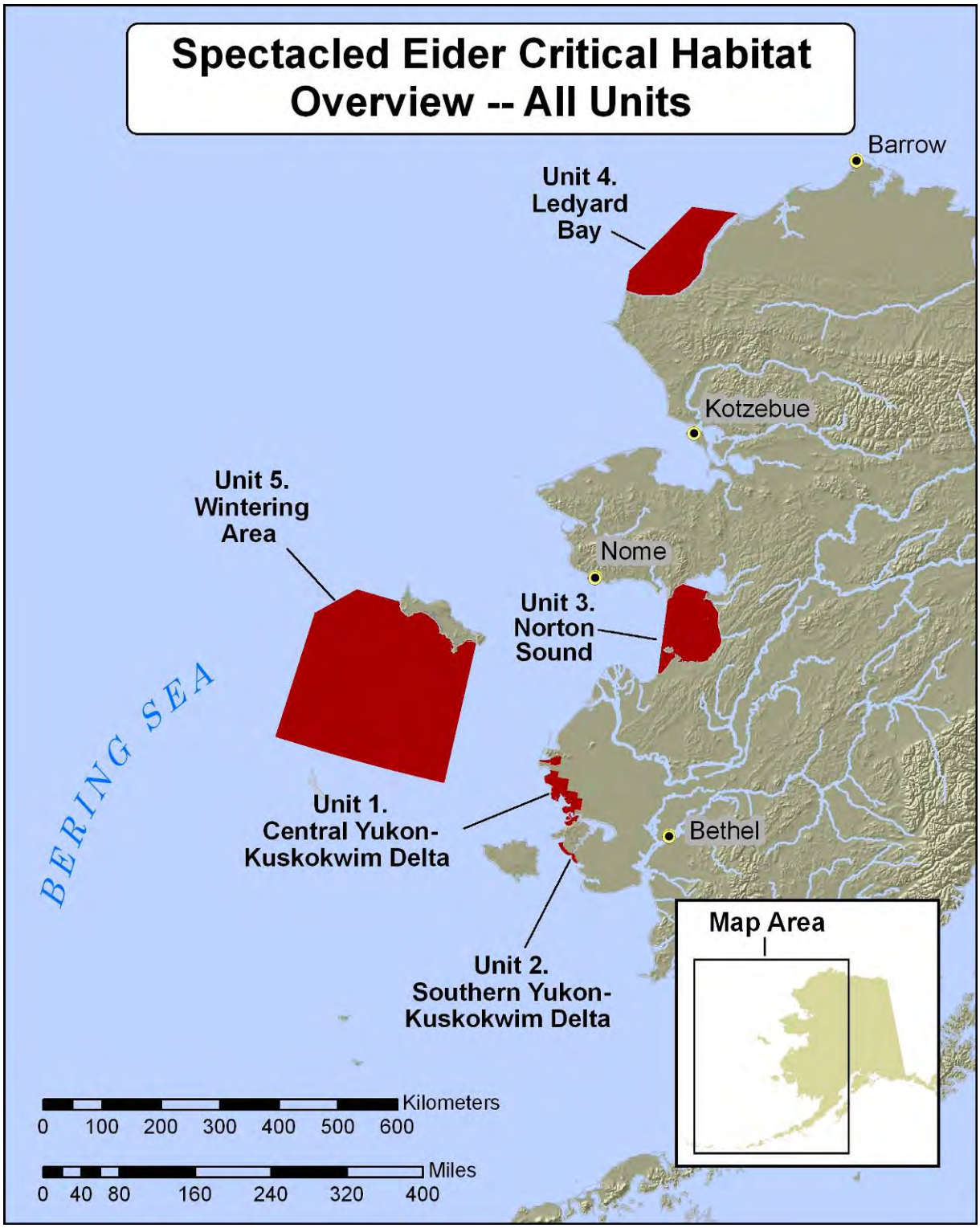


Fig. 3. Spectacled Eider Critical Habitat Overview.

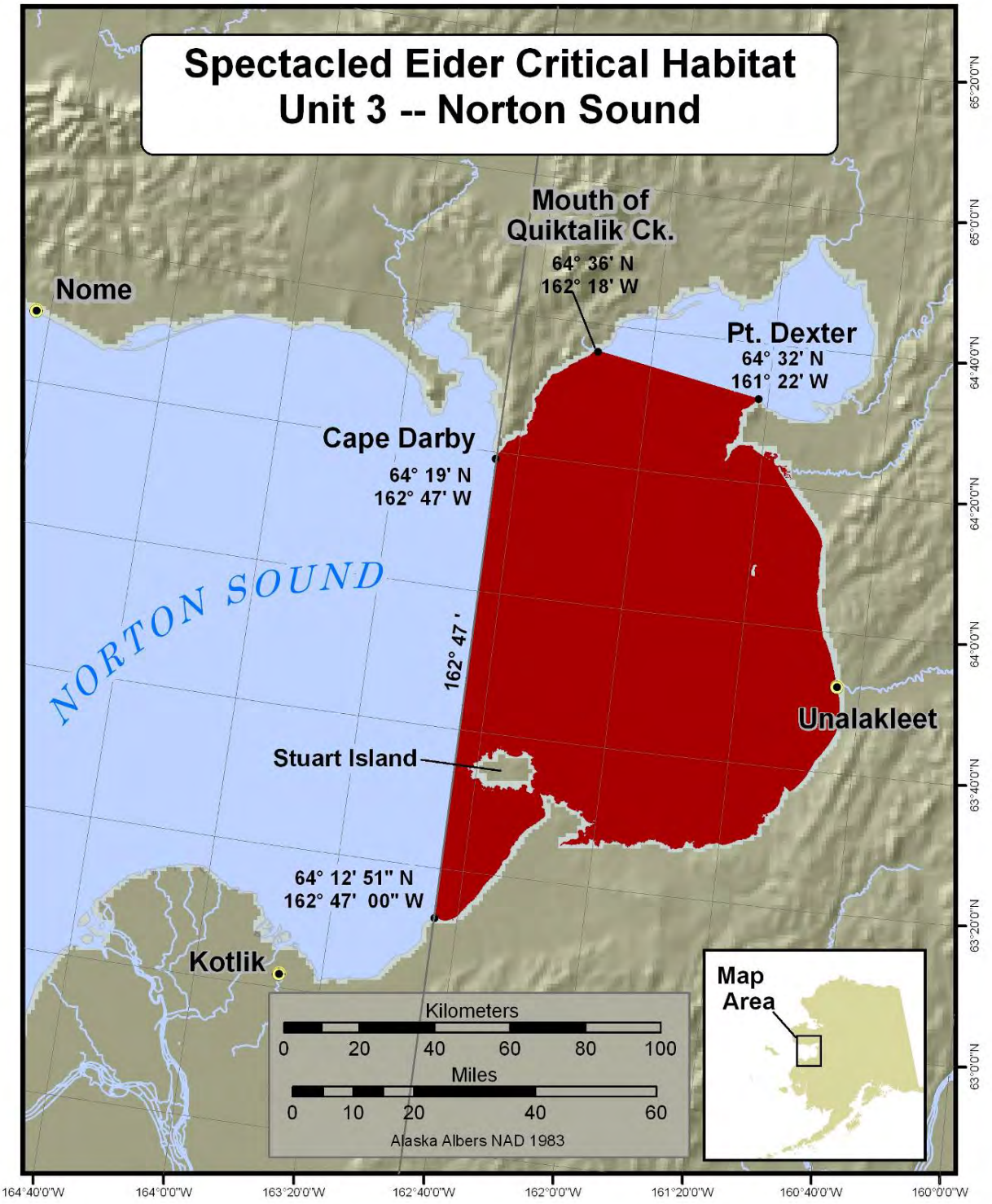


Fig. 4. Spectacled Eider Critical Habitat Unit 3 - Norton Sound.

APPENDIX B: PHOTOGRAPHY FROM JULY 2006 SITE VISIT

Existing gabion structure:

Coastal segment of existing gabion structure.

Existing gabion structure near the fish processing plant.

Existing gabion structure.

Infrastructure:

Loading dock adjacent to the fish processing plant.

Structures threatened by coastal erosion. Note the extensive erosion near the structure in the left of the photograph (denoted by white star).

Structures threatened by coastal erosion.

Segment of coastline with the proposed area of gabion extension.

Sample collection:

Example of benthic material collected using a $1m^3$ dredge.

Example of benthic material collected using a $1m^3$ dredge