

## 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 effects of the following action:

Emergency Bank Stabilization  
Galena, Alaska

The revetment project will protect approximately 1,800 linear feet of riverbank by placing 28,000 cubic yards of armor rock, 288,000 square feet of filter fabric, and 9,300 cubic yards of filter stone placed along the Yukon Riverbank. A 3-foot-thick layer of rip rap will extend from the top of the bank about elevation 123 feet, to elevation 90 feet. Filter fabric and filter stone will be placed to minimize the movement of fine material within the bank. A total affected area will be approximately 7.9 acres. The riverbank will be graded to provide an even slope for placement of the filter material and rock. Soils from the excavation would be placed on the upper slope as a base for revegetation of native plants. Excess materials will be taken to the local landfill. Construction of the revetment and rock transportation from the quarry to the project site will be done during the winter.

Construction activities along the Yukon River bank near Galena will not produce significant effects. No fish and wildlife habitat, threatened or endangered species, critical habitat, or cultural resources will be adversely impacted by the project.

The accompanying environmental assessment supports the conclusion that the project does not constitute a major Federal action significantly affecting the quality of the human environment. Therefore, an environmental impact statement is not necessary to construct the riverbank stabilization project in Galena, Alaska.

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Colonel, Corps of Engineers  
District Engineer

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Date

**ENVIRONMENTAL ASSESSMENT  
EMERGENCY BANK STABILIZATION  
GALENA, ALASKA**

**1.0 INTRODUCTION**

The need for this project was investigated under the Energy and Water Development Appropriations Act, 2001, as enacted by Section 1(a)(2) of P.L. 106-377, Conference Report 106-988, and Continuing Appropriations for FY 1985, Section 116-190.

**2.0 PURPOSE AND NEED**

Galena, Alaska, is on the north side of the Yukon River, approximately 125 miles south of the Arctic Circle and 270 miles west of Fairbanks (figure 1 of the attached Galena Emergency Bank Stabilization Letter Report). Galena serves as the hub for transportation, government, and commercial services for the western interior region of Alaska. Access to Galena is only by water or air. Commercial fishing, seasonal construction work, and mining contribute to the economy of the region.

Galena is divided into two town sites. The original site, commonly referred to as "Old Town," began as a fish site known as Henry's Point. The other site, near Alexander Lake, is commonly referred to as "New Town" and was established in 1971 after an ice-jam flood damaged a large number of structures in the original town site. New Town is approximately 1.5 miles upriver of Old Town. For the purposes of this report, it is understood that "Galena" includes both town sites and the airport.

The city of Galena, Alaska, has been the object of extensive efforts to reduce or abate erosion caused by the Yukon River along its banks. The primary cause of erosion at Galena is a combination of thermal degradation of the bank, river stage and currents undercutting the bank, and wave action with high water during summer storms. Several bank stabilization structures have been constructed.

Bank erosion continues to encroach upon the community of Galena. This continued erosion threatens the residences and businesses and increases the risk of failure of the existing bank protection measures. Long-term erosion threatens to short-circuit (flank) the Yukon River and isolate the community. Bank stabilization measures along this reach would significantly reduce the risk of damage to residences, businesses, existing bank protection measures, and the community as a whole.

**Previous Work**

The existing bank stabilization at Galena was constructed by different interests beginning in the late 1950's. The first project was constructed by the U.S. Air Force in 1959-1960 and consisted

of semi-circular sheet pile cells. Barrels (55-gallon drums) filled with sand and gravel were placed behind and above the sheet pile wall. Total length of this project was 275 feet. The second project, Phase I, was constructed by the State of Alaska in the early 1980's. Phase I consisted of placing riprap along the bank 2,500 feet upstream of the upstream extent of the sheet pile wall. The U.S. Army Corps of Engineers constructed the most recent project, Phase II, in 1987. Phase II consisted of riprap placed along 1,400 feet of river bank, beginning about 800 feet upstream of Phase I. The Phase II riprap extended from the top of the bank, about elevation 125 feet, to elevation 90 feet (winter low water elevation). Existing bank stabilization is shown on figure 1 of the Letter Report.

The Mueller Mountain quarry was the source of rock for both riprap phases. The quarry is about 15 miles east of Galena. Heavy construction equipment accessed the quarry from Galena by a winter ice road, figure 2 of the Letter Report. The rock was quarried and placed during the winter for both phases.

### **3.0 ALTERNATIVES CONSIDERED.**

#### **3.1 Without Condition (No Federal Action)**

The without condition is a description of what would be expected to occur if no Federal action is taken. At this time there are no State or local plans to address the planning objectives.

The no-action alternative consists of conditions, as they currently exist. The environmental impact of this alternative would be the continued erosion along the Galena city front where residences and city facilities exist. There would be an economic and social consequence if no action was taken. There would likely be the need for periodic maintenance of the existing protection structures. Short-term, temporary protective measures along the riverbank would be required periodically. Some structures may have to be moved or abandoned. No adverse impacts to physical, chemical or biological resources are anticipated with this proposal. The no-action alternative would not affect the subsistence life style or cultural resources.

#### **3.2 Proposed Project Alternatives**

The erosion problem at Galena has been evaluated several times over many years. The current alternatives are discussed in detail in the Galena Emergency Bank Stabilization Letter Report, Galena, Alaska, Alaska District Corps of Engineers 2001.

Several construction alternatives were evaluated for providing bank stabilization. These alternatives varied in construction material: articulated concrete mattress, sheet pile wall, riprap, and bendway weirs. Alternative 3 (riprap) was selected as the recommended plan because it provided the most bank protection, was technically feasible, and environmentally acceptable.

The alternatives evaluated for providing bank protection upstream of the existing Phase II reach are described below. The alternatives were configured to provide the maximum amount of bank protection without exceeding the Federal cost limit of \$6,000,000. A physical comparison of the alternatives is provided in Table 1.

### **3.2.1 Alternative 1 - Articulated Concrete Matt (ACM)**

The matt unit consists of concrete blocks wired together to form 4- by 25-foot sections. A 1-inch gap between each block would give each section flexibility to conform to the unevenness of the bank and for bank settlement. The sections would have a 4-foot overlap to ensure continuity and would extend from the top of bank, about elevation 125 feet, to elevation 90 feet (winter low water elevation). Filter fabric and filter stone would be placed to minimize the movement of fine material within the bank. Grading would be necessary to provide an even slope for placement of the filter material and the ACM. About 1,400 feet of bank would be protected using ACM. Planimetric and cross-section views of this alternative are shown on figures 3 and 4 of the Letter Report.

### **3.2.2 Alternative 2 - Sheet pile Wall**

This alternative would consist of driving 40-foot lengths of sheet pile along the river's bank. Thermal piles 40 feet long would be placed behind the sheet pile wall 20 feet on center to maintain the permafrost lenses behind the wall. The wall would be anchored to deadman piles to minimize the risk of buckling or overturning. Insulation would be placed behind the wall for a distance of 20 feet and a depth of 3 feet to inhibit thawing from seasonal temperature changes. Riprap would be placed along the toe of the wall to prevent undermining of the wall due to toe scour. About 1,075 feet of bank would be protected using sheet pile. Planimetric and cross-section views of this alternative are shown on figures 5 and 6 of the Letter Report.

### **3.2.3 Alternative 3 – Riprap (Recommended Plan)**

This alternative would consist of a 3-foot thick layer of riprap extending from the top of bank, about elevation 125 feet, to elevation 90 feet (winter low water elevation). Filter fabric and filter stone would be placed to minimize the movement of fine material within the bank. Grading would be necessary to provide an even slope for placement of the filter material and riprap.

Several sources of rock are located within the general vicinity of Galena. Due to the marshy terrain between the quarry and project site, transportation of rock would occur during the winter and would require construction of a winter ice road. It was assumed that the Mueller Mountain quarry would provide the riprap for this project. Alternative 3 is presented in two phased sections according to funding; section 1 would stabilize 810 ft of bank in the vicinity of Galena. The bank stabilization would consist of the placement of 129,600 ft<sup>2</sup> of filter fabric, 4,200 yd<sup>3</sup> of filter stone, and 12,600 yd<sup>3</sup> armor rock. The section project area would be about 3.5 acres. Section 2 would continue the bank stabilization for another 990 ft for a total length of about 1,800 feet covering approximately 7.9 acres. Total project quantities are included in Table 1. Planimetric and cross-section views of this alternative are shown on figures 7 and 8 of the Letter Report.

### **3.2.4 Alternative 4 - Bendway Weirs**

Bendway weirs are a series of low-level rock sills, angled 20 to 30 degrees upstream, that extend from the outside riverbank to the river's main flow path. The weirs would be high enough to redirect a significant portion of the flow and primary current away from the outside bank yet low

enough to allow normal river traffic to pass over them unimpeded. Redirection of the primary current would reduce the bank erosion due to shear velocity. However, the erosion process along the Yukon River is primarily controlled by the freeze thaw cycles of the permafrost layer along the bank. The weirs would not reduce wind and wave induced bank scour and subsequent sloughing of thawed overhanging sections. Therefore, the weirs were determined to not be technically feasible and a quantitative evaluation of this alternative was not conducted.

### 3.3 Comparison of Alternatives

All alternatives have a common objective, which is to provide the maximum amount of bank stabilization along the Yukon River without exceeding the Federal limit of \$6,000,000. Alternative 1 (Articulated Concrete Mattress) would provide 1,200 feet of bank protection due to its high prefabrication cost and shipment of matt sections to Galena. Alternative 2 (Sheet pile Wall) would provide the least amount of bank protection (1,075 feet) due to its high cost of materials, installation, and shipment. Alternative 3 (Riprap) would provide the greatest amount of bank protection (1,800 feet). Alternative 4 (Bendway Weirs) was determined to not be technically feasible and was not included in the comparison of alternatives.

All alternatives would be constructed using land-based equipment. Construction would occur during the winter to make use of the low water level. The physical characteristics of the alternatives are shown in table 1.

**Table 1. Physical Characteristics of Alternatives (based on \$6,000,000 Federal Limit)**

	Alternative 1 (ACM)	Alternative 2 (Sheetpile Wall)	Alternative 3 (Riprap)	Alternative 4 (Bendway Weirs)
Filter Fabric (ft <sup>2</sup> )	153,000	79,000	288,000	
Filter Stone (yd <sup>3</sup> )	5,000	2,000	9,300	
ACM (ft <sup>2</sup> )	134,000	—	—	
Thermal Pile (each)	—	66	—	
Sheetpile (ft <sup>2</sup> )	—	52,700	—	Not technically feasible
Riprap (yd <sup>3</sup> )	—	5,900	28,000	
Upland area impacted <sup>a</sup> (acre)	0.7	0.9	1.2	
Area impacted above summer water level – el. 110 ft (acre)	0.9	1.5	1.7	
Area impacted below summer water level – el. 110 ft (acre)	2.6	1.8	5.0	
Length of Bank Protection (ft)	960	1,300	1,800	

<sup>a</sup>Upland area defined as the area extending landward from the top of bank.

Three alternative rock sources were also considered during past studies besides the existing rock

quarry at Mueller Mountain: Bishop Rock, Bear Bluff, and Pilot Mountain. Tests on rock specimens taken in the mid 1960's show that Bishop Rock and Bear Bluff are not suitable for riprap rock material. Both Mueller Mountain and Pilot Mountain have an adequate quantity of rock for all the above proposals; however, rock from Mueller Mountain disintegrates when submerged in ethylene glycol. The ethylene glycol test is a method of accelerating the likely response of a rock to prolonged water exposure. The environmental implications of developing a new quarry site at Pilot Mountain, within the Innoko Wildlife Refuge, are severe. Securing appropriate land use permits from the landowners would be a long and likely unsuccessful process. Mueller Mountain has been used for the last several bank stabilization projects. The construction took place in the winter in part because access (15 miles) to the quarry was easier over a constructed ice road, Letter Report Figure -2.

## **4.0 AFFECTED ENVIRONMENT**

### **4.1 Natural Environment**

Galena is between the Koyukuk National Wildlife Refuge to the north and the Kaiyuh Unit of the Innoko National Wildlife Refuge to the south. Galena is located within the Koyukuk Flats region, an extensive lowland. Characteristic of the lowlands are the many large thaw lakes found along the major rivers. Meander belts are common along the broad, rolling silt plains covered with dunes and thaw sinks. Several low bedrock hills rise from the center of the lowlands, which drain into the Yukon River. Permafrost is a major consideration in planning development in the vicinity of Galena. The area adjacent to the Yukon River is underlain by discontinuous permafrost of varying depths. Away from the river floodplain, thin to moderately thick permafrost, with depths up to 600 feet, generally underlies the area.

Interior Alaska climate along the central Yukon River is continental with temperature extremes from winter to summer. Average temperatures for Galena are 38 to 68 degrees Fahrenheit (F) in the summer and -20 to 18 degrees F in winter; extreme temperatures range from -64 to 92 degrees F. Winds are generally light in interior Alaska with long periods of calmness. Galena receives about 14 inches of precipitation annually including an average 54 inches of snow. May 11 is the average date of breakup on the Yukon River and is considered the date the river becomes unsafe for a person to travel on the ice. The average date of freeze-up is November 4 and is considered the date it is safe for one to travel on the ice. The first ice on the river occurs between October 15 and 30 and ice-out occurs around May 15.

#### **4.1.1 Vegetation**

Four major vegetation communities are present around Galena: bottomland spruce-popular forest, upland spruce hardwood (aspen, spruce, birch); lowland spruce (black spruce and tamarack) and low brush bog and muskeg. The high brush vegetation is also present but less extensive. The bottomland spruce-popular forest occurs in a broad band adjacent to major rivers on the floodplains and low terraces. The upland spruce-hardwood forest is a widespread vegetation type found in higher, better-drained sites away from rivers. The lowland spruce is found in less well-drained sites often over permafrost. Low brush bogs and muskegs are found on wetter sites generally underlain with shallow permafrost. The high brush community (closed

tall shrub, willow, and alder-willow) is found along streams and fringing floodplain meadows. High brush, occurring as floodplain thickets, develop on newly exposed alluvial deposits after flooding. This early successional plant community often provides valuable wildlife habitat to species such as moose. The climax bottomland spruce-popular forest and the successional high brush plant community are found in the project site along the riverbank.

#### **4.1.2 Fish and Wildlife**

King, coho and chum salmon migrate far up the Yukon River in their annual migration to spawning grounds. King salmon enter the Yukon in June and reach the Canadian boarder by mid to late July. Spawning takes place from July to early September. Coho salmon enter the river in mid to late summer. They generally spawn in spring-fed tributaries as far upstream as the Tanana River drainages where peak spawning activities take place in September and October. The chum salmon of the Yukon have two distinct runs—the summer and fall chums. The summer run enters the Yukon in May –June and spawns in runoff tributaries of the lower Yukon below the Koyukuk River. The fall run migrates upstream starting in late June or July and spawns in spring fed streams mostly upstream of the Kantishna River. Some move as far upstream as the headwaters of the Yukon near the Yukon-British Columbia border. The young salmon of all species migrate downstream with post breakup waters at varying times in fresh water.

Arctic grayling, northern pike, burbot and several species of whitefish are found throughout the main drainages of the Yukon River and most of its tributaries. In interior Alaska most grayling move out of the smaller streams to larger rivers for over wintering. Northern pike winter in fairly deep water of lakes and rivers. The burbot is usually a resident of fairly deep water in the river or lake. Burbot spawn in winter (January and February) in moderately shallow to deep water with bottoms composed of clean sand, gravel, and stones. The white-fish species found in the Yukon River are sheefish, least cisco, Bering cisco, round whitefish, broad whitefish, and humpback whitefish. All except the Bering cisco are fall spawners.

Other species occurring in the Yukon River system are char, longnosed sucker, lake chub, Alaska blackfish, trout-perch, slimy sculpin, and arctic lamprey.

The Galena area supports varied species of mammals and birds. Riparian habitats, especially the high brush plant community, provide abundant moose browse. They support high moose densities during the winter and are calving areas. Galena is not within the traditional range of any caribou herd. Black bears are found throughout the forested areas of the Yukon drainage. Grizzly bears range primarily in the uplands but may be found in all portions of the lowlands. Wolves are abundant in the area. The area is very productive beaver country and provides good habitat for furbearers including river otter, mink, marten, muskrat, short-tailed and least weasels, wolverine, lynx, red fox, and coyote. Porcupine, ground squirrel, red squirrel, and snowshoe hare are well distributed across the region.

At least 140 species of birds use the flats and forested areas of the Yukon. Common year-round resident species include the goshawk, gyrfalcon, spruce grouse, ruffled grouse, willow ptarmigan, sharp-tailed grouse, great horned owl, yellow-shafted flicker, hairy woodpecker, downy woodpecker, gray jay, northern raven, black-capped chickadee, boreal chickadee and hoary redpoll.

Migratory waterfowl are particularly abundant in the spring and summer in the broad floodplains, lakes, and extensive muskegs. Waterfowl production is very high for Canada and white-fronted geese and ducks, mainly pintail, widgeon, scaup, and scoters. Trumpeter and tundra swans breed in the area.

#### **4.1.3 Threatened and Endangered Species**

There are no listed species in the project area. Coordination has been conducted with the U.S. Fish and Wildlife Service (Final Fish and Wildlife Coordination Act Report, 2001), found in Appendix 3.

#### **4.1.4 Essential Fish Habitat (EFH)**

The 1996 reauthorization of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) amendments mandate that Federal agencies assess the effects of Federal projects to essential fish habitat (commercial fish stocks in all life stages and associated habitats) and consult with the Department of Commerce (50 CFR 600.905-930).

Habitats of particular concern are areas known to be important to species in need of additional levels of protection from adverse effects. In determining habitat types of particular concern, consideration should be given to the sensitivity, exposure, rarity, and the importance of the ecological function of the habitat.

Essential fish habitat means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. For the purpose of interpreting the definition of essential fish habitat: “waters” includes aquatic areas and their associated physical, chemical, and biological properties that are used by fish, and may include areas historically used by fish where appropriate; “substrate” includes sediment, hard bottom, structures underlying the waters, and associated biological communities; “necessary” means the habitat required to support a sustainable fishery and a healthy ecosystem; and “spawning, rearing, feeding, or growth to maturity” covers a species’ full life cycle.

Species evaluated under EFH that could be expected to use the near shore river habitats in the project area include the three species of Pacific salmon: king, chum and coho. Pacific salmon migrate, spawn, and rear in the Yukon River. Alteration of a small amount of riverbank habitat is not expected to have a significant impact on salmon.

## **4.2 Human Environment**

Galena was established in 1917 as a supply point for galena (lead ore) prospects south of the Yukon River. The towns along this stretch of the Yukon River were founded on the sites of Athabaskan winter settlements. In this case, “Natulaten” or Notaglita” was a settlement of the Upper Yukon Koyukon. This group of Koyukon is bounded by the Koyukuk River Koyukon to the north, the Lower Yukon Koyukon to the west, and the Kutchin to the east. The area’s Koyukon Athabascans had spring, summer, fall, and winter camps, and moved as the wild game

migrated. This semi-nomadic group began to change with the encroachment of European civilization. Malakhov of the Russian American Company made the first European contact with the Koyukon in 1838 when he reached the Yukon River. He then established a trading post at Nulato. Exploration of all rivers and tributaries in Koyukon territory took place over the next 50 years. Not much cultural change took place in upper Yukon Territory until the gold rush era, when the Yukon River became a corridor to the Klondike goldfields.

Galena was established in 1918 near an old Athabaskan fish camp called Henry's Point. In 1920, Athabascans living 14 miles upriver at Loudon began moving to Galena to sell wood to steamboats and to work hauling freight for the mines. A school was established in the mid-1920s, and a post office opened in 1932. The Galena Air Field was constructed in World War II. In 1945, the community suffered a major flood. During the 1950s, military facilities at the Galena and Campion Air Force Stations, and airport and road developments sparked growth in the community. Due to a severe flood in 1971, a new community site was developed at Alexander Lake, about 1.5 miles east of the original town site. City offices, the health clinic, schools, washeteria, store, and more than 150 homes were constructed at "new town" and a city government was formed. The Air Force Station was closed in 1993, and the facilities are currently being used by the Galena School District as a boarding school. The Chugach Development Corporation maintains the base facilities under contract.

Galena is a first class city and serves as the transportation, government, and commercial center for the western interior. Federal, state, city, and village government jobs dominate. Other jobs include transportation, retail business, and construction, and 33 residents hold commercial fishing permits. Gana-A'Yoo, Limited is the village Corporation and Doyon Limited is the Regional Corporation. The Loudon Village Council is a BIA-recognized traditional council.

The population of Galena is 675 according to the 2000 census. The population is 67.4 % Native. Many of Galena residents practice a subsistence lifestyle. Subsistence food sources include salmon, whitefish, moose, and berries. Galena serves as a regional transport center for surrounding villages. The state-owned airport provides year-round access. The rivers allow access by cargo barges from mid-May through mid October. During winter, the frozen rivers are used for travel to Ruby, Koyukuk, Kaltag, and Nulato.

## **5.0 ENVIRONMENTAL CONSEQUENCES**

### **5.1 Natural Environment**

#### **5.1.1 Physical**

Physical effects anticipated from the proposed bank stabilization project would be limited to riverbank disturbances and quarry site disturbances. Riverbank disturbances include changes in the bank morphology and changes in the rate of river migration. The proposed excavation would disturb about 7.9 acres of riverbank, allowing a uniform and sloped revetment cap to be installed. This excavation work would remove much of the irregular bank convolutions caused by erosion, replacing them with what would be a rock berm. Therefore, the bank slope would be altered slightly to ensure a stable surface for the rock. The excavation work would be accomplished with land-based machinery (bulldozers, front-end loaders, and backhoes). This excavation would have

a stabilizing influence upon the otherwise differential rate of bank erosion. No significant negative physical impacts would be expected. Current patterns, water circulation, and water level fluctuation of the Yukon River would not be affected by this

proposal. The excavated soils would be replaced on the upper bank of the revetment to encourage revegetation. Excess materials would be disposed of at the local landfill. Wood would be available to local residents.

The physical impact of using Mueller Mountain quarry as the rock source is inconsequential because it is an established quarry site. In addition, there is a road established between Galena and the quarry site. The benefit of constructing the rock revetment during the winter, when the river and ground are frozen, minimizes physical damages to the terrain.

### **5.1.2 Biological**

Impacts generated by this proposal to the biological resources of the area would affect vegetation, fisheries, birds, and mammals.

Minor vegetation disturbances would occur at the potential quarry site as additional rock beyond what is stockpiled is blasted off the slope. Vegetation disturbances are anticipated from placement of revetment alternatives due to the excavation work proposed along the bank. These losses would be small in quantity and restricted to the alignment of the revetment. This alignment varies with the alternatives. Alternative 3, the selected plan, would disturb 1.4 acres of riverbank. The loss of vegetation as a result of this disposal would not adversely affect riparian habitats because of the small area involved. Some riverbank vegetation, primarily tall shrubs and trees, would be eliminated along with the excavation work. The plants likely offer minor erosion protection and cover for waterfowl and other river margin wildlife species. No significant impacts are anticipated as a result of this work.

Potential fisheries impacts could include displacement and avoidance of the construction area. The proposed project site does not contain spawning areas. It is used as a migration corridor for king, silver, and chum salmon, as well as burbot, sheefish, Bering cisco, least cisco, pigmy whitefish, round whitefish, broad whitefish, and Arctic grayling. If construction was conducted during the summer, migrating fish may be stressed by the in-water activity associated with the project. Increased noise, construction equipment in the water, and turbidity associated with armor rock or concrete mattress placement could cause migrating fish to avoid the area. Increased turbidity could also stress fish during respiration and reduce success during feeding. These effects would be temporary, terminating at the end of the construction effort. Restrictions on construction activity during the time of fish in- or out-migration would significantly reduce any potential impact. Long-term changes in resting or feeding habitat are not anticipated with this proposal because the river basin is naturally dynamic over time. Fish dwelling or resting within the project area could be displaced by construction activity. This effect also would be temporary, lasting the duration of construction.

Winter construction (the selected scenario) would have significantly fewer impacts. The river is much reduced because of the ice cover and flowing water may not be encountered. Fish and wildlife contact would be minimal. Winter construction would also have the advantage of using

the quarry access ice road. This road would reduce overland terrain impacts to wetlands, flowing creeks and any resident fish.

Wildlife would not be affected at the proposed construction site. Mueller Mountain has been identified as offering habitat to waterfowl, moose, black and brown bear, snowshoe hare, red fox, and mink. At the quarry site itself, however, wildlife use is likely limited. The road linking Galena to the Mueller Mountain quarry site receives use by wildlife as a transport corridor. Adverse effects due to the activity at the quarry site and along the haul road would be short term and inconsequential due to the confined area of quarry activity and the previous disturbed nature of the site.

### **5.1.3 Water Quality**

During construction in summer, placement of the armor rock would result in water quality impacts in the form of increases in turbidity and suspended sediments. These increases would be caused by the impact of the rock striking the river bottom, causing sediment plumes to rise in the water column. Increased suspended sediments reduce water clarity, affect water color, and can result in changes in dissolved gas levels. However, these increases would be short-term and local, lasting as long as construction activity. The timing of the in-water construction activity would be during the winter, between November 1 and the first presence of open water in the spring. The impact of these temporary decreases in water quality is therefore minimal.

## **5.2 Human Environment**

### **5.2.1 Cultural Resources**

No prehistoric cultural resources have been found in the project vicinity. Potential for locating prehistoric cultural resources is not considered likely since the work is along a dynamic riverbank. Should any artifacts be encountered, the State Historic Preservation Officer will be informed. Correspondence from the SHPO is in appendix C.

### **5.2.2 Economic Impacts**

Construction of this project would have a minor effect on the Galena economy through local hire of some workers, and the purchase of local materials and services during the construction period. The operation of the project is expected to reduce the bank erosion rate significantly and positively affect local residences and current and future businesses.

## **6.0 REQUIRED PERMITS AND AUTHORIZATIONS**

Pertinent Federal and State laws and statutes have been reviewed for the proposed project. The USFWS Coordination Act Report is included in EA-Appendix 1. Section 404(b)(1) of the Clean Water Act, which discusses discharge of dredged or fill material, has been prepared for the proposed action (Alternative 3) in EA-Appendix 2. Coordination correspondence is contained in EA-Appendix 3. A Certificate of Reasonable Assurance under Section 401 of the Clean Water Act is required and will be received after the public notice and review of the project. This project is not within an Alaska Coastal Management Program service area.

## 7. DOCUMENT PREPARERS

The names of the persons involved in the preparation of this document were omitted in compliance with the Department of the Army web security policy.

## 8.0 CONCLUSION

The proposed action, as outlined in this assessment, will not have a significant adverse impact on the natural or human environment. The discharge of fill materials associated with the proposed action complies with the 404 (b)(1) guidelines of the Clean Water Act with the inclusion of appropriate and practical discharge conditions. Therefore, the preparation of an Environmental Impact Statement for this action is not required. A Finding of No Significant Impact (FONSI) has been prepared.

## 9.0 REFERENCES

Alaska Department of Community and Economic Development website, 2001.  
<http://www.dced.state.ak.us>.

Alaska Department of Fish and Game, 1986. *Alaska Fisheries Atlas*.

Alaska Department of Fish and Game, 1986. *Alaska Habitat Management Guide-Western and Interior Regions Map Atlas*.

U.S. Army Corps of Engineers, 1986. *Environmental Assessment Galena Bank Stabilization Advanced Measures*.

U.S. Army Corps of Engineers Alaska District, 2001. *Galena Emergency Bank Stabilization Letter Report, Galena, Alaska*.

U.S. Fish and Wildlife Service, 2001. *Yukon Riverbank Stabilization Project, Galena, Alaska, Final Fish and Wildlife Coordination Act Report*. U.S. Fish and Wildlife Service, Ecological Services, Fairbanks Field Office.

**EA-APPENDIX 1**

**EVALUATION OF THE DISCHARGE OF FILL MATERIAL  
RELATED TO THE EMARGENCY BANK STABILIZATION PROJECT  
AT GALENA, ALASKA, IN ACCORDANCE WITH  
SECTION 404(b)(1) GUIDELINES**

EVALUATION OF THE DISCHARGE OF FILL MATERIAL  
RELATED TO THE EMERGENCY BANK STABILIZATION PROJECT  
AT GALENA, ALASKA, IN ACCORDANCE WITH  
SECTION 404(b)(1) GUIDELINES

SUBPART A - GENERAL

Fill material should not be discharged into the aquatic ecosystem unless it can be demonstrated that such a discharge would not have an unacceptable adverse impact either individually or in combination with other known and/or probable impacts of other activities affecting the ecosystem 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 portions of the project that would require an evaluation in accordance with the Section 404(b)(1) guidelines consist of the proposed addition of 37,300 cubic yards of filter stone and armor rock material onto the Yukon River bank for bank protection. The approximate area is 7.9 acres. A description of the proposed project and alternatives evaluated for impact analysis can be found in the environmental assessment (EA) prepared for this project.

The purpose of the proposed project is to increase the level of protection now in place at Galena to reduce the amount of shoreline erosion at new-town Galena.

The proposed project or any of the project alternatives will not affect the continued existence or critical habitat of species listed as threatened or endangered under the Endangered Species Act of 1973 (17 USC 1531 et. seq.). Endangered species consultation is in the Fish and Wildlife Coordination Act Report appendix to the EA.

As determined in subparts C through G of this evaluation, the proposed project or any of the

alternatives, based on preliminary findings, will not contribute to significant degradation of waters of the United States including adverse effects on human health, life stages of organisms dependent on the aquatic ecosystem, ecosystem diversity, productivity and stability, and recreational, aesthetic, and economic values.

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.

Appropriate and practicable steps have been identified in subpart H, which would minimize potential adverse impacts of the discharge on the aquatic ecosystem. These mitigating measures may be incorporated into the project design or may be required by permit conditions or other agreements. The winter construction schedule when the river is frozen would minimize fish and water quality affects.

#### SUBPART C - PHYSICAL AND CHEMICAL IMPACTS

Pertinent information about primary, secondary, and cumulative impacts of the proposed project and alternatives as they relate to substrate; turbidity/suspended particulates; physical and chemical changes to the water columns; current patterns and water circulation; and water level fluctuation are discussed in the EA (Impacts of the Proposed Action).

#### SUBPART D - BIOLOGICAL IMPACTS

Pertinent information about the impacts of the proposed project and alternatives on the natural environment of the Yukon River and Galena, Alaska, are fully described in the "Environmental Consequences of the Proposed Action" portion of the EA. Adverse impacts resulting from the discharge of fill materials are relatively minor. Work would result in direct impacts to 7.9 acres of riverbank and riverbed.

#### SUBPART E - POTENTIAL IMPACTS ON SPECIAL AQUATIC SITES

The proposed project would not affect any special aquatic site.

#### SUBPART F - POTENTIAL EFFECTS ON HUMAN USE CHARACTERISTICS

Pertinent information about the impacts of the proposed project on the human environment and use characteristics is discussed in the EA. No adverse impacts are anticipated to municipal and private water supplies, recreational and commercial fisheries, water-related recreation aesthetics or parks, national and historical monuments, wilderness areas, or research sites and similar preserves.

## SUBPART G - EVALUATION AND TESTING

The potential source of armor rock material to be used in this proposed project would be the Mueller Mountain Quarry, located about 15 miles east of Galena, Alaska. The potential impacts of using rock from this quarry are evaluated in the EA (Impacts of the Proposed Action). Based on these evaluations and discussions and the locations of the potential material source sites described, the possibility that the proposed material is a carrier of contaminants is unlikely.

Based on this evaluation, there is little likelihood that fill associated with the proposed project or any practicable alternatives would result in contamination of the aquatic ecosystem; therefore, no testing is required.

## SUBPART H - ACTIONS TO MINIMIZE ADVERSE EFFECTS

Actions concerning the location of fill, the type of material, the controlling of material following placement, the method of dispersion, plant and animal populations, human use and other actions were considered in an attempt to minimize adverse effects of this proposed project. The location of the rubble mound fill is fixed to provide maximum cost effective erosion protection to citizens of Galena and their property. The rock would be taken from an existing quarry. Other alternative rubble mound material sources would be complicated and potentially environmentally damaging to develop.

The Yukon River shoreline during winter is receded because of the freeze-up, therefore construction on the bank and nearshore would be out of the water. Work through the ice further from shore may encounter flowing water. Work during winter would minimize impacts to fish and water quality.

Excavation of the slope would impact trees and shrub vegetation. Soils would be re-placed onto the riprap above the water line to encourage revegetation of the riparian habitat.

**EA-APPENDIX 2**

**U. S. FISH AND WILDLIFE COORDINATION ACT REPORT**



**United States Department of the Interior**  
**Fish and Wildlife Service**  
NORTHERN ALASKA ECOLOGICAL SERVICES  
101 12th Ave., Box 19, Room 110  
Fairbanks, Alaska 99701  
November 15, 2001



Environmental Resources Section, Alaska District  
CEPOA-EN-CW-ER  
U.S. Army Corps of Engineers  
Post Office Box 898  
Anchorage, Alaska 99506-0898

Re: Yukon Riverbank Stabilization Project

Dear Mr. .

Enclosed is the Final Fish and Wildlife Coordination Act Report for the Yukon River Stabilization Project in Galena, Alaska. The Coordination Act Report contains a summary of the project area's fish and wildlife resources, identification of endangered species, an evaluation of the Muller Mountain quarry site, and U.S. Fish and Wildlife Service recommendations. Please contact 907-456-0209 should you have any questions concerning these comments.

Sincerely,

Acting Field Supervisor

ESG/esg

cc: ADF&G, Fairbanks



U.S. Fish & Wildlife Service

*Ecological Services  
Fairbanks Field Office*

Coordination Act Report NAES-CAR-0101



Habitat  
Conservation

Yukon Riverbank  
Stabilization Project  
Galena, Alaska

Final  
Fish and Wildlife Coordination Act Report



Endangered  
Species

By:

*Fish and Wildlife Biologist  
U.S. Fish and Wildlife Service  
Northern Alaska Ecological Services  
101 12th Ave., Box 19, Room 110  
Fairbanks, Alaska 99701*



Environmental  
Contaminants

*November 2001*

**Yukon Riverbank Stabilization Project  
Galena, Alaska**

**Final Fish and Wildlife Coordination Act Report**

**Submitted By:**

**Fish and Wildlife Biologist  
U.S. Fish and Wildlife Service  
Northern Alaska Ecological Services  
101 12<sup>th</sup> Avenue, Box 19, Room 110  
Fairbanks, Alaska 99701**

**November 2001**

## INTRODUCTION

The Alaska District of the Corps of Engineers (COE) is planning to construct a bank stabilization project along the Yukon River near Galena, Alaska (Figure 1). Their plan is to stabilize 2,100 feet of bank with 336,000 square feet of filter fabric, 10,900 cubic yards of filter stone and 32,700 cubic yards of armor rock. The project area is approximately 9.2 acres (Figure 2).

Several alternatives that provide bank stabilization were evaluated by the COE before selecting Alternative 3 - Riprap. Alternative 1 considered use of articulated concrete mats; Alternative 2 evaluated use of a sheetpile wall; Alternative 3 evaluated riprap; and Alternative 4 considered bendway weirs (low-level rock sills, angled 20 to 30 degrees upstream, that extend from the outside riverbank to the river's main flow path).

This report constitutes the U.S. Fish and Wildlife Service (Service) Fish and Wildlife Coordination Act Report on the COE Bank Stabilization Work at Galena. The purpose of this report is to provide the COE with planning information, to discuss the presence of fish and wildlife resources likely to be affected by the bank stabilization work, and to define potentially significant impacts associated with the project. The following report is based on information provided by the COE, Alaska District, a June 19, 2001 site visit, a literature review, and telephone interviews with agency biologists. Questions regarding this report should be directed to \_\_\_\_\_ Fish and Wildlife Biologist, at 907-456-0209.

This report is prepared in accordance with the fiscal year 2002 Scope of Work and 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 2b of the Fish and Wildlife Coordination Act (FWCA). This report is intended to provide equal consideration of fish and wildlife conservation in conjunction with the project purpose.

## PROJECT AREA

Galena is a village of 675 people (2000 census, DCED 2001) and is located on the north bank of the Yukon River, approximately 125 miles south of the Arctic Circle, 270 air miles west of Fairbanks and 325 air miles north-northwest of Anchorage. Galena lies between the Koyukuk National Wildlife Refuge to the north and the Innoko National Wildlife Refuge to the south. Both refuges were created in 1980 with passage of the Alaska National Interest Land Conservation Act. Two separate town sites exist in Galena: Old Town which is located on the Yukon River, south and east of the decommissioned Galena Air Force Base; and the Alexander Lake Area (New Town) located just east and north of Old Town, developed to provide an area that was less impacted by the periodic flooding of the Yukon River. New Town is located approximately 1.5 miles upstream of Old Town, and was established in 1971 after an ice jam flood damaged a large number of structures in Old Town. Galena serves as the hub for transportation, government, and commercial services for the western Interior region

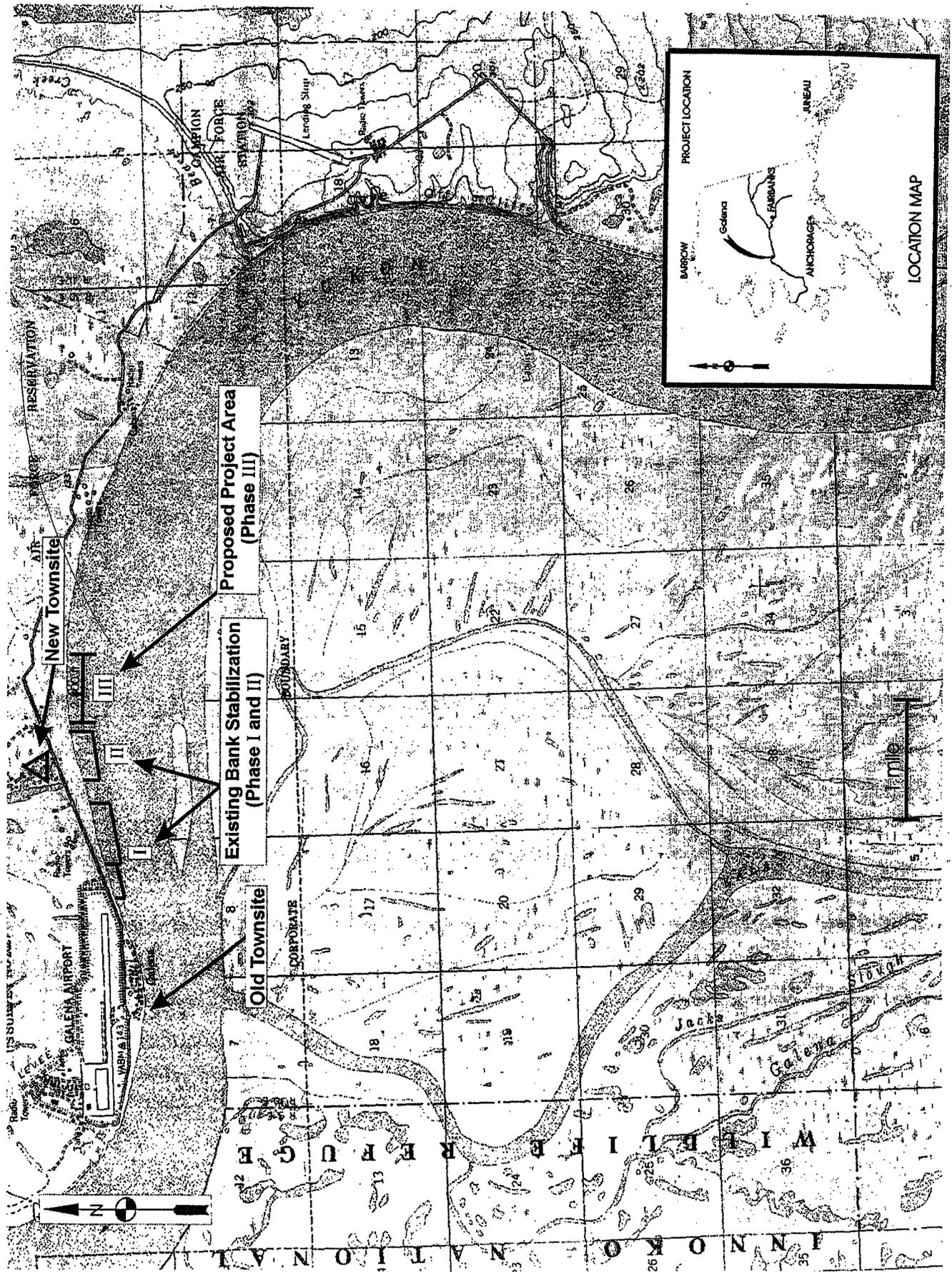


Figure 1: Galena Emergency Bank Stabilization



ALASKA DISTRICT  
CORPS OF ENGINEERS  
CIVIL WORKS BRANCH

ALTERNATIVE 3 - RIPRAP FOOTPRINT  
EMERGENCY BANK STABILIZATION, GALENA, ALASKA

Figure 2

of Alaska. Access to Galena is only by water or air. The economy of the region is based predominantly on Regional Corporation non-profits, seasonal construction work, education, Civil Service and care-taking the military base.

Erosion at New Town and Old Town is a serious threat (Figure 1). Average erosion rates at Old Town are approximately 5 feet per year and 15 feet per year at New Town (COE 1986). The primary cause of erosion at Galena is a combination of thermal degradation of the bank, currents undercutting the bank, and wave action created by summer storm high water. The COE has conducted field studies since 1952. Erosion rates in Galena have been recorded since the late 1940's.

The City of Galena, U.S. Air Force, the State of Alaska, and the COE have conducted Yukon River bank stabilization efforts for over 50 years. The following table gives a brief history of those projects.

<i>Date</i>	<i>Action</i>
1959-60	Semi-circular sheetpile cells constructed by USAF. Several 55 gallon drums filled with sand/gravel were placed behind and above sheetpile wall 275' long. (Photo 1).
Early 1980's	State of Alaska constructed Phase 1: Riprap placed along 2,500' of river bank beginning at the upstream extent of sheetpile wall (Photo 2).
1987	COE constructed Phase 2, the most recent project: Riprap placed along 1,400' of river bank beginning 800' upstream of Phase 1 (Photo 3).



Photo 1: Sheetpile placed by USAF 1959-60

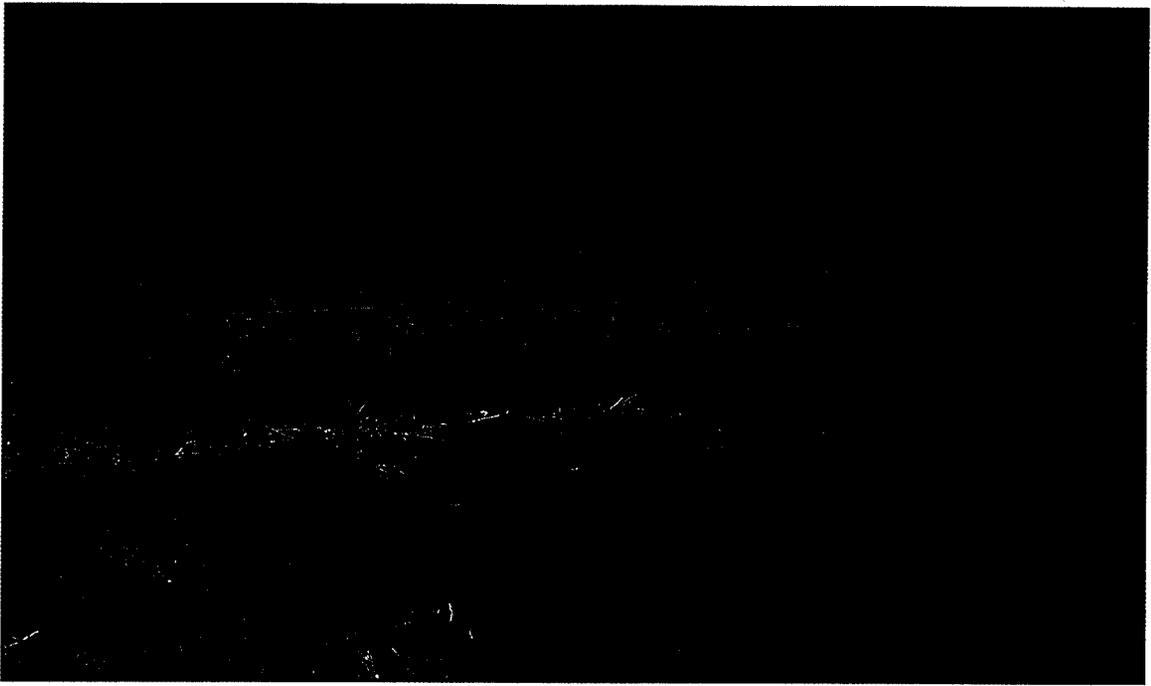


Photo 2: Phase 1-1980's Notice Vegetation over Riprap

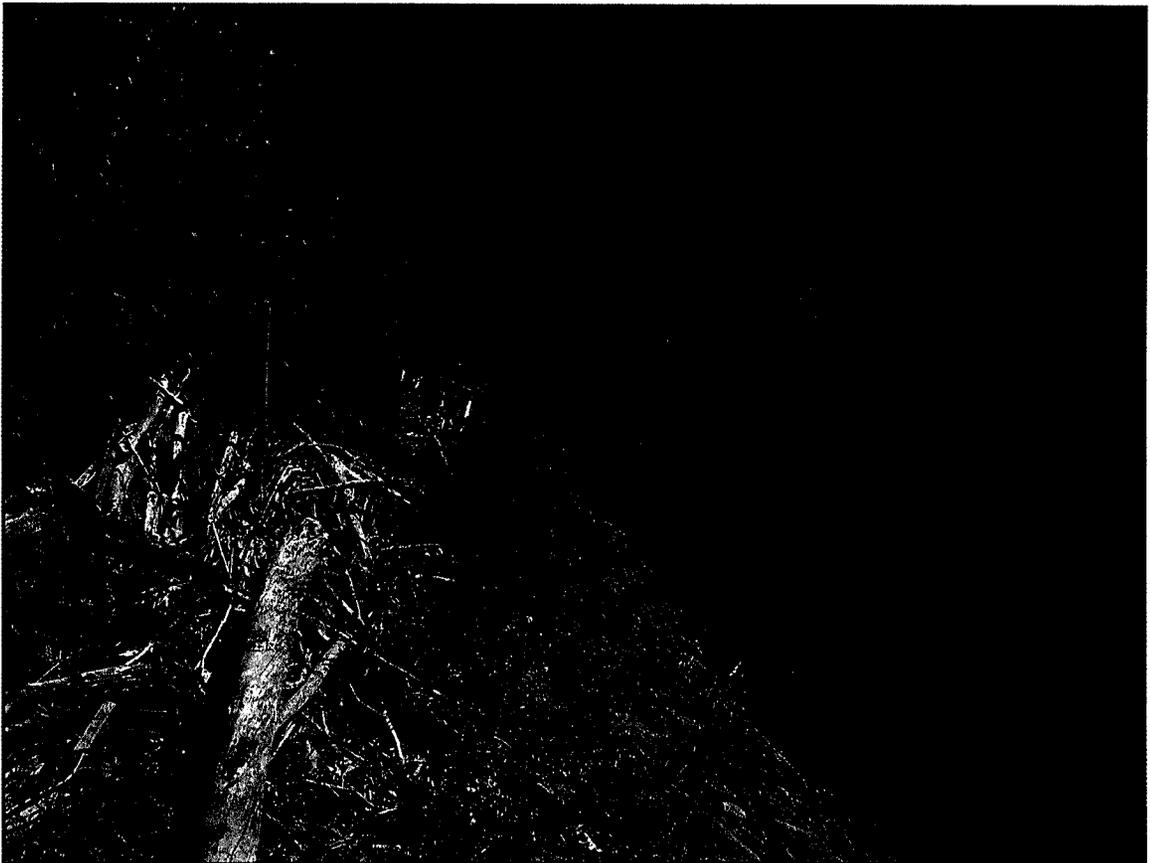


Photo 3: Phase 2 - 1987

National Environmental Policy Act (NEPA) documentation on bank stabilization projects at Galena includes an Environmental Assessment (COE 1986), Reconnaissance Feasibility Study (COE 1986) and Galena Emergency Bank Stabilization Letter Report (COE 2001). The Service commented on the Phase 2 project with a letter of no objection (FWS 1987).

### **PROJECT DESCRIPTION:**

Previous Galena bank stabilization projects (Phases 1 & 2) have successfully protected portions of Galena along 4,175' of the Yukon River. The City of Galena has requested assistance from the U.S. Army Corps of Engineers to abate the erosion along 2,100' (upstream of the previous projects) near the New Town section of Galena. Bank stabilization along this reach of the Yukon River would significantly reduce the risk of damage to residences, businesses, existing bank protection, and the community as a whole.

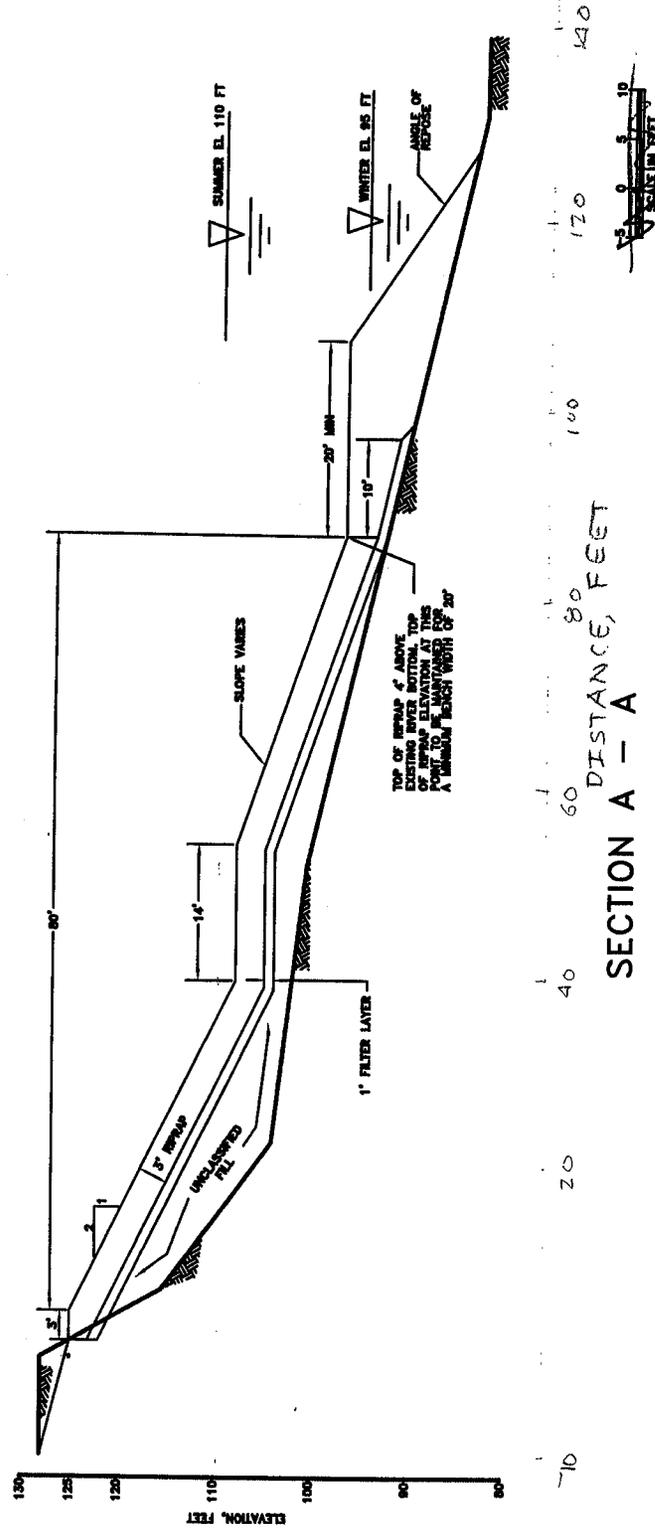
The COE considered the following alternative erosion control methods in response to the emergency bank stabilization problem in Galena. The alternatives were configured to provide the maximum amount of bank protection without exceeding the Federal cost limit of \$6,000,000.

(a) Alternative 1 – Articulated Concrete Matt (ACM): Concrete blocks are wired together to form 4'x25' sections. The sections would overlap each other by 4' to ensure continuity. The sections would extend from the top of the bank (elevation 125') to winter low water (elevation 90'). Filter fabric and filter stone would be placed to minimize the movement of fine material within the bank. Grading would be necessary to provide an even slope for placement of the filter material and the concrete matt. Under this scenario, approximately 1,400' of bank could be protected without exceeding budget limitations.

(b) Alternative 2 – Sheetpile Wall: 40' lengths of sheetpile would be driven into substrate along the river's bank. Thermal piles (40' long) would be placed behind the sheetpile wall 20' on center to maintain the permafrost lenses behind the wall. The wall would be anchored to deadman piles to minimize the risk of buckling or overturning. Insulation would be placed behind the wall for a distance of 20' and depth of 3' to inhibit thawing from seasonal temperature changes. Riprap would be placed along the toe of the wall to prevent undermining of the wall due to toe scour. Approximately 1,075' of bank could be protected without exceeding the budget.

(c) Alternative 3 – Riprap: 3' thick layer of riprap extending from the top of the bank (elevation 125') to the winter low-water level (elevation 90'). Filter fabric and filter stone would be placed to minimize the movement of fine material within the bank. The bank would be graded to provide an even slope for placement of filter material and riprap. Approximately 2,100' of bank could be protected using the riprap method (Figures 2 & 3).

(d) Alternative 4 – Bendway Weirs: A series of low-level rock sills, angled 20 to 30 degrees upstream, that extend from the outside riverbank to the river's main



SECTION A - A



ALASKA DISTRICT  
CORPS OF ENGINEERS  
CIVIL WORKS BRANCH

ALTERNATIVE 3 (RIPRAP)-CROSS SECTION A-A  
EMERGENCY BANK STABILIZATION, GALENA, ALASKA

Figure 3

flow path. The weirs would be high enough to redirect a significant portion of the flow and primary current away from the outside bank yet low enough to allow normal river traffic to pass over them unimpeded. Redirection of the primary current would reduce the bank erosion due to shear velocity. However, the erosion process along the Yukon River is primarily controlled by the freeze thaw cycles of the permafrost layer along the bank. The weirs would not reduce wind and wave induced bank scour and subsequent sloughing of thawed overhanging sections. Therefore, the weirs were determined to not be technically feasible.

After analyzing economic and design factors, the COE selected Alternative 3 - Riprap as the action to be carried forward. Alternative 3 would create a revetment that stabilizes and protects the bank from further erosion. The COE plans to stabilize 2,100 feet of the Yukon River bank with 336,000 square feet of filter fabric, 10,900 cubic yards of filter stone and 32,700 cubic yards of armor rock. Total project footprint is estimated to be 9.2 acres.

Phase 3 construction is estimated to begin in winter of 2002/2003 and will take approximately two months. Timing of construction may be altered to accommodate contractor and materials availability.

### **QUARRY SITES**

Several sources of rock are located within the general vicinity of Galena. As currently planned, Mueller Mountain Quarry would provide the riprap for this project (Figure 4). Mueller Mountain Quarry is an existing quarry east of Galena, and is characterized by an upland spruce-hardwood forest mainly consisting of paper birch, quaking aspen, balsam poplar, and white spruce (COE 1986). Approximately 32,700 cubic yards of rock would be removed from the quarry. The quarry would expand by approximately 0.5 acre as a result of the project. The contractor will submit a quarry development plan. The impacted acreage is upland, largely mixed deciduous-coniferous forest. Due to the marshy terrain between the quarry and project site, transportation of rock would occur during the winter and would require construction of a single-lane, 8-mile long winter ice road. The type of rock Mueller Mountain Quarry provides is columnar basalt (Photo 4). Quarry development and operation typically have severe environmental impacts from the destruction of vegetation, scraping and stockpiling of overburden, noise from rock blasting, and heavy equipment operation. Since the quarry site and the haul road are already established, further disruption to vegetation and wildlife would be minor. These impacts would be minimized because quarry access with heavy construction equipment will be during the winter over an ice road. Rock will be quarried and placed during the winter of 2002/2003.





Photo 4: Mueller Mountain Quarry Rock

## **BIOLOGICAL RESOURCES**

The biological resources of Galena and the surrounding area were described in the 1986 Reconnaissance Feasibility Study – Bank Stabilization Report as well as the 1986 Galena Bank Stabilization Advanced Measures EA. The following is a discussion of the most significant fish and wildlife resources affected by the proposed project.

### **Fish**

The Yukon River is the largest river in Alaska, and serves as a major migration corridor for chinook, chum, and coho salmon as well as sheefish, Bering cisco and broad whitefish from mid-June through August. Chum salmon are the most abundant salmonid, followed in descending order of abundance by chinook and coho (ADFG 1998). Salmon are not known to spawn in the project site area (ADFG 1986). Other fish that reside in the Yukon near Galena include burbot, least cisco, round whitefish, Arctic lamprey, northern pike, and Arctic grayling. The proposed project site does not provide rearing or spawning habitat for resident fish (David Daum, USFWS Fairbanks Fishery Resources Office, pers. com.) Since construction is planned for winter, 2002/2003, it is expected that the project will have little effect on fish migration.

### **Birds**

Waterfowl commonly occur on the Yukon River near Galena, with increased abundance during spring and fall migrations. Swans, geese and ducks are the major water birds with a million ducks and 450,000 geese typically migrating out of the Koyukuk-Innoko area in the fall (COE 1986). Species most likely to occur near the project site and quarry site during the winter months include: Bohemian waxwing, gray jay, common raven, black-capped and boreal chickadee, common and hoary redpoll, pine grosbeak, white-winged crossbill, downy and hairy woodpecker, snow bunting, great-horned and great-gray owl, boreal and northern hawk owl, willow and rock ptarmigan, spruce and ruffed grouse, and

northern goshawk. Significant impacts to any of these species is not likely if construction occurs as planned, during the winter months.

The Mueller Mountain quarry site is surrounded by small lakes and ponds. These lakes provide food for waterfowl during the summer months (COE 1986). Blasting of rock could be detrimental to migrating or nesting birds, depending on timing. Significant impacts to birds is not likely if blasting of quarry rock occurs as planned, during the winter months.

### **Mammals**

Common mammals of the area include lynx, snowshoe hare, shrews, voles, wolves, beaver, black bear, moose and fox. Large mammals do not frequent the City of Galena or the project site. Impacts to mammals are expected to be minimal and short term. (Jenny Bryant, USFWS Biologist, Koyukuk/Nowitna National Wildlife Refuge Complex, pers. com.).

### **Endangered Species**

There are no federally listed species and/or proposed or designated critical habitat in the project area. The Service does not expect any new species being listed in this area over the course of the project.

The proposed project site is within the range of the American peregrine falcon (*Falco peregrinus anatum*), which was removed from the list of threatened and endangered species on August 25, 1999. Due to its recent recovery from endangered status, the American peregrine falcon will be monitored on a regular basis for the next decade. If survey data indicate a reversal in recovery, the American peregrine falcon could be emergency listed at any time. The Service recommends applicants and agencies avoid impacts to peregrine falcons to assure a healthy long-term population. The Service believes the proposed project and associated activities are not likely to adversely affect peregrine falcons.

The American peregrine falcon migrates through the area and is known to nest on the cliffs of eroded stream banks of the Yukon River and its tributaries in the summer. Though no peregrine falcon nests are known to be located within a 3-mile radius of the proposed bank stabilization site, 3 nest sites occur within 10 miles. Six falcon nests are located within 15 miles of the Mueller Mountain quarry site. Falcons may occasionally be observed in the area of the project.

## **DISCUSSION**

The Service has a responsibility to recommend measures that ensure fish and wildlife and their habitats receive equal consideration during project planning. Our recommendations are designed to mitigate project-related impacts according to the following sequence: avoidance, minimization, and compensation for unavoidable impacts.

The Service has determined that the proposed Yukon River revetment will not have a quantifiable impact on fishery resources. Fish spawning is not known to occur at the project site, and the river at Galena serves primarily as a migratory corridor. Juvenile salmon

migrating downstream in May and June and adult salmon migrating upstream in June, July, and August would not be disturbed by the deposition of riprap during the months of January, February and March, 2003. Any fish cover habitat created from the placement of rock would likely be temporary as interstitial spaces become filled with silt and sediment.

Secondary impacts from this project may include altered flow velocities and hydraulic vectors along the 2,100 feet of armor rock as well as altered erosion and deposition patterns downstream. Project-derived impacts will be difficult to predict given the relatively small project footprint in the Yukon River basin. In addition, project-derived impacts may be masked or overshadowed by natural hydrologic events such as floods and natural erosion and deposition.

The uplands in the project area along the Yukon River have been altered, filled and used for residential and commercial activities. Since the early 1980's when the State of Alaska constructed Phase 1 and placed riprap along 2,500' of riverbank, silt and sediment have filled in the riprap. Along the Phase 1 riprap, willow and alder are well established and provide stabilization to the bank as well as potential rearing habitat (Photo 2). It is expected that silt and sediment will fill in Phase 3 riprap and that willow and alder will colonize these banks as well. The revetment is not expected to have any significant adverse impacts to fish. Other wildlife may be displaced during construction, but these impacts are expected to be minor and temporary.

Mueller Mountain is characterized by an upland spruce-hardwood forest mainly consisting of paper birch, quaking aspen, balsam poplar, and white spruce (COE 1986). Quarry development and operation typically have severe environmental impacts from the destruction of vegetation, scraping and stockpiling of overburden, noise from rock blasting, and heavy equipment operation. Since the quarry site and the haul road are already established, further disruption to vegetation and wildlife would be minor. These impacts would be minimized because quarry access with heavy construction equipment will be during the winter over an ice road. Rock will be quarried and placed during the winter of 2002/2003. The contractor will submit a quarry development plan.

## **RECOMMENDATIONS**

The COE chose Alternative 3 (rock riprap) as the most effective means to stabilize the bank along the Yukon River. Conventional riprap placement, however, typically does not provide wildlife habitat and may increase erosion downstream of the revetment. Phase 1 and 2 riprap projects at Galena have revegetated effectively, although this has taken 10 to 15 years. The Service suggests it may be prudent to collect the fill from the original cut and place it on top of the finished riprap. The soil would contain root wads and be a natural seed source. Some soil may be washed away during high water or break-up, but enough will be trapped in the riprap to facilitate revegetation.

Studies have shown that the frequency of revetment failure is lower in vegetated revetments than non-vegetated sections. Roots, particularly fibrous willow roots, prevent washout of fines and stabilizes the native soil. Vegetation helps anchor rock riprap to the bank and increases their lift-off resistance. In addition, vegetated revetments provide fish

and wildlife habitat. Vegetation will also slow water velocities and encourage deposition and sedimentation along streambanks.

### **LITERATURE CITED**

Alaska Department of Community and Economic Development (DCED) website. 2001.  
<http://www.dced.state.ak.us>

Alaska Department of Fish and Game (ADFG). 1986. Alaska's fisheries atlas.

Alaska Department of Fish and Game (ADFG). 1998. Catalog of waters important for spawning, rearing and migration of anadromous fishes. Western region.

Alaska Department of Fish and Game (ADFG). 1998. Yukon River comprehensive salmon plan for Alaska.

U.S. Army Corps of Engineers (COE). 1986. Bank stabilization, Galena, Alaska. Reconnaissance feasibility study.

U.S. Army Corps of Engineers (COE). 1986. Environmental assessment Galena bank stabilization advanced measures.

U.S. Army Corps of Engineers (COE). 2001. Galena emergency bank stabilization letter report, Galena, Alaska.

U.S. Fish and Wildlife Service (FWS). 1987. Letter regarding Galena bank stabilization ER-86-22 project.

U.S. Geological Survey (USGS). 1952. Nulato (C-1) quadrangle.

U.S. Geological Survey (USGS). 1953. Nulato (C-2) quadrangle.

# STATE OF ALASKA

## DEPARTMENT OF FISH AND GAME

### HABITAT AND RESTORATION DIVISION

1300 COLLEGE RD.  
FAIRBANKS, AK 97701  
PHONE: (907) 459-7289  
FAX: (907) 456-3091

November 7, 2001

Fish & Wildlife Biologist  
Northern Alaska Ecological Services  
U.S. Fish and Wildlife Service  
101 12th Ave., Box 19, Room 110  
Fairbanks, AK 99701

Dear Ms. :

RE: Draft Fish and Wildlife Coordination Act Report; Yukon River Bank Stabilization Project; Galena, AK.

The Alaska Department of Fish and Game, Habitat and Restoration Division (ADF&G-HRD), has reviewed the draft Fish and Wildlife Coordination Act Report prepared by the U.S. Fish and Wildlife Service for the proposed Yukon River Bank Stabilization Project located near Galena, AK. The ADF&G-HRD concurs with the USFWS's draft report and its recommendations. In particular we support the recommendation to stockpile and respread the organic layer and vegetation back over the top of the stone riprap. In our opinion, respreading the organic layer back over the riprap will encourage more rapid recolonization of the riprapped banks by woody vegetation which will accelerate recovery of the site for fish and wildlife values.

If there are any questions regarding this response, please contact  
459-7281.

907-

Sincerely,

Regional Supervisor  
Habitat and Restoration Division

cc: COE, Anchorage

**EA-APPENDIX 3**  
**CORRESPONDENCE**

RECEIVED

JUN 13 2001

OHA JUN 12 2001



REPLY TO  
ATTENTION OF:

DEPARTMENT OF THE ARMY  
U.S. ARMY ENGINEER DISTRICT, ALASKA  
P.O. BOX 898  
ANCHORAGE, ALASKA 99506-0898

Environmental Resources Section

State Historic Preservation Officer  
Office of History and Archaeology  
550 West 7<sup>th</sup> Avenue, Suite 1310  
Anchorage, AK 99501-3565

Dear Ms. :

The U.S. Army Corps of Engineers, Alaska District (Corps) is proposing a bank stabilization project in Galena (Section 3 and 4, T9S, R10E, USGS Quad Nulato (C-2); figure 1). The purpose of this letter is to notify you of a federal undertaking that has the potential to cause effects on historic properties and to seek your concurrence on the assessment of effect.

The area of potential effect (APE) includes approximately 2,800 feet of bank about 2.5 miles east of Galena. The proposed alternative would involve cutting the existing bank back then placing a 3-foot-thick layer of riprap from the top of the bank to the lowest point along the length of the beach. Filter fabric and filter stone would be placed to minimize the movement of fine material within the bank. Backfill and grading would be necessary to provide an even slope for placement of the filter material and riprap (figure 2). The bank would be cut back no further than the existing roadbed, which is 20 to 40 feet (figure 3). Figure 4 shows the end of the bank stabilization that has been done to date and the condition of the non-stabilized bank.

The rock would be taken from an existing source at either Pilot Mountain, approximately 12 miles downstream from Galena, or from Mueller Mountain, approximately 10 miles east of Galena. The rock would be removed during the winter, which would require construction of an ice road. There are no reported sites at these rock sources.

There have been archaeological surveys in the area, but no survey of the APE. The Alaska Heritage Resources Survey (AHRs) files were consulted and no archaeological or historical properties have been identified within the APE. Based on this information, there will

be **no historic properties affected** by this undertaking. We seek your concurrence on an assessment of no historic properties adversely affected. If you have any questions please call (753-5638) or (753-5670).

Sincerely,

Chief, Environmental Resources Section

Enclosures

cf: w/ enclosures

President, Gana-A' Yoo, Limited  
First Chief, Louden Village Council

Concur/do not concur \_\_\_\_\_

State Historic Preservation Officer

Date

**No Historic Properties Affected**  
Alaska State Historic Preservation Officer  
Date: 9/4/2001  
File No.: 3130-1P 41E

*Received  
9/27/01*