

Chapter 3

Introduction - This chapter describes the affected environment and the environmental consequences of each alternative by key issue. It also presents the scientific and analytical basis for the comparison of alternatives in Table 1 in Chapter 2.

All effects, including direct, indirect and cumulative effects, are disclosed. Effects are quantified where possible, and qualitative discussions are also included. The means by which potential adverse effects will be reduced or mitigated are described (see also Chapter 2).

The discussions of resources and potential effects take advantage of existing information included in the Revised Forest Plan, FEIS, other project EA's, project-specific resource reports and related information, and other sources as indicated. Where applicable, such information is briefly summarized and referenced to minimize duplication. The planning record for the Katalla Exploratory Oil and Gas Drilling project includes all project-specific information, including resource reports, and other results of field investigations. The record also contains information resulting from public involvement efforts. The planning record is located at the Cordova Ranger District Office in Cordova, Alaska, and is available for review during regular business hours. Information from the record is available upon request.

Analyzing Effects - Environmental consequences are the effects of implementing an alternative on the physical, biological, social and economic environment. The Council on Environmental Quality regulations implementing the National Environmental Policy Act (NEPA) includes a number of specific categories to use for the analysis of environmental consequences. Several are applicable to the analysis of the proposed project and alternatives, and form the basis of much of the analysis that follows. They are explained briefly here.

Direct, Indirect and Cumulative Effects - Direct environmental effects are those occurring at the same time and place as the initial cause or action. Indirect effects are those that occur later in time or are spatially removed from the activity, but would be significant in the foreseeable future. Cumulative effects result from incremental effects of actions, when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions.

Unavoidable Adverse Effects - Implementation of any action alternative would cause some adverse environmental effects that cannot be fully mitigated or avoided. Many adverse effects can be reduced, mitigated or avoided by limiting the extent or duration of effects. The application Revised Forest Plan standards and guidelines, Best Management Practices (FSH 2509.22.12 and 14), project-specific mitigation measures, and monitoring are all intended to further limit the extent, severity, and duration of potential effects. Regardless of the use of these measures, some adverse effects will occur. The purpose of this chapter is to fully disclose these effects.

Existing Conditions

Watershed, Streams - The project area lies in parts of two watersheds, the main Katalla River watershed and the Katalla Slough watershed. Although the project may affect only parts of these watersheds, the entire watersheds were examined to see how existing conditions in other areas may contribute to cumulative effects or may otherwise contribute to our understanding of the processes that relate to the project.

The Katalla River watershed has 23,419 acres, and more than 83.4 miles of stream. There are extensive networks of wetlands, beaver ponds, and oxbow ponds across the upper valley floor. Only the lower 1.75 miles of river could be affected by this project; 1.5 miles below the old roadway where supplies would be unloaded and about 0.25 mile upstream which is the extent of tidal influence. The Katalla Slough watershed is smaller, encompassing 1,977 acres and having about 12.9 miles of stream. The old roadway runs parallel to the slough and crosses a number of small streams that flow into the slough. The proposed drilling site and most of the past drilling activities are located in this watershed, primarily in a section to the east on the slopes above the slough.

The area has a maritime influenced climate, moderate temperatures (40° F mean temperature), heavy rainfall (120 inches/year), 60-80 inch snow packs in the surrounding hills, and cloudy, wet weather throughout the year (USDA Forest Service, 1983).

The vast majority of the Katalla River watershed is in a natural, untouched state. There is a substantial amount of natural bank erosion as the Katalla River meanders through the valley. Comparisons of aerial photographs taken in 1974 and 1993 show many areas where the river has shifted and eroded large sections of bank in a relatively short amount of time. Despite the sediment input, habitat surveys at three sites on the main river in 1989 show that there are large amounts of suitable spawning area for salmon (Unpublished USFS survey data, 1989). Apparently there are sufficient flows to transport excess sediment out of the system.

Irish Creek is a tributary to the Katalla River and joins the river on the west bank south of the airstrip. It would not be affected by the project except where it makes a loop and borders the southwest end of the airstrip for about 200 feet. This area would be at the edge of the proposed equipment storage area on State of Alaska lands. A 100-foot vegetation buffer will be maintained between the creek and storage area to protect pink salmon spawning area.

The Katalla Slough watershed was greatly affected by the 1964 earthquake, which raised the area about 10 feet. Pre-earthquake photographs show that much of the main slough area used to be a more open, navigable lagoon with large intertidal mudflats. The channel has incised and narrowed, and the mudflats are now sedge and sphagnum meadows. The growth of alder and willow in this area since the uplift has attracted beavers, as the main slough and many smaller slough channels have beaver dams and ponds.

Effects of Past Human Activities - Natural oil seeps were discovered in the Katalla district and on the north side of Controller Bay, 20 miles to the east, about 1896 (Martin, 1921). Forty-four wells were drilled in this area between 1901 and 1932. Of the 44 wells, 28 wells were drilled in the “Katalla field” and of the 28 wells, 18 wells produced (Appendix A, Map 1). The producing wells were within an area of approximately 60 acres¹² of private land, and produced oil from fractured sandstone and siltstone of the Katalla (renamed Poul Creek) formation, at depths ranging from 360 to 1,750 feet (Miller, 1959). Most of the productive wells were on a claim (Claim No. 1, MS 599) patented under the placer mining law prior to enactment of the oil and gas leasing law (Miller, 1959). This is the area where the current activities are proposed. Production in the Katalla district amounted to 153,922 barrels of oil, from 18 wells over 30 years. A refinery was constructed and the refined oil was used for fishing fleets and other local uses. Production ceased in 1933 when the refinery burned down. The refinery was not rebuilt.

¹² This 60 acres is private land and known as Claim No.1.

Past human activities, which may have affected the watersheds and the water resources, include logging of the nearby forests for building materials, construction of roads and railways, and oil drilling and production. Most of the activities occurred from 1896 to 1933, the period from the first exploration of the area until the refinery burned and the town of Katalla was abandoned (Shaw, 2001). From 1985 to 1986 there was additional exploratory drilling activity. The 2.5-mile old roadway was used to access the private land at the Claim No.1 site. On this private land, about 7.0 acres were cleared for a camp, drill site and other facilities; and a test well was drilled. Equipment from these later activities, and an abandoned crew camp still remains on site, and there is a “reserve pit” where some drilling wastes are still stored. Cassandra Energy proposes to use the same cleared area for their crew camp, drill site and other facilities.

The logging does not appear to have had a long-term effect on the watersheds, based on examination of aerial photographs and some stream survey data from 1989. Areas which were logged include the old townsite on the west bank of the Katalla River, an area along Clear Creek about one mile from the end of the old roadway, some sections along Katalla Slough, and on an old beach berm between Katalla Slough and the ocean (Shaw 2001). There is no evidence in the photographs of landslides or blowdown. Stream survey data from Clear Creek, downstream from a logged area, show that fish habitat has not been impaired. There are good salmon spawning gravels and abundant large woody debris for rearing habitat (Unpublished USFS survey data 1989). The areas along the slough and on the beach berm do not show any signs of erosion or other ongoing effects (Ken Hodges, personal observations, aerial photography analysis). Thus, there do not appear to be adverse effects from the logging, and this past action would not contribute to cumulative effects in the watersheds.

One can easily see the old railway beds on the aerial photographs. Near the town site, the raised beds still impound water or divert small streams. Although the natural stream channels have been altered, new drainage patterns and channels have developed over the years. It would be speculative to say whether or not any substantial adverse impacts remain. In the main valley area the diversions are fewer, and there are a number of places where smaller streams or the meanders of the main river have washed away or cut through the bed. The photographs show that the beds are well vegetated and would not be causing serious erosion or sedimentation problems compared to the natural conditions. Again, none of these past activities have impacts that would contribute to the cumulative effects in the watershed.

Road building in the area has been limited to the area around the old Katalla town site and the 2.5-mile roadway leading to the drilling site. The roads around the town site are mostly overgrown with vegetation. All that appears to be left of them are the all-terrain vehicle trails between the cabins (Ken Hodges USFS, personal observations). As with the railway beds, some stream channels may have been altered, but there do not appear to be any lasting effects or impacts to streams. The 2.5-mile roadway on the east side of the Katalla River was last used in 1988 and is still intact, although some trees have fallen across the roadway, and there is one culvert that has washed out. This has caused one bank to erode, depositing some sediment downstream. A survey crew noted that some culvert and ditch maintenance was needed, but there does not appear to be any threat to fish habitat since the affected streams do not have fish and are incapable of carrying large amounts of sediment. The road has diverted some small seeps and ephemeral streams, but these are few in number and have no fish habitat. The effects on drainages, flows, and wetland functions are negligible.

An important issue related to roads is the ability of fish to pass through culverts or other structures at the stream crossings. The current Forest Service standard for fish passage is that the

migration of fish at all life stages should not be impeded (USDA Forest Service, 2001). Generally fish passage problems are associated with culverts, which can increase velocities so fish cannot swim against the current or which can create other physical barriers (Furniss et al., 1991). Fish surveys have been conducted in all of the streams crossed by the old road to the drilling site. Bridges rather than culverts cross all the streams that were found to have fish. The bridges did not create any barriers, so there would be no fish passage problems.

The effect of past oil drilling in the area has been visually assessed. It is possible that there has been some contamination of soils or groundwater with fuels or oil, but since the more recent activity and most of the historic drilling have been on private land, no tests have been conducted. In 1992, Forest Service employees walked through the camp while looking at the old roadway. They noted that bags of concrete were broken open and spilled, but these substances are not on the hazardous materials list. No other spills were mentioned. It should be noted that there are numerous surface oil seeps occurring naturally in the area, so it would be difficult to determine whether any oil contamination is related to human activity or natural processes. Some machinery and artifacts from the earlier drilling operations (pre 1933) can be found in the area, and much of the equipment from the 1985 to 1986 activity is still on site. There is also a "reserve pit," where drilling wastes are stored, left over from this time period on private land. The Cassandra Energy Corporation has submitted an in-place closure plan to the Alaska Department of Environmental Conservation, calling for the solidification of the drill cuttings with cement. This is an approved method of cuttings disposal, but no written permit has been issued at this time (oral communication, Judd Peterson, State of Alaska, Department of Environmental Conservation).

Soil, Landforms - Davidson and Harnish (1978) describe the general landtypes and soils of the Katalla area as follows. Forested mountain slope landtypes surround the low-lying areas. Soils on steeper slopes are moderately well drained and thin, ranging from bedrock to 50 cm. (20 inches). Gentler slopes are well drained with soils thicker than 100 cm. The Katalla River valley is mostly an unforested glacial outwash area. The finely textured alluvial sediments and flat gradient cause the area to be poorly drained. Soils are generally thicker than 100 cm. In some outwash areas there are sands and gravels that are better drained. The Katalla Slough area is mostly uplifted tidal marsh with poorly drained sandy loams and silty loams greater than 100 cm. thick.

Geology - The general geology of the area is described as mainly tertiary aged marine and continental clastics consisting of siltstones, organic shales, sandstones, and locally abundant submarine volcanic rocks (USDA Forest Service, 1983). Around the proposed drilling site there are also quaternary marine and alluvial sediments. Of particular interest for this project are the quaternary beach deposits. There is a series of these deposits near the mouth of the Katalla River valley; they are generally long linear features that are parallel to the shoreline. The old access roadway to the Katalla oil field follows an old railway bed that was constructed on one of these old stranded beach deposits. This type of deposit consists of clean, washed sand, pebbles, boulders, and little, if any, fines. It is considered to be excellent as road foundation (Kachadoorian, 1960).

More specifically, the project area is in the Gulf of Alaska Tertiary Province. This province includes tertiary age, sedimentary rocks that are exposed east of the Copper River. These rocks were deposited in a continental margin basin where marine regression and transgression took

place during the middle Eocene and possibly during the early Miocene. The Gulf of Alaska Tertiary Province has been designated by the U.S. Geological Survey as a “Favorable Petroleum Geological Province” (FPGP)¹³. The Katalla area, as defined in the 1982 CNI Agreement, lies completely within the FPGP. Although there are known deposits, past exploration has not revealed sufficient quantities for commercial production, and this area is considered to have low potential for oil and gas development, (Nelson and others, 1984).

The Gulf of Alaska Tertiary Province is underlain by several tectonstratigraphic terranes, chiefly the Prince William and Yakutat terranes. Mesozoic and early Tertiary rocks of the Prince William terrane, (the Valdez and Orca Groups respectively), have no known oil and gas resource potential (Bruns, 1996).

The oil bearing rocks are mostly from the Oligocene through Miocene (middle Tertiary) in the Poul Creek formation (formerly the Katalla formation) of the Yakutat terrane. Attributes indicative of a hydrocarbon province are present, including extensive onshore oil and gas seeps and numerous anticlinal traps (Blasko, 1976; Plafker, 1987). The Poul Creek formation and offshore equivalents are known to have some sections with favorable hydrocarbon characteristics, including source and reservoir rocks and thermal maturity.

Vegetation - Most of the hillslopes up to the tree line are forested with Sitka spruce (*Picea sitchensis*) and western hemlock (*Tsuga heterophylla*). The spruce dominate on the well-drained alluvial fans and beach berms, while the hemlock are more prevalent on the steeper slopes. The lowland areas are covered mostly by grasses in the drier areas and sedge or sphagnum mosses in the wetland areas (Unpublished USFS survey data 1989). In the sandier areas along the river and beach area, lupine (*Lupinus nootkatensis*), beach rye grass (*Elymus arenarius*), and beach pea (*Lathyrus maritimus*) are the dominant species. Sitka alder (*Alnus sinuata*) and willows (*Salix spp*) are found near the streams along with salmonberry (*Rubus spectabilis*) and other shrubs.

The uplifting of the Katalla Slough area by the 1964 earthquake has caused much of the lowland area to drain and become drier. Different plant species are colonizing these areas, so the vegetation types are in a state of change. Willow is colonizing some of the area along the coast, while thick, young Sitka spruce stands have become established on the uplifted river bluffs and other drier areas. Alder is also a pioneer species but eventually gives way to Sitka spruce where the soil is dry enough.

During the sensitive plant surveys, the crews identified all of the plants that were encountered. No exotic plant species were found.

Threatened, Endangered, and Sensitive (TES) Plant and Animal Species

Plants

¹³ This means that the geology of the broad area is favorable for the occurrence of petroleum. It does not indicate whether economic quantities are present. Within a “favorable” area can be areas of varying oil and gas potential, e.g. high, medium and low.

There are no federally listed threatened or endangered plant species known to exist on the Chugach National Forest. There are, however, 13 species on the Forest Service Alaska Region Sensitive Species list which are known or are suspected to occur on the Forest. These are:

| | |
|--------------------------------|--|
| Eschscholtz's little nightmare | <i>Aphragmus escholtzianus</i> |
| Norberg arnica | <i>Arnica lessingii</i> ssp. <i>norbergii</i> |
| Moonwort fern, no common name | <i>Botrychium tunux</i> |
| Moonwort fern, no common name | <i>Botrychium yaaxudakeit</i> |
| Goose-grass sedge | <i>Carex lenticularis</i> var. <i>dolia</i> |
| Tundra whitlow-grass | <i>Draba kananaskis</i> |
| Truncate quillwort | <i>Isoetes truncata</i> |
| Calder lovage | <i>Ligusticum calderi</i> |
| Pale poppy | <i>Papaver alboroseum</i> |
| Kamchatka alkali grass | <i>Puccinellia kamtschatica</i> |
| Smooth alkali grass | <i>Puccinellia glabra</i> |
| Unalaska mist-maid | <i>Romanzoffia unalascensis</i> |
| Circumpolar starwort | <i>Stellaria ruscifolia</i> ssp. <i>aleutica</i> |

Sensitive plant surveys were conducted along the old roadway on June 19, 2001, and along the new road proposed in Alternative 3 on August 17, 2001 (Zimmerman 2001, 2001a). No sensitive plants were found during either survey. Additional plant surveys will be conducted on the areas to be disturbed for the proposed staging area on National Forest land, and/or if a section of new road is built to avoid impacts to an eagle nest. These areas would have habitats similar to the ones in the previous surveys where no sensitive plants were found. Based on the types of habitats, no sensitive plants would be expected to be present. A road or staging site could be moved if sensitive species were found.

Animals

There are seven threatened, endangered, or sensitive animal species known to exist in the waters around or on the land of the Chugach National Forest. These are:

| | | |
|--------------------------|---------------------------------------|------------|
| Humpback whale | <i>Megaptera novaeangliae</i> | Endangered |
| Steller sea lion | <i>Eumetopias jubatus</i> | Threatened |
| Montague Island Vole | <i>Microtus oeconomus elymocetes</i> | Sensitive |
| Trumpeter swan | <i>Cygnus buccinator</i> | Sensitive |
| Dusky Canada goose | <i>Branta canadensis occidentalis</i> | Sensitive |
| Osprey | <i>Pandion haliaetus</i> | Sensitive |
| Peale's peregrine falcon | <i>Falco peregrinus pealei</i> | Sensitive |

Humpback Whale - The humpback whale may occur in the off shore waters of the Gulf of Alaska, but would not venture into the Katalla River or otherwise be in the project area.

Steller Sea Lion - The Steller sea lion can be found in the off shore waters of the Gulf of Alaska. They also use the islands at Point Martin, about three miles southwest the Katalla River, as a

haul-out site. There is a sea lion rookery about 27 miles southeast of the project area on Kayak Island. Sea lions are not known to use the Katalla River.

Montague Island Vole - The Montague Island vole is found only on Montague Island, about 80 miles to the west, and would not be in the project area.

Trumpeter Swan - Trumpeter swans live in wetland areas and nest in ponds similar to those found in the lower Katalla River and Katalla Slough area. There is one known trumpeter swan nesting site about one-half mile from the lower section of the Katalla River.

Dusky Canada Goose - The dusky Canada goose breeding range is restricted to the Copper River Delta and surrounding wetlands, including the lower Katalla River valley and wetlands near the Bering Glacier (Campbell, 1990). It winters primarily in the Willamette Valley in Oregon, and along the Columbia River in Washington (Comely et al. 1988; Bartonek, 1971). Suitable nesting habitat for Canada geese exists along the lower Katalla River and Katalla Slough, but no nests have been documented.

Osprey - The osprey is considered uncommon to rare throughout Alaska (Palmer, 1988). The osprey is widely distributed across much of Alaska south of the Brooks Range, but localized in the vicinity of lakes, large rivers and coastal bays (Gabrielson and Lincoln, 1959). The osprey could occur within the project area although no observations have been documented and no nests were seen while conducting bald eagle nest searches. The lower reaches of Katalla River would be ideal fishing habitat. Suitable nesting habitat, in the form of coniferous forests surrounds the valley.

Peale's Peregrine Falcon - Peale's peregrine falcon nests in Alaska along the Pacific coast from southeastern Alaska through the Gulf of Alaska and west to the Aleutian Islands. Nesting habitat in Alaska includes ledges of vertical rocky cliffs in the vicinity of seabird colonies (Gabrielson and Lincoln, 1959). There is a known nest site on the sea cliffs north of Point Martin, approximately three miles from the mouth of the Katalla River.

Wildlife (non -TES species)

The Katalla area has abundant wildlife resources with many species of mammals and birds. During the public comment period, people specifically mentioned concern about bears, bald eagles, shorebirds, and "migratory birds."

Bear - Two species of bear are present in the project area, brown bear (*Ursus arctos*) and black bear (*U. americanus*). All of the habitats in the Katalla area are used by brown and black bears during spring, summer and fall. They are usually found in dens from late fall to winter through early spring. The lower Katalla River area offers early spring foods for bears in the form of herbaceous vegetation. Salmon runs provide food for bears in the area from at least mid July through the end of October. Berries, clams, and other potential food sources are also present.

Bald eagle - The bald eagle (*Haliaeetus leucocephalus*) is found throughout the coastal regions of Alaska and particularly where abundant food sources such as salmon are available. The protection of eagles is regulated under the Bald Eagle Protection Act (16 USC 668-668d). The

U.S.D.A. Forest Service (USFS) Alaska Region and the U.S.D.I. Fish and Wildlife Service (USFWS) have developed an MOU that describes the standards and guidelines for bald eagle conservation (USFS Agreement No. 02MU-1110001-018). In accordance with the agreement, Forest Service biologists have conducted surveys to determine whether eagle nests are present in the project area and whether the nests are being used (active). In 2001, there was an active eagle nest near the old roadway about one mile east of the Katalla River. They also found two inactive nests in the general area, but not close to areas where project activities would be a concern (Logan, 2001).

Goshawk - The northern goshawk (*Accipiter gentilis*) is a forest habitat generalist, breeding in coniferous, deciduous, and mixed forests across its holarctic range (Reynolds et al., 1992). While goshawks occur in a variety of forest successional stages, it is believed that nesting birds are most commonly associated with mature forests (Crocker-Bedford, 1993, Titus et al., 1994; Titus 1996). The species is considered a non-migratory resident in the Prince William Sound area (Isleib and Kessel, 1973).

Due to concerns over population declines, the northern goshawk is currently listed by the U.S. Fish and Wildlife Service as a species of management concern. Species of management concern include those for which there is some evidence of vulnerability but for which there are not enough data to consider a listing proposal under the Endangered Species Act of 1973. On June 19, 2001 a calling survey was conducted along the old roadway to determine whether any goshawks might be in the area. There were no calling responses, nor were any individuals seen (Burcham 2001).

Shorebirds - Coastal areas of south-central Alaska are important migration stopovers for migrating shorebirds. Each May, as many as 4-6 million western sandpipers (*Calidris mauri*) and Pacific dunlins (*C. alpina*) use the Copper River Delta as a migration stopover. Red knots (*C. canutus*), least sandpipers (*C. minutilla*), pectoral sandpipers (*C. melanotos*), lesser yellowlegs (*Tringa flavipes*), short (*Limnodromus griseus*) and long-billed dowitchers (*L. scolopaceus*), marbled godwits, black-bellied plovers (*Pluvialis squatarola*), Pacific (*P. fulva*) and American golden plovers (*P. dominica*), and many other species use this area during migration as well. These birds use mudflats as critical feeding areas to replenish their fat reserves during their long migrations to breeding grounds.

Approximately 300 acres of tidal flats, that represent potential migratory shorebird habitat, exist in the lower Katalla River and on beaches between Katalla River and Palm Point, about two miles southwest of the mouth of the river. Shorebird surveys flown in during migration in 1992, and 1994, revealed no shorebirds using the area near Palm Point, and surveys of outer beaches of Kanak Island, 2.5 miles southeast of the drilling site, revealed relatively low numbers of shorebirds. Undoubtedly shorebirds use the area, but due to its small area, it is not nearly as critical as tidal flats on the Copper River Delta or Controller Bay, 10 miles southeast of the project area.

Other Migratory Birds - The public comments concerning migratory birds were more general in nature, but this category would include the aforementioned shorebirds, waterfowl such as ducks and geese, raptors, passerines, and numerous others. Given the uplifted areas with

pioneering brush, the estuarine and beach areas, the older forests, and the grass and sedge areas, the Katalla area provides a wide variety of vegetation and habitat types for these species. These habitats are typical of the coastal mainland areas along most of Gulf of Alaska. Ann Rappoport with the U.S. Fish and Wildlife Service stated in a comment letter that vegetation clearing, excavation, and fill placement for roads or staging areas could result in the destruction of bird nests, which is a violation of the Migratory Bird Treaty Act. Mitigation would include avoiding clearing between April 15 and July 15 when birds are nesting.

Isleib and Kessel (1973) recorded 79 species of passerine birds in the north Gulf Coast-Prince William Sound Region of Alaska. When this list is cross-referenced with the Migratory Nongame Birds of Management Concern in the United States: the 1995 List (Division of Migratory Bird Management 1995) and the bird species of southcoastal Alaska in the Partner's in Flight Alaska Biogeographic Regions Landbird Conservation Plan, Ver. 1.0 (Boreal Partners in Flight Working Group 1999), the following species of concern are identified:

| Species | | Habitat |
|---------------------------|--------------------------------|---|
| Alder flycatcher | <i>Empidonax alnorum</i> | Alder thickets |
| Blackpoll warbler | <i>Dendroica striata</i> | Conifers, primarily spruce |
| Chestnut-backed chickadee | <i>Parus rufescens</i> | Conifers, mixed forests |
| Golden-crowned sparrow | <i>Zonotrichia atricapilla</i> | Thickets, shrubs, dwarf conifers |
| Gray-cheeked thrush | <i>Catharus minimus</i> | Riparian thickets, coniferous forest edges |
| Northern shrike | <i>Lanius excubitor</i> | Deciduous, coniferous trees, thickets |
| Northwestern crow | <i>Corvus caurinus</i> | Coniferous forest, forest edges |
| Olive-sided flycatcher | <i>Contopus cooperi</i> | Conifers, bogs |
| Red-breasted sapsucker | <i>Sphyrapicus ruber</i> | Conifers, coastal lowlands |
| Rufous hummingbird | <i>Selasphorus rufus</i> | Conifers, brush, adjacent meadows |
| Townsend's warbler | <i>Dendroica townsendi</i> | Conifers, mixed forests |
| Varied thrush | <i>Ixoreus naevius</i> | Coniferous, deciduous forests with dense understory |

There are numerous other species that are not on the species of concern list that could nest in the areas affected by the proposed activities. We assume that all of the areas that would be cleared could be used by some migratory bird species.

Other Mammals - Mountain goats (*Oreamnos americanus*) inhabit the steeper portions of the Ragged Mountains that form the western boundary of the Katalla Valley and in the Don Miller Hills to the east. The goat populations are managed by ADF&G by strict harvest quotas. Moose (*Alces alces*) use the Katalla Valley and the uplifted areas where willow is becoming established, but it is thought that the densities are low (Dave Crowley, ADF&G, personal communication). Again, the populations are monitored and the harvests are regulated by ADF&G. Wolverine (*Gulo gulo*), lynx (*Lynx canadensis*), and wolves (*Canis lupus*) are all thought to be in the Katalla area in relatively low numbers.

Additional information including value ratings for habitat disturbed is in the Biological Evaluation for Wildlife, (Burcham, 2002).

Fish

The Katalla River watershed has populations of all five species of Pacific salmon: chinook salmon (*Oncorhynchus tshawytscha*), coho salmon (*O. kisutch*), sockeye salmon (*O. nerka*), chum salmon (*O. keta*), and pink salmon (*O. gorbuscha*). Dolly Varden (*Salvelinus malma*) are known to inhabit the system. Geneticists collected cutthroat trout *O. clarki* in Irish Creek, which flows into the lower Katalla River near the mouth (Gordon Reeves USFS Forestry Sciences Laboratory, personal communication). Three-spined stickleback (*Gasterosteus aculeatus*), and various types of sculpin (*Cottus spp.*) are also likely to be present.

Since the 1.5-mile stretch of the river in the project area (downstream from the road) is all tidally influenced, some of the species that do not dwell in brackish waters only use the area as a migration corridor. For other species, this is a prime spawning area. There is an approximately 0.5-mile segment with areas where pink salmon and possibly chum salmon spawn. Pink salmon spawn in this area from early August until mid-September. The other species of salmon, and pink and chum salmon as well, spawn farther upstream in areas not affected by tides. Chinook and coho salmon juveniles may use this estuarine area for rearing habitat, but at least for coho salmon, the lower Katalla River lacks extensive backwaters, vegetation, and other complex habitat coho juveniles prefer. Upstream from the old roadway there is good habitat for all salmonid species. No rainbow trout (*O. mykiss*) or its anadromous form, steelhead, are known to be in the system.

The only Katalla River fish population data are for coho and sockeye salmon, taken from aerial surveys conducted by the Alaska Department of Fish and Game (unpublished data provided by ADF&G Commercial Fisheries Division, Cordova). The numbers of fish reported in these surveys are not intended to be accurate population estimates, since water clarity, tree cover, or other factors may hinder viewing. Instead, the counts serve as an index, showing relative abundance from year to year.

Peak coho salmon counts in the Katalla River from 1993 to 2001 have averaged 4,600 (no estimate 1998), although the last three years have averaged 2,900. Sockeye salmon counts from 1993 to 2001 have averaged 1,200. Pink salmon spawning in the lower river could number from 500 to several thousand (Todd Rogers, lodge owner, personal communication, Ken Hodges USFS, personal observations 1989, 1990, 2001), but no systematic counts have been made. No estimate is made for the number of pink salmon spawners upstream from the road. There is no information for chum or chinook salmon populations except that they are present (Ken Hodges USFS, personal observations, 1990, 2002).

Katalla Slough is a smaller, mostly estuarine system, but pink and coho salmon, cutthroat trout, and Dolly Varden have been observed there. Pink salmon have been seen in the main slough channel, while juvenile coho salmon have been observed in Arvesta Creek, Oil Creek, a small tributary crossing the road, and a small tributary off of the main slough (Unpublished USFS survey data, 1989; unpublished USFS survey data, 2001, 2002). Adult coho salmon carcasses were observed in Arvesta Creek near the road indicating that there is spawning in the system (Sean Stash USFS, personal observation, 2002). Cutthroat trout were caught in the main slough

channel for a genetics study in 2001 (Gordon Reeves USFS Forestry Sciences Laboratory, personal communication). Juvenile Dolly Varden were also found in the tributary crossing the road (Unpublished USFS survey data 2001). One unidentified juvenile flatfish was observed in Katalla Slough, perhaps a starry flounder (*Platichthys stellatus*), a common estuarine fish, as well as an unidentified sculpin (Unpublished USFS survey data, 1989). Sticklebacks are likely to be present either in the main channel or in the small slough tributaries. No chinook, chum, or sockeye salmon have been seen in this area. No population information is available from ADF&G or other sources for the Katalla Slough system. No rainbow trout or steelhead are known to be in the system.

Except for the small tributaries along the old roadway, the streams in the system provide good fish habitat. Coho salmon probably spawn in the eastern half of the main slough and in the lower sections of the larger tributaries where we have seen suitable spawning habitat. The small slough channels and beaver ponds in the wetlands do not have spawning area, but provide extensive and valuable rearing habitat for juvenile coho salmon. The smaller tributaries crossing the old roadway may go dry at times, and only one of these was found to have fish. These smaller streams are also steep and tend to form shallow braids as they reach the flat wetland area adjacent to the slough, which would prevent fish migrating into these streams from the slough.

There is also one creek (sometimes called Irish Creek) close to the end of the airstrip in the general area of the proposed 2.5-acre equipment storage area on State of Alaska land. It is on the southwest end of the airstrip and is separated from the cleared area by an approximate 25-foot wide section of alder and other brush. An off-road vehicle trail used to run from the airstrip and across the creek, so there is a small cleared path that is now being overgrown. Irish Creek has pink salmon spawning habitat in the section closest to the airstrip. A local landowner, Terry Zeznock, stated in a public comment that coho salmon spawn there as well. Cutthroat trout are also present in the creek (Gordon Reeves USFS Forestry Sciences Laboratory, personal communication).

Cultural and Historic Resources

The Katalla area has numerous historical artifacts related to the early oil and gas production. For this project, Shaw (2001) conducted a historic field survey of the drilling site, camp area, and the route for a new road on the southeast bank of the Katalla River in Alternative 3, to meet the requirements of the National Historic Preservation Act, and paragraph K of the 1982 Department of the Interior/Chugach Natives Incorporated Settlement Agreement. Based on past surveys, it was determined that the old roadway did not require additional surveys. The survey report documents the locations of wellheads, equipment, pipelines, artifacts, and other relics from the early Katalla era. Shaw recommends that the Claim No.1 Oil Field, the private land on which the proposed drilling operations would take place, and the site of the old Residence Camp be determined to be eligible for the National Register of Historic Places. A logging/wharf site downstream from the end of the road proposed in Alternative 3 was not recommended for eligibility.

After Shaw had completed his survey work, Cassandra Energy Corporation proposed clearing a 2.5-acre equipment storage area on State of Alaska land near the Katalla airstrip. The proposal

states that, “Some brush clearing may be required to remove recent growth from both the storage area and airstrip.” Some of the area is already disturbed from the construction of the airstrip, but depending on the boundaries of the proposed area and the ground disturbance required to clear the brush, there could be potential effects to historic resources. Prior to any activity, an archaeologist will determine whether there is likely to be any effect, whether surveys are required, or whether any mitigation is necessary.

In Shaw’s report (2001) he states that the area is interesting from the standpoint of Native history because it is the northern territorial boundary of the Tlingit nation. He states, “The lower elevations have potential for the presence of prehistoric/protohistoric camps ...” but these areas are outside of the area of potential effects of the project and that it was improbable that the Claim No.1 area was ever used for a “major occupation.” The low pass to the east may have been a travel corridor, but the area around the drilling site and camp has a low probability for finding prehistoric material. During the historic survey, the crew looked for evidence of prehistoric artifacts or materials, but none was found.

Shaw (2001) recommends a “no adverse effect” determination regarding historic properties for the proposed use of the old roadway and the proposed exploratory drilling activities under all action alternatives, and the construction of a new road under Alternative 3. This recommendation was made with the following stipulation: “The agreement should contain provisions for activities of the undertaking to occur only on Clearings 1-3 of the 1985 developed area within Claim No.1, and restrict personnel to the developed footprint of the three clearings and their connecting roads.” Since there are old wellheads near Clearing 3 at the east end of the development, “... lateral expansion should only be allowed in areas well away from these site features.”

Current Human Use

Subsistence - The lack of permanent residents, the low number of temporary workers at the Katalla cabins, and the distance from the nearest town make it unlikely that subsistence harvest occurs in the area. The area is about 55 miles by air from Cordova and 70 miles by boat. There is no road access to this area. In either case, potential subsistence users would have to invest considerable amounts of time and/or money to get to the area. The resources that could be obtained in the Katalla area are readily available in the immediate Cordova area.

There are no winter caretakers for the cabins there, and the owners of the cabins do not live there as a primary residence. Before the guided fishing and hunting season, there are only a few people caretaking and getting the facilities ready (Todd Rogers, personal communication). If subsistence users from other areas were in Katalla, for whatever reason, it is possible that they could harvest some species. This harvest, however, would be more likely to be opportunistic rather than being the focus or the purpose of the trip.

Under the federal subsistence fisheries regulations, the Katalla area is considered part of the Prince William Sound subsistence district. Salmon and smelt are the only fish recognized as having customary and traditional use that would be found in the project area. Under subsistence regulations, salmon can only be caught with gill nets or seine nets in saltwater, not in the Katalla

River or in Katalla Slough. Smelt have not been documented in the Katalla River, but it is possible that one species of smelt, the eulachon (*Thaleichthys pacificus*), could spawn in the river anytime from February to early June. Eulachon are abundant in the Cordova area, spawning in freshwater streams as well as tidally influenced areas where there are fine gravels and coarse sand for spawning substrate. The lower Katalla River has some sandy areas (Ken Hodges, personal observations), but again, the presence of eulachon has not been documented.

There are no special federal subsistence hunts in the Katalla area, such as there are for mountain goats in certain areas of Prince William Sound or for moose on the west Copper River Delta. There are, however, numerous species that have federally recognized customary and traditional use, such as black bear, snowshoe hare (*Lepus americanus*), spruce grouse (*Dendragapus canadensis*), wolverine, and many others. Again, the lack of people in the area makes it unlikely that there is substantial subsistence harvest, and the availability of these species close to Cordova makes it unlikely that people would go to the expense of traveling to Katalla.

Commercial Fishing - There is a large commercial fishery in the off shore waters, mostly for sockeye, coho, and chinook salmon. In 2001 the commercial fisheries in the Copper River and Bering River districts caught 1.3 million sockeye; 250,000 coho; and 39,600 chinook worth approximately \$12.9 million, ex-vessel price (Alaska Department of Fish and Game website). There is, however, no commercial fishery in the Katalla River or Katalla Slough. Undoubtedly some of the fish produced in the Katalla systems are harvested in the commercial fishery. Since the fish being harvested come from a mixture of different stocks, it cannot be determined what percentage of these fish are produced in the Katalla or other systems.

Recreation - Aside from the current interest in oil and gas drilling, the existing human use of the Katalla area is geared to recreation. Most of the recreational use is provided by commercial guides, who provide hunting and fishing services and lodging at the cabins there. Current recreational activities in the Katalla area are:

1. Commercial sportfish outfitting and guiding on the Katalla River.
2. Commercial big game outfitting and guiding for brown bear, black bear, moose and mountain goats.
3. Unguided sport hunting for the species listed above.
4. Unguided sport fishing on the Katalla River.
5. Cabin rentals for hunters and sportfishers at the old Katalla town site.
6. Day use hiking and exploring of the town site and surrounding area.
7. Beachcombing, berry picking, photography, and other secondary activities associated with the above activities.

Two businesses provide lodging and fishing services, one averaging 30-50, and the other 40-45 fishing clients per year. Five outfitter/guides are permitted for big game hunting in the game management unit, but since they tend to split up the territory among themselves, only one guide uses the Katalla area as his core region, and another guide uses it infrequently. The hunting guide that uses the Katalla area also provides lodging.

While the main exploratory drilling activity would occur on the private land 2.5 miles to the east of the Katalla River, barge traffic on the river, truck noises, drilling workers fishing and hunting in the area, and helicopter or airplane noise could all affect the aforementioned recreational users around the cabins, river, and beach areas.

Sportfishing - The owners of the two fishing services said that almost all of the sportfishing is for coho salmon in the months of August and September, with the peak being from mid-August to mid-September (Steve Ranney, Todd Rogers personal communications). Some of the early clients may fish for pink salmon when coho salmon are not yet abundant. There are cutthroat trout in the area, but the regulations require catch-and-release fishing only. No rainbow trout or steelhead are known to be in the area, but they would also be managed for catch-and-release fishing only.

The businesses average around 80 clients per year (five or more clients per week for eight weeks for one, about four to 10 per week for six weeks for the other), but there are probably few other anglers besides the guided clients. There are no public campgrounds or facilities near the Katalla River, and the nearest Forest Service cabin is 4.5 miles to the west. Since the weather in August and September is often windy and rainy, not too many anglers would be expected to camp in tents. The ADF&G sportfishing reports do not have separate listings for the Katalla River, so there are no data on the fishing effort and harvest. Although the aerial index escapement numbers for coho salmon have been somewhat lower for the past three years than the 10-year average (2,900 average vs. 4,600), there is no indication of overharvest by anglers. One lodge operator said that the runs were actually increasing over the past several years (Todd Rogers personal communication).

Hunting - Most of the hunting occurs during the spring bear season in the latter part of May and then during the fall moose and bear season from mid-September to the end of October. There are no statistics on the number of hunters using the Katalla area itself, but there are records of harvests in the area for brown bear, black bear, and moose.

From 1982 to 2000 (19 years) the reported harvest of brown bear averaged 1.05 bears per year. However, the average is misleading since in eight of those years no bears were killed, while five were harvested in 1985, and three each in 1986 and 1982. There may have been increased hunting pressure in 1985 and 1986 when there were people working at the drilling operations. Black bear harvest averaged 1.52 annually from 1980 to 2000 (21 years) with four killed in 1987 and 1998, and three in 1986 and 1989. Moose harvest from 1980 to 2000 has been relatively low, 0.33 moose per year, with three killed in 1988 and none in 17 of the 21 years. There are no records for waterfowl or other game effort or harvest. There is no known trapping since there are no caretakers or other people spending the winter and spring there.

Other Recreational Activities - It is assumed that most of the hiking, beachcombing, exploration of the old town site, and other recreational use in the area is associated with the clients of the cabin owners and the outfitter/guides who are primarily in the area for hunting and fishing.

The number of people who would travel to Katalla for purposes other than hunting or fishing are probably limited by the expense of flying to the area, the absence of public facilities, and the lack of extensive historic features. There are no old buildings or derricks, but there are some artifacts and pieces of equipment in the woods. Occasionally people staying at the Forest Service cabin 4.5 miles to the west will walk to the Katalla area to see the graveyard or the town site, but it is a long walk and access along the beach is complicated at high tide. The graveyard itself is hard to find and difficult to walk to because of the thick brush and swamps (Ken Hodges USFS, personal observations).

The Recreation Opportunity Spectrum (ROS) for the East Delta as identified in the Revised Forest Plan is Primitive II. Upon initiation of activity associated with rights reserved under the 1982 CNI Settlement Agreement, the 521 Minerals Management Prescription applies to the project area (Revised Forest Plan Record of Decision, page 13; Revised Forest Plan, Chapter 4, page 4-84). The ROS for the project area is Roaded Natural (RN). The characteristics of a RN classification are:

- Access: Snowmachines, OHVs, developed trails, foot, bicycles, on designated routes only. Roads may be present. Roads maintained for high clearance vehicles only.
- Remoteness: Nearby sights and sounds of human activity may be present. Distant sounds may be heard.
- Social Encounters: Users should expect to encounter other groups.
- Visitor Impacts: Use noticeable but not degrading to resources. Rustic facilities may be constructed for users.
- Visual: Alterations away from travel corridors are few and subordinate to landscape.

Existing Scenery Inventory - The value of an area for recreation is also tied to the natural scenery, which is expressed in terms of the “integrity” of the scenery. Scenery is a part of all forest settings and contributes to the quality of the user’s experience. The existing scenic integrity for the Katalla Analysis Area and the East Copper River Delta is “very high.” Upon initiation of activity associated with rights reserved under the 1982 CNI Settlement Agreement, the 521 Minerals Management Prescription applies to the project area (Revised Forest Plan Record of Decision, page 13; Revised Forest Plan, Chapter 4, page 4-84). The Scenic Integrity Objective for the project area is Very Low.

The scenic integrity objectives (SIO) identify the specific management direction for managing the scenery of the Chugach National Forest. The SIO for the Katalla analysis area is expressed as a range from Very low in the project area to “High” to “Very High” in the watershed outside the project area.

- **High Scenic Integrity Value:** The valued landscape character appears intact. Deviations may be present but must repeat form, line, color, texture, pattern, and landscape character so that they are not evident.
- **Very High Scenic Integrity Value:** The valued landscape character is intact with only minute if any deviations. The existing landscape character and sense of place is expressed at the highest possible level.

- **Very Low Scenic Integrity Value:** The valued landscape character appears heavily altered. Deviations are noticeable and do not mimic typical size, shape or pattern of the viewed landscape.

Bering Lake Roadless Area - The proposed action is located within the Bering Lake Roadless Area #15, (Appendix C, FEIS, Revised Forest Plan, May 2002). The Roadless area has a gross acreage of 1,032,730, of which 966,240 acres are National Forest System lands. The Bering Lake Roadless Area was not recommended for designation under the Wilderness Act of 1965 (Record of Decision, Revised Chugach Forest Plan, May 2002).

The Roadless Area Conservation Rule of January 12, 2002, prohibits road construction and reconstruction activities (including temporary road construction) within inventoried roadless areas of the National Forest System. The Roadless Rule is enjoined from being implemented by a lawsuit filed in Idaho Federal District Court. The proposed action constitutes a prior existing reserved right (CNI Settlement Agreement, 1982), and as such is unaffected by the proposed Roadless Rule (U.S.D.A. Forest Service, November 2000, Roadless Area Conservation FEIS, page 2-4). Recent interim direction by the Chief of the Forest Service has reserved authority for allowing activities within roadless areas where road access is needed pursuant to reserved or outstanding rights or as provided by statute or treaty, to the Regional Forester prior to completion of a Roads Analysis in the Revised Forest Plan (USDA Forest Service, 2001a).

Wild and Scenic Rivers - The Katalla River was eligible for classification under the Wild and Scenic Rivers Act of 1972 (FEIS for Revision of the Chugach Forest Plan, May 2002). The Katalla River was found to be not suitable, and not recommended for classification as a Wild and Scenic River, (Record of Decision, Revised Land and Resource Management Plan, May 2002).

Environment and Effects by Key Issues

Issue 1: Effects on fish, wildlife, historic resources.

Effects on Fish

The public scoping process identified concerns about the possible effects to fish from barge/landing craft traffic in the river, disturbing salmon spawning areas with the barges, disturbing/scouring of the river banks or gravel around the barges at the landing areas, roads, fuel spills or other accidents with hazardous materials, and the use of water from Arvesta Creek for camp and drilling operations. The effects under each alternative are disclosed here. There is also concern that increased coho salmon harvest by the drilling camp workers in addition to the harvest by the guided clients could affect the population. This will be discussed under the Cumulative Effects section. This will further reduce the potential for any adverse effects.

In the first EA we assumed that barge operations would occur during the pink salmon spawning season and during the coho salmon sportfishing season. Since that time the Alaska Department of Fish and Game Habitat Division has said that it will restrict barge traffic in the Katalla River when pink salmon are spawning, which is approximately early August to mid-September.

One other major concern was whether barges could travel to the proposed landing sites without scraping the bottom of the river and disturbing the spawning gravels. The Alaska Department of Fish and Game and the Forest Service have conducted separate surveys of the channel cross sections at various sites along the Katalla River. The data show that the channel is deep and wide enough for smaller barges at 12.0-foot tides. Matt LaCroix of ADF&G Habitat Division said that the shallowest area was 3.6 feet at a 12.6-foot tide (Cordova tide table, 9.7 Wingham Island tide table). At this area the bottom is relatively flat across the channel, so the channel is sufficiently wide for barges. Thus, the permit would only allow shallow draft barges (two-foot draft) at 12-foot tides or better. During especially high tides, larger barges could carry the heavier pieces of equipment. These trips would be worked out with ADF&G on an individual basis.

It also appears that the mobilization period, which would include the heaviest barge traffic, could occur in the winter of 2002-2003, if the Plan of Operations and permits are approved. Previously it was thought that this could occur during the pink salmon spawning season or the coho salmon fishing season.

Magnuson-Stevens Fishery Conservation and Management Act, Essential Fish Habitat

Under this act, federal agencies are required to consult with the National Marine Fisheries Service (NMFS) if federal actions may cause adverse effects to regulated species of fish or Essential Fish Habitat. In this area, this includes all five species of Pacific salmon (chinook, chum, coho, pink, and sockeye salmon) and any waters they use for migration, rearing, or spawning. NMFS is required to make Conservation Recommendations to help mitigate possible adverse effects. NMFS made the following recommendations, which would apply to all of the action alternatives:

1. Pre-stage oil response equipment to protect biologically important sites such as river deltas, lagoons, and barrier islands.
2. Muds and cuttings from drilling operations shall be reinjected down hole.
3. All standards and mitigations set by the Alaska Department of Natural Resources and the Alaska Department of Fish and Game in the issuance of any related permits for oil and gas exploration shall be adopted as part of the Plan of Operations approved by the USFS. Monitoring should be initiated at startup and repeated periodically throughout the project to ensure compliance with the standards and guides listed in the aforementioned permits. A site restoration plan including revegetation and clean-up shall be provided and coordinated with regulatory and resource agencies prior to approval of the Plan of Operations.
4. Should commercially producible hydrocarbon reserves be found, the USFS, in coordination with NMFS and other affected parties, will initiate a Special Area Management Plan, or similar comprehensive area-wide planning process. This process will use a watershed approach in conjunction with the preparation of an Environmental Impact Statement to provide a larger framework in which to analyze cumulative and secondary impacts.

The pre-staging of spill response equipment has been proposed in CEC's Oil Discharge Prevention and Contingency Plan, which is being reviewed by the state DEC and will require

approval before a permit is issued by the State. The plan calls for equipment to be staged at the drilling area and at the downstream staging area on the Katalla River. While it may not be possible to prevent all adverse effects to fish or their habitat in the unlikely event of a major well blow-out, the state permit should ensure that adequate measures are being taken to prevent the spread of spills beyond the Katalla systems to the Copper River and Bering River deltas, nearby bays and lagoons, and the offshore barrier islands.

Similarly, DEC is responsible for issuing permits for the disposal of drilling muds and cuttings. In addition to reinjection, incineration and solidification are also approved methods for the disposal of cuttings. The plan does not call for the use of reserve pits, which could possibly leach contaminants. This was the main concern expressed by NMFS. NMFS biologist Brian Lance stated in a later consultation that the standards in the permit should meet the requirements of the Magnuson-Stevens Act (personal communication September 12, 2002).

The third recommendation recognizes the state permits as the standards to be followed for protecting fish and EFH. The state agencies will be responsible for monitoring the activities regulated by the permits they issue, but the Forest Service will assist within its authority and on National Forest land. The last recommendation would only be applicable if commercial quantities of gas and oil are found. The Forest Service would welcome closer and coordinated efforts with other agencies as proposed in this recommendation.

Generally speaking, the actions proposed in alternatives 2, 3, and 4 should have only negligible, temporary effects on Pacific salmon and EFH as defined in the Magnuson-Stevens Act. These effects are described in the following discussions. The Forest Service standards, guidelines, and Best Management Practices, combined with the standards set in the NMFS recommendations and state permits, will be used to protect fish and EFH to the maximum extent possible.

Barge/Landing Craft Traffic

Alternative 1 - No Action. There would be no effects.

Alternatives 2, 3, and 4 - Under all of the action alternatives, large ocean-going barges would unload equipment at a storage area on State of Alaska land downstream from the pink salmon spawning areas. The equipment would be transferred to smaller landing craft-type boats or barges which would travel directly over the pink salmon spawning areas and either over or near coho salmon holding in the channels. ADF&G will limit barge traffic while pink salmon are spawning, but after that period barges could still pass over adult coho salmon holding in pools in the last few weeks of September and in early October. Coho salmon do not spawn in the intertidal areas, but generally hold in the pools before moving farther upstream to spawn.

The most likely effect on adult coho salmon will be that the fish would be scared away from their holding positions. The barges would have 1.0 to 5 feet of clearance in the shallow areas and about 6 to 8 feet above the deeper pools, so the fish will be aware of the boats. In shallow water fish are easily frightened by boats or other large moving objects (Chick et al. 1999), but would be expected to return when the disturbance ends. The disturbance would be temporary and infrequent. Only two to three barges per week would be bringing supplies when coho salmon are in the river, since the peak mobilization period is proposed to occur in the winter.

Although the barges be limited while pink salmon are spawning, they would pass over spawning areas while eggs and alevins are in the gravel. The eggs are laid in August and September and the young do not emerge until late April and May the next year, depending on water temperatures and other climatic factors (Groot and Margolis 1991). The disturbances to eggs in the gravel from the wakes or propeller thrust should be minimal because the barges should not be operating at full power. The barges would be moving slowly in the narrow and relatively shallow river and would be moving with the tides (Dan Lowry, DALO Marine, personal communication). Given the lower speeds, the thrust from the propellers should not disturb eggs in the gravel, which are buried an average of 8 to 12 inches below the surface (Groot and Margolis 1991). The barges will maintain at least a foot of clearance at the most shallow point. Groot and Margolis (1991) also report that high percentages of pink salmon eggs are lost naturally in the spawning process due to redd superimposition, egg retention, flow conditions, and other factors. The implication is that large numbers of eggs are laid to compensate for losses.

These actions would have no effect on juvenile salmonids that rear or migrate through this section of the river. Rearing habitat is limited because of the relative scarcity of aquatic vegetation and other complex habitat (Ken Hodges USFS, personal observations), so the numbers of rearing fish are expected to be low. Smolting fish, which are migrating to sea, would do so in late spring and early summer when barge traffic should be infrequent. The danger to juvenile and smolting fish from propellers would be minimal since the fish can swim away from the boats and as Killgore et al. (2001) found, blade contact is infrequent, and mortalities are high only for larval fish smaller than 10 mm (0.4 inch). The smallest salmonid in the area would be pink salmon fry, which are 28 to 35 mm (1.1 to 1.4 inch).

Alternative 2 - Under this alternative, the ocean going barges would unload equipment about one-quarter mile up the Katalla River. The small barge would then travel another 1.25 miles up the Katalla River at high tides to unload equipment and supplies at the end of the old roadway. As described before, barge traffic would disturb and temporarily displace fish in the channel. The entire 0.5-mile section of pink salmon spawning area would be traveled over by the smaller barge. At the off-loading site where the barges would anchor, there is no spawning area, but there is a deep pool where migrating coho salmon congregate in August and September. These fish could be displaced during the unloading period, which could range from a few hours or up to a day, depending on the type of equipment being unloaded and whether they have to wait until the next tide cycle to leave.

One commenter expressed concern that the water rushing around the barge could scour the banks, causing erosion and sedimentation. This is a possibility, but the amount of increased erosion would probably be minimal and would be insignificant compared to the natural erosion occurring in the watershed. The bank at the site is eroding naturally as is practically every bank at a river bend in the valley. As stated earlier, aerial photographs taken in 1974 and 1993 show that large sections of the riverbank and valley floor have eroded and have been washed away. Since the spawning areas are not highly sedimented, it is felt that the river flows are sufficient to transport most of the fine materials out of the system. No effect is anticipated from barge activity.

Alternative 3 - Under this alternative, the ocean-going large barge would unload equipment at the downstream equipment storage site, but the smaller vessels would only travel three-quarters of a mile upstream to offload equipment at a site about one-half mile downstream from the old roadway. This would eliminate disturbances to most of the pink salmon spawning area, reducing the effects to about 100 yards. The off-loading site would be adjacent to an area where pink salmon spawn but the eggs would not be in the deepest part of the channel where the barge would be anchored. Coho salmon could be holding in the deeper water, and could be temporarily displaced. At this site, the barges could operate at lower tide levels, which means the work could be spread out over more days with fewer barges per day. This would lessen the impact to some fish. As with Alternative 2, scouring of the bank caused by water moving around the barge is expected to be minimal and there is very little downstream spawning area that could be affected. No effect is anticipated from this activity.

Alternative 4 - Smaller barges would travel from the downstream storage area to a gravel bar about 550 feet downstream from the end of the existing road. The barges would float over the downstream end of the gravel bar at high tides and lower the ramp onto the higher dry section of the bar. Equipment would be driven over the gravel bar and then up the riverbank. As the tide drops the barge would rest on the gravel bar. Since the gravel bar goes dry, there is no spawning there. The tail end of the barge could extend into the water, but the area downstream of the gravel bar is more sedimented than the main channel (since it is still somewhat of a depositional area) and no pink salmon were observed spawning there (Matt LaCroix ADF&G Habitat Division, personal communication). Thus, there should be no effect on spawning area at the landing site.

While the barge rests on the gravel bar there will be some water movement around the hull, but the flows should not cause significant scouring. The gravel bar is a depositional area so the currents there are slower than in the main channel of the river. Also, most of the water movement would be from the receding tide rather than the more forceful current of the river except at the higher flood flows. Since there is no spawning area where the barge will rest, there will be no scouring of eggs in the gravel. No effects are expected from barge activities.

Clearing of Staging/Storage Area on State of Alaska land

Alternative 1 - No action. There would be no effects.

Alternatives 2, 3, and 4 - Under all of the action alternatives, a 2.5-acre storage area on a bluff above the Katalla River would be cleared of brush. There is already an airstrip in this area, a 150-foot dirt roadway leading from the river beach to the airstrip, an off-road vehicle trail, and other cleared sections. If the area were cleared of brush, some of the surface soil would be disturbed. The main concern to fish would be whether this soil could be carried into streams where it could affect fish habitat.

It is unlikely that sediment from the disturbed soil would affect fish habitat. The area is quite flat and appears to be well drained because the soil has sand and gravel, and the vegetation has species that prefer well-drained areas, such as beach strawberry (*Fragaria chiloensis*). Thus, it is unlikely that much water would collect or have much erosive power as it would if it were

flowing down a slope. The transport of sediments will also be lessened because a buffer strip of vegetation will be left around the site so that sediments are trapped in the vegetation if there is some surface flow. It is possible some water and sediment could flow down the surface of the 150-ft roadway that goes from the river to the airstrip. Waterbars or other methods to divert water into the vegetation would prevent the transport of sediments. This area is not on National Forest land, so State of Alaska officials would oversee the standards for clearing of the area.

The Katalla River does not have any spawning area this far downstream in the system, since this is more of a depositional area for all of the silts and sediments carried down the river. Thus, some small sediment input from this cleared area would have no effect. However, Irish Creek at the southwest end of the airstrip has pink salmon spawning area in the area where it runs closest to the airstrip. Sedimentation of this creek will be prevented by maintaining a 100-foot buffer between the cleared area and the creek.

Use and Maintenance of the Temporary Road

Alternative 1 - No action. There would be no effects.

Alternatives 2, 3, and 4 - Under all of the action alternatives, the 2.5-mile old roadway would be cleared of vegetation and minor grading performed. Seven prefabricated bridges would be placed at stream crossings. Generally speaking, the main fish concerns involving roads are alteration of stream channels and flows, and sedimentation of streams from bank and road erosion.

Reopening the road would not affect fish habitat. The Plan of Operations states that the equipment for installing the bridges will not need to work in the streams, no new culverts will be placed, nor will any of the streambanks along the road need to be disturbed. Since the areas around the streams will not be disturbed, the channels and the flows would not be changed and sediment input would be negligible. Road surface erosion will also be minimal since the road is relatively flat with only short downhill segments, so large amounts of water do not collect on the road. Maintenance of ditches will be required in some places, however. Another mitigating factor is that most of the streams along the road do not have fish habitat and are too small to transport large amounts of sediments to fish bearing areas.

New Temporary Road Construction Including the Small Barge Access Ramp

Alternative 1 - No Action. There would be no effects.

Alternative 2 - Under this alternative, small barges would off load at a site near to the end of the old roadway. An area about 25 feet by 25 feet would be cleared for an access ramp to extend the old roadway down to the edge of the water. Some of the streamside vegetation would need to be cut and some soil would be disturbed, which could introduce some sediment into the river upstream from the pink salmon spawning area. Any disturbed surfaces other than the roadbed would be seeded with native plants to reduce erosion (USDA Forest Service, 1996). Rig matting would be used on the surface of the road bed where appropriate to protect the soil and reduce erosion. Water bars or other measures will be used to channel water away from the road surface

and reduce sediment input to the river. Even with this mitigation, some sedimentation could occur, but it would be temporary and not likely to affect water quality or fish habitat. The cut in the bank would only be temporary, lasting for the duration of the project, and then would be restored and revegetated.

The Alaska Department of Fish and Game Habitat Division had concerns about cutting into a bank that is at a river bend and that has some erosion taking place already. Matt LaCroix (ADF&G personal communication) felt that disturbances could destabilize the bank. The thought behind this alternative is that the height of the barge deck above the water, combined with the slope of the ramp from the barge, would place the cut area high on the bank. The ramp would also be placed where the bank is not actively eroding, as indicated by the vegetation growing there. The vegetation below the ramp would not have to be disturbed. The proposal submitted by CEC to the U.S. Army Corps of Engineers calls for cutting down five feet from the top of the bank. Brian Heinrichsen, USFS civil engineer, stated in a report that a barge could lay its ramp on the existing road without excavation on the proper tide. Depending on the type of barge that is decided on, it may be possible to lessen the depth of the cut. In any case, sedimentation should be minimal and would not affect the downstream spawning area. Sediment input from this disturbance would be negligible compared to the natural input. Just below the site there is a stretch of about 100 yards of collapsing riverbank. Upstream there are eroding banks at every meander. Apparently the flows in the river are capable of flushing the sediments out of the downstream spawning area and preserving the quality of the spawning substrate even though there is high natural sediment input.

A staging area up to 2.0 acres would be cleared along the existing road. Although this would cause soil disturbance, the area would be about 200 yards from the river. It is flat and has no streams that could carry sediments to the stream. Rig matting would be used where appropriate to lessen the soil disturbance.

Alternative 3 - This alternative would require approximately 0.5 mile of new temporary road along the east side of the Katalla River, and 300 yards of new temporary road through the forest near the old roadway to avoid disturbances to a bald eagle nest (this is in addition to use and maintenance of the existing roadway). Except at the off loading site for the smaller barge, the road along the river would stay at least 100 feet from the Katalla River to avoid impacts to the riparian area.

The off loading site would require bank disturbance similar to Alternative 2 and would have the same types of mitigation, but again, the effect of sediment input would be negligible compared to existing natural levels. Sediment input from this site could affect a much smaller area - about 100 yards of downstream spawning area instead of 0.5 mile.

The new temporary road along the river would need to cross two wetland areas and the upstream end of a slough, altering about 6,000 square feet (300 feet x 20 feet road width) or 0.14 acres of wetland. The slough could provide rearing habitat for juvenile coho salmon, although none have been documented there. Because a bridge long enough to span the 40-ft wide slough would be expensive, this alternative would build the road with multiple culverts. Using culverts will alter about 800 square feet (40 feet channel width x 20 feet road width) of rearing habitat. Given the

3.6 miles of similar small slough channel in the Katalla Slough watershed, this amount of area is negligible. The slough is a placid backwater and constriction of the channel by a culvert or bridge would not cause erosion or fish passage problems. Sedimentation from the fill would not be a problem because the silt would not be transported far and because there are no spawning areas that would be affected. The regional Forest Service handbook requires that road slopes or other disturbed soil be planted with native grass seed or other vegetation to reduce erosion (USDA Forest, Service 1996). The loss of habitat would be mitigated when the road is obliterated after the project is completed.

This alternative would require fill material to build the roads, so a quarry would be need to be developed or material would need to be barged in. The Plan of Operations states that no materials would be taken from National Forest land, so the rock would need to be taken from a site on the private land at Katalla or elsewhere. Using the road fill requirement estimates in USDI, Bureau of Land Management (1998), average soil depths to bedrock reported in Davidson and Harnish (1978), and a 30% hillside slope, approximately one-half acre might be needed for a quarry. This would vary depending on the actual slopes, layout, and soil depths.

Davidson and Harnish (1978) indicate, however, that the forested mountain slopes of the area have moderate inherent surface erosion hazard, high erosion hazard on road cut slopes, and moderate slump hazards on road cut slopes. Cutting a quarry into a hillside could trigger slumps or landslides. There are some places at the western end of the private land that are not directly adjacent to streams, but if slumps or erosion problems expand, sediments could be carried downhill to fish-bearing streams. A mitigation measure would be to barge in road fill material rather than opening a quarry.

The section of road in the forested area around the eagle nest would not affect fish habitat. There are no streams or wetlands that would be crossed (Milo Burcham USFS, personal communications). The sloping road banks would be vegetated with native grasses to reduce erosion. Any sediment from surface or road bank erosion would be trapped in the forest vegetation before reaching streams.

Alternative 4 - This alternative would require running equipment along a gravel bar 150 to 200 feet before the road begins on the riverbank. Running equipment on the gravel bar will disturb the surface, and fine sediments that have been deposited there could be more easily washed into the river by rain, high flows, or tides. Matt LaCroix (ADF&G Habitat Division, personal communication) states that most of the gravel bar is dry except at the highest waters and the size of the gravels and cobbles will support the equipment without much displacement. Equipment would not be run on the gravel bar when it is flooded. Also, gravel bars are not static features and are naturally reformed to varying degrees during high flows. Disturbing the surface may increase the movement of some of the deeper substrate particles, but the overall input of sediment in the stream or effect on spawning would not increase significantly.

This alternative would also require a cleared 0.2-acre landing area on the riverbank where equipment can be unloaded. Rig matting would be placed on the ground to reduce disturbance of the soil and erosion. A 30 to 50 foot vegetation buffer would be maintained between the landing area and the river to trap any sediment that might wash down.

The new temporary road would be approximately 550 feet long and would run roughly parallel to the Katalla River on the east bank. Except at the barge landing site, the road would be about 100 feet from the Katalla River to avoid sedimentation or other effects to the river. The road would run 40 to 50 feet from the upper end of a backwater tributary to Katalla Slough. Although the buffer will not be as wide, sedimentation will not be a problem since the area is flat and vegetated, and the tributary is a beaver pond with no spawning area. Any sediment from the road would be trapped in the vegetation or would settle out in the pond. Disturbed soil along the road would be revegetated with native plants. Four bridges would be laid across some shallow, ephemeral channels. The channel banks would not be disturbed and no fill would be placed in the channels, so no sediments should be produced that could affect streams or fish habitat.

Rig matting would also be used to protect the soil for the entire length of the road. Over the last 150 feet, the road would cross a soft wetland area. Logs and brush or other fill would be needed under the matting for support. Brush from the cleared roadway could be used, but about 50 to 75 logs 8 to 12 inches in diameter would be needed (Brian Heinrichsen USFS road engineer, personal communication) and would have to be brought to the site. The use of rig matting and the log supports will lessen soil disturbance and reduce the chance of sediments being carried into the streams. The risk of sedimentation is minimal, since there are only a few small ephemeral streams that have limited ability to transport sediments. The area around the roadway is flat and vegetated so it is unlikely that sediments could be transported overland.

As in Alternative 2, a staging area up to 2.0 acres would be cleared along the existing road. Although this would cause soil disturbance, the area would be about 200 yards from the river. It is flat and has no streams that could carry sediments to the stream. Rig matting would be used to lessen the soil disturbance.

Although this alternative will include more disturbance and activity near the Katalla River, the use of buffers, rig matting, revegetation, and BMP's will reduce soil disturbance and sediment transport. There should be minimal input of sediments into the streams and negligible effects on fish habitat.

Fuel Spills or Accidents involving Other Hazardous Materials

Alternative 1 No action. There would be no effects.

Alternatives 2, 3, and 4 - Given the possibility for natural hazards, human error, shipping or other transport mishaps, and equipment failure, there is no guarantee that there will be no spills or accidents involving hazardous materials. If any toxic or hazardous material associated with the operations is not properly contained, it could contaminate the soil, groundwater, or surface water, and potentially harm aquatic organisms. The effects will depend to a large degree on the type and amount of material involved and where it is spilled. To harm fish or other aquatic life, a substance would have to be spilled directly into the water or transported indirectly by surface flow or groundwater to the streams.

The Plan of Operations and permits from state and federal agencies will be used to ensure that hazardous materials are handled and stored safely. During transport, the hazardous substances would be in containers approved by the Department of Transportation that can withstand dropping or other common handling mishaps. The Plan of Operations states that all hazardous materials will be stored in lined, diked storage areas so materials do not contaminate the soils or spread beyond the storage area. Storage areas would be located away from streams and wetlands. Emergency spill plans and equipment will be a part of the requirements in the permits.

The Oil Discharge Prevention and Contingency Plan presents a more detailed discussions of how CEC would respond to oil spills of varying sizes, with scenarios including the spill of fuel from a tank truck accident, rupture of a fuel storage tank, and an oil well blowout. Spill containment equipment will be located in the drilling area and also at a site on the Katalla River. The equipment on the Katalla River will address the concern brought up during the comment period that the equipment at the camp would be too far from a spill on the river. The Katalla equipment will include a small skiff that could operate in shallow waters at low tides and booms to help prevent spilled materials from being washed out to the ocean, which was another public concern. State inspectors will be responsible that the plans and regulations are being followed. Fueling or maintaining vehicles or equipment adjacent to streams or on National Forest land would not be allowed.

Commenters also asked that the effects of an oil spill be described. It should be noted here that the proposed activities do not include the building of oil pipelines, large oil storage facilities, or transporting oil in tankers. Within the scope of the proposed action, major (greater than 1,000 barrels – or 42,000 gallons) spills of crude oil would only occur if there were a well blowout. This could occur if the drills hit high pressure pockets of gas and/or oil and the pressure could not be controlled through the hydrostatic pressure of the drilling muds, through the blowout prevention equipment, or other means. The detailed description of how these measures work and the responses that would be taken are discussed in detail in the discharge prevention and contingency plan. A Canadian environmental effects assessment estimated the possibility of a major blowout as one in 2,600 annually (Husky Oil Operations Limited, 2001). The Alaska Department of Natural Resources Division of Oil and Gas (2000) reports, “There has never been an oil spill from a platform blowout in Alaska.” There have been blowouts that only produced gas.

The impacts of a blowout would depend to a large degree on the amount of liquid oil and its dispersal. The Oil Discharge Prevention and Contingency Plan indicates that some blowouts are mostly gas: “Several blowouts have occurred in southcentral Alaska in the past 20 years; both were at offshore platforms in the Cook Inlet area, were a result of encountering shallow, high-pressure gas, and did not include the release of significant quantities of liquid hydrocarbons.” Belore, et al. (1997) present a model on aerial dispersion of oil that factors oil flow rate, size of pipe, gas to oil ratio, and oil droplet size (varying wind speed tends to cancel its own effects). The Oil Discharge Prevention and Contingency Plan uses this model to conclude that nearly all of the oil would fall to the ground within 6,000 feet, which is about the distance from the drill site to the open ocean at its nearest point. Thus, most of the oil would fall on land or inland waters. Within this radius, about 58% of the area is in the Katalla Slough drainage (1,500 acres), with the remaining area in the Redwood Bay and Strawberry Harbor drainages (1,100 acres).

The hills to the north, east, and south could help to contain the oil within the Katalla Slough drainage.

Perhaps one of the greatest concerns would be whether the oil could be contained so it would not contaminate fish habitat or flow into the ocean where it could affect the commercial fisheries, the Copper River Delta and the State Critical Habitat area, Bering River to the east, or, as one commenter mentioned, the Yakataga State Game Refuge to the east.

Absorbent booms, skimmers, and pumps would be used to contain oil that enters the streams. Several small skiffs, booms, and other equipment will be staged at the downstream landing site for deployment in Katalla Slough. Materials and equipment for Redwood Creek and other streams outside of the Katalla Slough watershed would need to be flown by helicopter to the sites. Most of the streams in these areas flow into protected, relatively placid estuarine channels, which could make oil recovery more efficient, although this is very sensitive and biologically productive habitat.

Actual impacts would depend on spill size, time of year, weather (for dispersal or ability to respond), and a number of other factors. Trying to predict all of the impacts would be impossible and speculative, but given that most of the spill would be on land and in the Katalla Slough drainage, and that the oil may be more easily contained in the estuarine channels, some of the impacts of a spill over the full 6,000-foot radius could include the following.

1. Oil contamination of 2,600 acres with decreasing contamination toward the perimeter. About 70% of the contaminated land area would be forested hill slope and the rest sphagnum and sedge wetlands.
2. Direct loss of wildlife and fish in affected areas. Numbers dependent on season, amount of contamination, and other factors.
3. Minimal impact on habitat and populations in Katalla River drainage, depending on success of containment in Katalla Slough. Otherwise, effect limited to tidally influenced area in lower 1.75 miles of river.
4. Loss of waterfowl habitat in wetland areas for an indeterminate period of time, depending on the degree of contamination and long-term effect on vegetation.
5. Loss of other wildlife habitat in forested regions.
6. Contamination of most of the 12.9 miles of stream in the Katalla Slough drainage, about 2.5 miles in the Redwood Bay area, and about one mile in the Strawberry Harbor area. Contamination would be highest in the Katalla Slough drainage as the other areas are farther from the drill site.
7. Loss of fish habitat for an indeterminate period depending on how long contaminants continue to be carried into the streams from the land, and how long contaminants persist in ponds, substrate, and other areas that aren't flushed by currents.
8. Some limited direct contamination of ocean water, other contamination depending on the ability of booms and pumps to contain spills in creeks.
9. Some loss of guided hunting and fishing clients. Spill is unlikely to directly contaminate the cabin area and may have minimal effects on the Katalla River fish populations and wildlife populations outside of affected area, but clients may not travel to an area near a major spill.

10. Commercial fisheries probably unaffected unless significant amounts of oil escape containment areas. Possible damage to reputation of Alaska salmon.
11. Effect to Copper River Delta unlikely unless significant amounts of oil escape containment. Prevailing currents would carry oil west, toward this area.
12. Bering River and Yakataga State Game Reserve are to the east. Prevailing currents would carry oil west, away from these areas.
13. Historic artifacts around drill site could be covered with oil, although undamaged. Some undocumented artifacts could be disturbed by oil removal equipment if State Historic Preservation Office does allow clean up in the general area.

Alternative 2 - One area where direct contamination of water could occur would be at the off loading site when supplies are being transferred from the barges to the trucks. A spill of hazardous material at the off loading site at the end of the old roadway could contaminate the 1.5 miles of the Katalla River downstream from the site, and perhaps another one-quarter mile or so upstream, which is the extent of the tidal influence. A major pink salmon spawning area begins about 100 yards downstream from the site and could be contaminated within a short time if the tide is going out. Other tidally influenced areas, such as Katalla Slough and the first 100 feet of the mouth of Irish Creek (on the west side of the Katalla River next to the airstrip) could be affected if contaminants were not cleaned up or contained. The tidally influenced areas of Katalla Slough would have some pink salmon spawning area and rearing area for juvenile coho salmon.

Alternative 3 - A spill at the downstream off loading site under Alternative 3 could affect pink salmon spawning area more than it would under Alternative 2 since the downstream site is directly adjacent to the spawning grounds. Contaminants may not be as diluted before they reach the spawning area. A spill at this site would also work its influence throughout the tidally affected areas if large enough and not contained. Since the proposed road would cross two wetland meadows and a slough, truck accidents at these points could release contaminants directly into water. Contaminants in water may be diluted, but they would also be more difficult to clean up and may be carried to fish habitat more easily.

Alternative 4 - Since the unloading would take place on a gravel bar, a spill would not go directly into the water and so would not disperse as quickly. However, contaminants could reach the water table quickly. The gravel bar is directly adjacent to pink salmon spawning area. As with the other sites, contaminants could be dispersed throughout the tidally influenced area if the spill is not contained.

Use of Water from Arvesta Creek

Alternative 1 - No action. There would be no effects.

Alternatives 2, 3, and 4 - The Plan of Operations calls for gradually filling a 12,600-gallon tank with water from the west fork of Arvesta Creek to supply the camp and drilling operations needs. Other tanks of unspecified sizes at the camp and at the drill site would be filled from the first tank. The purpose of the large storage tank is that short periods of high water consumption will not cause major fluctuations in the creek levels.

If too much water is taken out of the creek, fish habitat area will decrease, fish eggs in the gravels may not be sufficiently oxygenated, there may not be sufficient intergravel flow to carry metabolic wastes away from the eggs, pools or other sections of the creek may be more susceptible to freezing (along with any organisms), water temperatures could increase, habitat for aquatic invertebrates (a food source for fish) will decrease, and so forth.

The average annual flow of water in the creek is estimated at 1.7 cubic feet per second (cfs) based on a watershed area of 120 acres above the water intake site and an estimate of 9 cfs of runoff per square mile in this area (USDA Forest Service, 1983). Seasonal flows could vary considerably. The Plan of Operations calls for using 31,700 gallons/day or about 1,310 gallons/hour. If this use were spread evenly over the day, the use would only be about 0.05 cfs. However, use may be much higher or lower depending on the activity, and the tank may need to be refilled more quickly. Filling the 12,600-gallon tank would take 9.4 hours at 0.05 cfs. The Alaska State Department of Natural Resources is responsible for issuing a water use permit and will set standards for the minimum flow levels that must be maintained in the creek and, in turn, the rate at which water can be taken from the creek to fill the tanks.

The Forest Service has documented the presence of juvenile coho salmon and Dolly Varden char in the creek and has submitted this information to the Alaska Department of Fish and Game for inclusion in the Alaska Anadromous Waters Catalog. This will be considered in the issuance of the permit.

Matthew Eagleton of the National Marine Fisheries Service (personal communication) said that the standards and mitigations set by the Department of Natural Resources in the permit will meet the requirement that there are no adverse effects to fish or essential fish habitat as mandated by the Magnuson - Stevens Act.

Effects on Wildlife (Non-TES Species)

Effects on wildlife may stem from disturbances by the presence or activities of humans, alteration of habitat, increased presence of humans leading to greater hunting or trapping, and for bears, attraction to human foods or garbage and possible taking of bears under Defense of Life or Property provisions. During the public involvement process, commenters specifically expressed concern for bears, bald eagles, shorebirds, and other migratory birds.

Public comments on the original EA also expressed concern about drilling workers hunting bears and harming the local population. The harvest of bears increased in the 1980s when another drilling operation was going on. William Stevens, president of CEC, had discussed the issue with Dave Crowley, the area wildlife manager with ADF&G. Mr. Stevens (personal communication) wrote: "Since that conversation we have determined that no bear hunting will be allowed by employees, while staying at our camp and, as on any drill site, no unauthorized firearms will be allowed." Mr. Stevens also said that the only firearms that would be authorized would be for bear protection, with only designated people authorized to use them.

Human Disturbance

Alternative 1 - No action. There would be no effects.

Alternatives 2, 3, and 4 - All of the action alternatives would have similar effects on wildlife in regard to human disturbances except in the case of bald eagles. Human activity would cause most species to leave the immediate area when there are encounters and possibly move out of areas affected by noise, road traffic, or barge operations. Most of the mammalian species - wolf, lynx, wolverine, moose - are only thought to be present in low densities, so the encounters would be infrequent, if any, and the effects would be negligible¹⁴. Of the avian species, goshawks and ospreys are not known to be in the area. Shorebirds use the intertidal areas, but their presence is temporary. Other migratory birds may choose to use areas away from the roads and other activity centers for nesting and feeding. Although wildlife may be displaced, there are large amounts of similar, undisturbed habitat in nearby areas, so there would be little overall effect.

Alternative 2 and 4 - Bald eagles. An active bald eagle nest was found along the old roadway in 2001. If nesting bald eagles are disturbed, they may abandon the nest or leave eggs or unfeathered eaglets exposed and susceptible to cold. Sometimes eaglets can be frightened and may attempt to fly before they are fully able, with adverse results. Since the temporary road is within 330 feet of the nest, the terms of the MOU between the U.S. Fish and Wildlife Service and the Forest Service on eagle management will apply. Since the original EA was written, a variance has been granted to use the existing road within 330 feet of the nest tree. The variance stipulates that a biologist or other person familiar with eagle behavior monitor the nest site to determine its use. Vehicles should maintain normal operating speed within 330 feet of the nest tree and not stop or markedly slow down in that area (Mike Jacobson USFWS eagle management specialist, letter May 10, 2002).

Alternative 3 - Bald Eagles. Under this alternative a 300-yard long detour route away from the old alignment would be built so that truck traffic would be at least 330 feet from the nest. Building this new section of temporary road would require felling trees along the route, pulling the stumps, making the roadbed, and other activities. Although this activity would be 330 feet from the nest, it is thought that noise from the tree falling and other construction work could also be disruptive. Constructing the detour in the fall or winter when eagles are not present could mitigate this. Removing a swath of trees could make the remaining trees more susceptible to blowing down, which could endanger the nest tree itself. Mike Jacobson, USFWS eagle management specialist, stated in a letter granting a variance, that using the existing road would be preferable to constructing a new detour.

Alteration of Habitat

Alternative 1 - No action. There would be no effects.

Alternatives 2, 3, and 4 - Under all of these alternatives, a 2.5-acre storage area would be cleared of brush near the existing airstrip. This area appears to have been a former floodplain uplifted by the 1964 earthquake, so the vegetation and habitat is still in a successional stage. The

¹⁴ Defined as no species of concern are present, no/minor impacts are expected. Minor impacts that do occur have no secondary (long-term or population) effects (Burcham 2002).

area has thickets of young small diameter Sitka spruce, alder, and willow, while the open areas have beach strawberry, beach rye grass, fireweed (*Epilobium augustifolium*), nagoonberries (*Rubus arcticus*), beach pea, and yarrow (*Achillea borealis*). Since this area is close to the cabins and human activity, it is unlikely that the larger mammals would be using the area. The primary wildlife inhabitants of this area would be migratory birds, which would nest in the brush thickets. The U.S. Fish and Wildlife Service stated that migratory bird nests, eggs, and young could be harmed by brush clearing during nesting season, approximately April 15 to July 15. Depending on the timing of the Plan of Operations and permits, CEC proposes to begin work in the winter of 2002-2003, which would prevent adverse effects to nesting migratory birds. Thus, nesting birds would not be affected. The loss of this brush for habitat would have no effect since this type of habitat is abundant in the area. The loss of brush would also be temporary and would grow back once the project has ended.

Habitat could also be altered by the introduction of non-native plants that could compete with existing species. One of the interesting results of the plant surveys was that no non-native species were found in the survey area. Forest Service policy on weeds is described in FSM 2080. Of particular note is 2080.1 item 4 of this policy which states: "Use contract and permit clauses to prevent the introduction or spread of noxious weeds by contractors and permittees. For example, where determined to be appropriate, use clauses requiring contractors or permittees to clean their equipment prior to entering National Forest System lands." Since the Katalla area is believed to be free of non-native species, and since the most probable manner of spreading exotics would be from soil or vegetation on equipment, the special use permit will require that the equipment will be cleaned prior to transport to the Katalla area. This should prevent transport of seeds, roots, or other non-native plant parts to the area.

Alternative 2 - Under this alternative up to 2.0 acres of Sitka spruce forest could be cleared for a staging area along the old roadway about 200 yards from the Katalla River. This type of habitat is used by bears, bald eagles, and goshawks (although none were found in this area). The geographic information system (GIS) vegetation layer lists 846 acres of Sitka spruce forest in the project area defined in the wildlife specialist report, so the amount of habitat lost is relatively small compared to the amount in the area. The only other alteration would be the extension of the old roadway in construction of the access ramp about 25 feet to the edge of the Katalla River. About 625 square feet (0.014 acres) of riparian vegetation would be removed, mostly Sitka, alder, willow, salmonberry, and young Sitka spruce. This type of habitat is used by bears and passerine bird species, including sparrows, chickadees, and warblers. This type of habitat is abundant in the area (460 acres) and the loss of this limited amount of habitat would have no effect on the species that utilize it. Since the roads and staging area are temporary, the vegetation would return after the roads and staging area are obliterated. As mentioned previously, there would be no effects to nesting migratory birds if brush clearing occurs outside April 15 to July 15.

Alternative 3 - The proposed new temporary roads and staging area in Alternative 3 would alter up to 3.7 acres of habitat. The detour around the eagle nest would affect about 0.46 acres of old-growth Sitka spruce forest, which, again, is used by bears and other mammals, bald eagles, and goshawks. The road along the Katalla River would remove approximately 1.24 acres of habitat, including 0.6 acres of young Sitka spruce, 0.4 acres of beach rye grass/lupine, 0.14 acres of

sedge meadow and other wetland, and 0.1 acres of Sitka alder, willow, and other brush. The staging area would be located next to the off-loading site, one-half mile downstream from the old roadway. This would alter up to 2.0 acres of the beach rye grass/lupine area. These areas are used mostly by various passerine bird species. As stated previously, the Sitka spruce and brush habitats are abundant in the area (846 and 460 acres respectively). The GIS vegetation layer does not differentiate between beach rye grass, other grasses, and sedge, so the total areas for these particular habitats are not known. A rough estimate of the beach rye grass habitat would be 500 acres, based on personal observations (Ken Hodges USFS), roughly delineating those areas on a GIS layer with the aid of aerial photographs, and calculating the area. Thus, this type of habitat is also abundant. There would be no effect to nesting migratory birds if brush clearing occurs outside April 15 to July 15.

Since the roads and staging area are temporary, the vegetation would return after the roads and staging area are obliterated.

As described in the fish section, a source for road fill would be needed, and possibly one-half acre of hillside on private land on the west end of the private land could be used for a quarry. The hillslopes in this area are generally covered with Sitka spruce/western hemlock forests. Blueberries (*Vaccinium spp*) are often the understory vegetation, and so, such areas could be used by bears and birds. The loss of one-half acre of this type of habitat would be negligible given the extensive forests in the area. A mitigation measure would be to barge in fill from outside sources or use rig matting for the entire distance. Rig matting is expensive and may not be economically justified compared to importing fill.

Alternative 4 - This alternative would require clearing up to 2.0 acres of old Sitka spruce for a staging area as described for Alternative 2. Due to the abundance of this type of habitat, no effect is foreseen. This alternative would also require clearing about 0.2 acres of young Sitka alder, 0.2 acres of young Sitka spruce, and 0.1 acre of wetland with sphagnum moss and scattered Sitka spruce, alder, and willow. As stated in the other alternatives, all of these habitat types are abundant in the area. The total area affected is minimal – about one-half acre for the road and 2.0 acres for a staging area. All species of wildlife could find similar habitat elsewhere. Nesting migratory birds would not be affected if the clearing of vegetation occurs outside of the nesting period, approximately April 15 to July 15.

Increased Human Presence - Greater Hunting and Trapping

Alternative 1 - No Action. There would be no effects.

Alternatives 2, 3, and 4 - As mentioned in the introduction to the wildlife effects section, William Stevens has stated that he would not allow bear hunting by workers staying at the camp and that no unauthorized firearms would be allowed. The only authorized firearms would be those used for bear protection. Mr. Stevens has also said that he would not provide freezer space for fish, and presumably this would apply to game meat. Given these restrictions, it is unlikely that there would be any hunting by drilling workers. Mr. Stevens said the workers could go with the local guides if they wanted.

It is possible that some workers might wish to trap in the area, although workers will have long shifts (William Stevens, president CEC, personal communication) and may not have much spare time. At the present time there is no known trapping, because there are no residents in the area during the winter. Any trapping by oil workers would not interfere with existing endeavors. The furbearer populations are probably healthy because of the lack of trapping and could stand some harvest. The trapping regulations are intended to provide sustainable harvests, although it is possible that populations in the immediate area could be reduced. The trapping pressure would end when the project is finished.

Defense of Life and Property

Alternative 1 - No Action. There would be no effects.

Alternatives 2, 3, and 4 - The potential effects would be the same under all action alternatives. Human garbage at a remote camp such as Katalla would have the potential to draw bears from a large area, and could result in increased human/bear interactions and potential Defense of Life or Property takings of bears. The Plan of Operations calls for garbage to be incinerated on site. Incineration and temporary storage of garbage in bear-proof containers would insure that bears would not be attracted to the area and human/bear conflicts at the site would be negligible or low. No disposal of incinerated waste would be allowed on National Forest land. Dave Crowley, ADF&G area wildlife biologist, wrote in his comments that he is satisfied with the bear plan for the camp.

Effects on TES Species

As mentioned earlier, there are no known TES plant species in the project area, and of the animal species, only three sensitive species would be likely to be in the area, trumpeter swans, dusky Canada geese, and ospreys. Trumpeter swans are known to be in the area, but the other species have not been documented in the area.

Alternative 1 - No Action. There would be no effects.

Alternatives 2, 3, and 4 - Under all of these alternatives, a 2.5-acre storage area would be cleared of brush near the existing airstrip. Since this is not a wetland area, dusky Canada geese and trumpeter swans would not be present. Osprey nests would not be found at this site because there are no large trees for nests, only small Sitka spruce that have colonized the area since the 1964 earthquake. There are larger trees inland from this area, but that is where the cabins are located along with the associated human activities and disturbances. Ospreys would not be likely to nest where there would be disturbances. Since these species are unlikely to be in the area, there will be no effect.

Alternative 2 - Trumpeter swans and dusky Canada geese could be present in the lower Katalla River and Katalla Slough area. They would nest in the freshwater wetlands away from the river, rather than in the tidal areas. The nests would be screened from the barge traffic by the banks and shoreline vegetation, so there would be no disturbance. The one known swan nest is one-half mile to the west of the river. It is possible that geese could feed on grasses along the lower river and be disturbed by passing barges, causing the birds to fly to other nearby areas to feed.

The disturbance would be temporary, would not alter habitat or the food source, and would not prevent the geese from returning there to feed. Thus, this would have a negligible effect.

Ospreys use forested areas for nesting, but none have been observed in the area. The old roadway goes through a forested area, and up to 2.0 acres could be cleared for a staging area. Since ospreys are not known to be in the area, there would be no effects. If ospreys did migrate into the area, mitigation could be needed depending on whether the birds were nesting and where the nest sites were located.

The 25-foot extension of the old roadway to the river for the access ramp would require the removal of 625 square feet of alder, salmonberry, and young Sitka spruce. This type of habitat is not used by these species and would have no effect.

Alternative 3 - Under this alternative an additional 0.5-mile temporary road would be constructed along the east bank of the Katalla River. Trucks and other activity on top of the bank would be more visible to birds in the wetlands to the east, however, the only known swan nest is to the west. More than half of the road would be in a stand of young Sitka spruce where the traffic would be hidden by the trees. The road would also cross the upper end of a 40-foot wide slough, which has suitable habitat for swans or geese. Since this is a small amount of area being disturbed and no swans or geese are known to use that specific site, the effects would be negligible. Ospreys would not use any of the habitat affected by the road. Up to 2.0 acres of beach rye grass/lupine habitat could be cleared for a staging area and another 0.4 acre for the road. This type of habitat is not used by these species, and the clearing of this area would have no effect.

As described in Alternative 2, it is possible that geese could feed along the lower river and be disturbed by passing barges, causing the birds to fly to other nearby areas to feed. The disturbance would be temporary, would not alter habitat or the food source, and would not prevent the geese from returning there to feed. Thus, this would have a negligible effect.

This alternative would also create a 300-yard detour around an eagle nest in the forest along the old roadway, and would require a one-half acre quarry. Approximately one-half acre of Sitka spruce forest would be removed by the road, and one-half acre of western hemlock or hemlock/spruce forest would be removed by the quarry. There are approximately 846 acres of Sitka spruce habitat in the area and another 428 acres of western hemlock or hemlock/spruce forest. Again, ospreys use forested areas for nesting, but since no ospreys are known to be in the area and only about one acre of forest habitat would be cleared, no effects on ospreys are anticipated.

Alternative 4 - The effects on TES species would be similar to those described under Alternatives 2 and 3. Barges would travel up the river to a landing site 550 feet downstream from the existing road. As with Alternative 2, there would be negligible effects to geese and swans from barge traffic since nesting areas would be screened by the banks and vegetation, and individuals along the river would only have short, temporary disturbances. The road from the landing area to the existing road would also be screened by vegetation, so there should be no

disturbances to nesting birds in wetlands to the east. No swans or geese are known to nest near the road corridor.

As in Alternative 2, a staging area up to 2.0 acres could be cleared in an old-growth Sitka spruce forest. Ospreys use large trees for nesting, but since ospreys are not known to be in the area, there would be no effects. If ospreys did migrate into the area, mitigation could be needed depending on whether the birds were nesting and where the nest sites were located. The other habitats that would be altered are young Sitka spruce, Sitka alder, and sphagnum moss wetland with scattered alder, willow, and Sitka spruce. These areas would not provide habitat for TES species.

Thus, there would be no effects to TES species except for the negligible temporary disturbance of swans and geese if they were feeding along the river.

Effects on Historic Resources

The Katalla area is rich in historical artifacts from the oil and gas production activity in the early 1900's - mainly old machinery, pipes, pumps, and other equipment that are still lying in the bushes. Shaw (2001) notes, however, that the probability of finding material from Native American cultures is low.

Alternative 1: No Action. There would be no effects.

Alternatives 2, 3, and 4 - Shaw (2001) conducted a historic field survey to document existing historic and cultural artifacts and to ascertain the effects the proposed actions would have on these resources. He recommended a "no adverse effect" determination regarding historic properties for the proposed use of the old roadway and for the exploratory drilling activities under all action alternatives. This recommendation was made with the following stipulation: "The agreement should contain provisions for activities of the undertaking to occur only on Clearings 1-3 of the 1985 developed area within Claim No.1, and restrict personnel to the developed footprint of the three clearings and their connecting roads." Since there are old wellheads near Clearing 3 at the east end of the development, "... lateral expansion should only be allowed in areas well away from these site features."

After Shaw had completed his survey work, Cassandra Energy Corporation proposed clearing a 2.5 -acre storage area on State of Alaska land near the Katalla airstrip. The proposal states that, "Some brush clearing may be required to remove recent growth from both the storage area and airstrip." Some of the area is already disturbed from the construction of the airstrip, but depending on the boundaries of the proposed area and the ground disturbance required to clear the brush, there could be potential effects to historic resources. An archaeologist will visit the site prior to any activity to determine whether there will be any effect, whether surveys are required, or whether any mitigation is necessary.

If an oil well blowout were to occur, historic artifacts in the area could be oiled. Efforts to remove oiled vegetation and soil could also disturb buried or other undocumented artifacts. The

current Oil Discharge Prevention and Contingency Plan states that the Alaska Office of History and Archaeology would be consulted to obtain permits for containment activities at or near historically sensitive areas. The Alaska Department of Environmental Conservation has requested that containment plans in the historic areas be specified and permits obtained prior to operations.

Alternative 2 - The proposed actions in Alternative 2 are mostly addressed above. Shaw (2001) did not directly address, however, the proposal for a staging site up to two acres along the west end of the old roadway. This area is about two miles west of the main drilling and refining activity area, and there are no known wells in the vicinity (Huber 2002). Shaw does cite a report by a USFS archaeologist, Charles Diter, who concluded that the establishment of the 1985 road would have no adverse effect on historic properties. Shaw also walked the roadway, and while he did not examine a site for a staging area, he did not report any artifacts in the west end area. Given the lack of documented activity in the area and Diter's conclusion that bulldozing a road in the area would have no adverse effect, there would be no effect if the road were widened to make a staging area. If artifacts are uncovered, work will stop until an archaeologist can be consulted.

Alternative 3 - Under this alternative a new temporary road would be constructed on the east bank of the Katalla River along with a staging area up to two acres. Shaw (2001) states, "If the New Road is actually constructed, no additional survey is recommended because it is in a low probability area for National Register sites." Thus, the road and staging area would not have adverse effects on historic artifacts. If artifacts are uncovered, work will stop until an archaeologist can be consulted.

Construction of the new temporary road would also require fill material, so a quarry on private land in the Claim #1 area or some other source of material would be needed. Although Shaw addressed the possibility of a new road, a possible quarry site was not mentioned. The old wells, bunkhouses, and other artifacts mentioned in the report are in the eastern and southern sections of the area. There is a hillside to the west that could be a possible site since it is away from documented well sites. A survey would be needed since this is an area with a greater probability of having historic artifacts. Disturbances to artifacts could be mitigated by requiring road fill material to be barged in from another site rather than developing a quarry.

Alternative 4 - As in Alternative 3, a road would be built along the east bank of the Katalla River, except that it would be only 550 feet long. As stated in the report by Shaw (2001), "... no additional survey is recommended because it is in a low probability area for National Register sites." This alternative would also require a staging area up to 2.0 acres at the same site as described in Alternative 2. Again, no artifacts have been found in this area, and clearing a site would be unlikely to affect historical resources. If artifacts are uncovered, work will stop until an archaeologist can be consulted.

Issue 2: Risk of natural hazards of earthquakes and storms with respect to spills of drilling materials, fuel, any produced water or oil. How will drilling fluids, cuttings or hazardous materials be disposed of?

Weather Related Hazards

Alternative 1 - No Action. There would be no effects.

Alternatives 2, 3 and 4 - During the public comments, some people expressed concern that the frequent storms could endanger ships associated with the operations, leading to the danger of shipwrecks and spills. The winter weather in the Gulf of Alaska is characterized by the passage of intense storms, which typically have low sea level barometric pressure and associated cold fronts. From October through April, an average of one storm every four to five days crosses the Gulf, generally from west to east. These storms often have 80-knot winds that generate waves up to 65 feet high and can drop up to 300 inches of precipitation annually in the coastal mountains.

The current operations only call for exploratory drilling, not production, so there will be no oil tankers or other vessels carrying large amounts of crude oil. There will be supply ships that will carry fuel to run the camp, some hazardous materials listed in the Plan of Operations (drilling mud additives, lubricants), and the fuel in the ship's fuel tanks. Although any spill could have adverse effects, the quantities of supplies involved for this project are relatively small (7,500 barrels of fuel total). Onsite storage is estimated at 20,000 to 30,000 gallons (476 to 714 42-gallon barrels), with 1,500 gallons (36 barrels) used daily when operating, so the barges would only be transporting as much as can be stored at any given time. Shipwrecks and the adverse effects are always possible, but the quantities of material being shipped reduce the overall danger from storms and shipwrecks.

There will be times when supply ships will not be able reach the Katalla area. A form of mitigation would be to not travel during severe weather, however, the decision to travel would be left to the captain of the ship who has the experience to judge the safety of the conditions.

Geohazards - Geohazards data were collected by the petroleum industry and the U.S. Geological Survey to study the safety of siting oil and gas exploration and production platforms and pipelines. Seafloor hazards include ground shaking from earthquakes, surface faults, gas-charged sediments, submarine slides, and sediment gravity flows. Detailed studies have been done by Chase et al. (1970), Woodward-Clyde Consultants (1976), Molnia and Sangrey (1979), Atwood et al. (1981), Carlson et al. (1985), Hood and Zimmerman (1986), and Schwab et al. (1987).

The collision of the Pacific plate and the North American plate produced the Chugach and Coast Mountain ranges onshore and the structurally complex sedimentary basins found off shore. The influence of the warm Alaska current and the progressive uplift of these coastal mountain ranges brought about coastal marine glaciation. Glacial and glaciofluvial processes eroded large quantities of rock and transported the sediment to the continental shelf. These rapidly deposited sediments are typically underconsolidated and exhibit high pore pressure. Off shore, earthquakes, crustal deformation, and intense winter storm activity have destabilized parts of the Holocene glacial marine and normal marine section, producing submarine slides. The area of proposed drilling would be unlikely to be affected by such an event.

Earthquakes - Earthquake hazards may be either direct by ground shaking, fault displacement, or tectonic warping, or indirect through ground failure or generation of tsunami waves. Recent tectonism in the Gulf of Alaska is indicated by mountain ranges, raised beach terraces, and numerous active faults. Raised beach terraces are visible in the Katalla River valley. Historic records of seismicity are used to estimate the location, size, and frequency of future earthquakes in a region. In the Gulf of Alaska, data are available for the past 100 to 200 years, which is a relatively short record.

Nishenko and Jacob (1990) subdivided the Queen Charlotte-Alaska-Aleutian seismic zone into subsections based on historical records; damage and intensities of seismic events; and the positions of great earthquakes. The Katalla project area is within one of the segments delineated by the Prince William Sound earthquake of 1964. Since this segment ruptured in a great event within the last 40 years, it has a low probability of rupture from a similar large earthquake within the next few decades (McCann et al., 1980). However, the occurrence of a large magnitude event does not rule out the likelihood of a lesser magnitude event. In contrast to the project area, the Yakataga “seismic gap” is an area having a high probability for a large earthquake within the next 20 years. The project area lies in the low probability area but is near the edge of it and therefore might be affected by a large event in the Yakataga “seismic gap”.

While the frequency of movement along faults in the Gulf of Alaska suggests that an earthquake could occur during the life of an offshore production platform, earthquakes are far less likely to occur during the shorter time period needed to drill an exploratory well at Katalla. No pipelines or large offshore structures will be constructed for this exploratory drilling operation, which minimizes the amount of hazardous materials that could be affected.

Tsunamis and Seiches - Tsunamis are waves produced by the sudden displacement of a large volume of water by the rapid upward or downward movement of the ocean floor during a strong earthquake. Seiches are large waves generated in closed or semiconfined bays from subaqueous slumps and landslides related to ground shaking during earthquakes. Both types of waves may cause extensive damage to near shore facilities. The proposed project area (camp, road, and drill pad) is more than a mile from the shoreline, is at an elevation of about 50 feet, and is partly protected by topography. It is unlikely to be affected by tsunamis. The bay at Katalla is neither enclosed nor deep enough to create hazardous seiches.

Toxic or Hazardous Materials - Given the possibility for natural hazards such as earthquakes or storms, human error, shipping or other transport mishaps, and equipment failure, there is no guarantee that there will be no spills or accidents involving hazardous materials. The effects will depend on the type and amount of material, location, circumstances and conditions, but also upon the contingency plans and other precautionary measures that have been taken. If toxic or hazardous materials associated with the operations are not properly contained or stored, they could contaminate the soil, groundwater, or surface water, and potentially harm aquatic and terrestrial organisms.

The Plan of Operations and permits from state and federal agencies will be used to ensure that hazardous materials are handled, transported, and stored safely. The plan states that hazardous materials will be stored in a lined, diked storage area and segregated to hazard type. The drilling

pad is required to have a liner to prevent contamination of the soil if any leaks occur (Kyle Monkeliën, petroleum engineer, USDI Bureau of Land Management, personal communication). Equipment refueling or maintenance will not be allowed adjacent to streams or other bodies of water (USDA Forest Service, 1996). Emergency spill plans and equipment will be a part of the requirements in the permits (USDA Forest Service, 1996). An Oil Discharge Prevention and Contingency Plan has been developed detailing the actions that will be taken in the event of a spill or blowout, the equipment that will be used, the blowout prevention equipment, three hypothetical scenarios, and other information relevant to preventing and containing spills. This plan is currently being reviewed by the Alaska Department of Environmental Conservation, which will ensure that the plan, including the equipment and safety measures, meets State standards and other regulations. State inspectors will be responsible for ensuring that the plans and regulations are being followed.

The Katalla area is seismically active and it is always possible that an earthquake could occur. Possible problems that could occur during an earthquake include the breaking of pipes at the drilling rig and breaking of containers holding hazardous materials. The drilling pad and hazardous storage area will have liners and dikes to contain spills or leaks if pipes or containers are broken.

The action alternatives are the same except that under Alternative 2, the off loading of the barges would occur upstream at the end of the old roadway, while under Alternative 3 the off loading site would be 0.5 mile downstream and would require trucking supplies another 0.5 mile.

Alternative 2 - The Katalla River is a bit more shallow and narrow farther upstream toward the upstream off-loading site, but there would be little additional danger in shipping the supplies to the upstream site. The Katalla River in this section has a sand/gravel substrate with no boulders or bedrock. If the barge did run aground in the more shallow water, the hull and fuel tanks would not be likely to rupture. The boats are designed so they can go dry at low tides (Dan Lowry DALO Marine, personal communication). If there was a spill at the off loading site, the material could contaminate the 1.5 miles of the Katalla River downstream from the site, and perhaps another one-quarter mile or so upstream, which is the extent of the tidal influence.

Alternative 3 - A spill at this off loading site would be more likely to affect pink salmon since it is immediately adjacent to the spawning area. Contaminants could spread throughout the tidal area if not contained. Since the new temporary road proposed in this alternative would cross two wetland meadows and a slough, truck accidents at these points could release contaminants into water, which could disperse the contamination more than if there were spills on dry ground.

Alternative 4 -The off-loading site under this alternative would be on a gravel bar. Thus, if there were a spill, it would probably not be directly into the water and the contaminant would not disperse as quickly. The contaminant could flow through the gravels and hit groundwater quickly, but the flows would be slower than in the river itself. An accident along the proposed 550 feet of road could contaminate wetland areas or the four ephemeral stream channels. If water is in these channels at the time of the accident, contaminants could spread to fish bearing areas if not contained in time. The flows, however, are minimal, so dispersal would be slower and easier to contain than in larger streams.

Disposal of Wastes

Under all action alternatives, an estimated 1,958 barrels of drilling cuttings will be generated. The cuttings will be stored in a hazardous waste storage area on the private land and then would either be ground up and reinjected at the drill site, incinerated for decontamination, or solidified. About 72 barrels of used oil or diesel-contaminated material are expected to be generated. Garbage and most wastes will be incinerated. Those wastes that cannot be incinerated will be stored and shipped to an appropriate disposal facility. No disposal of waste, cuttings, or contaminated materials will be allowed on National Forest system lands.

Issue 3: Effects on recreational users.

The effects of this project on recreation users stem from disturbances from truck and barge activity, noise, competition for fishing areas with drilling workers, and changes in the visual quality. These effects, or the anticipation of these effects, may also affect the business of those catering to the recreational users - the cabin owners/outfitter-guides.

Effects of Truck and Barge Activity

Alternative 1 - No Action. There would be no effects.

Alternatives 2, 3, and 4 - An ocean going barge would make approximately 20 to 25 round trips to off load equipment and supplies at a site on the west side of the Katalla River on State of Alaska land near the airstrip (see Appendix A, Map 2). Up to 2.5 acres of storage area may be required to temporarily store equipment and supplies until it can be hauled up the Katalla River by a shallow draft small barge. Brush clearing will be required to remove small diameter recent growth from the storage area. Occasional helicopter and/or small plane flights will provide for personnel access, and deliver equipment and supplies to an existing airstrip located on State of Alaska land near Katalla (see Appendix A, Map 2).

Drilling equipment, materials, supplies and personnel will be transported from the storage area by shallow draft barge upstream about 1.5 miles at high tide (12-foot or higher) and off loaded at an access ramp or road constructed on National Forest System lands. Under all action alternatives approximately 50 to 60 barge loads of equipment and supplies would be landed during the initial mobilization period. Barges would be in the river for a few hours around the high tides, but since not all days have sufficiently high tides, there would be no barge traffic on some days. The mobilization period is expected to take two months. This would require 50 to 100 truck trips to carry the material from the barge off loading area to the operations site. About two to three barges per week would bring supplies after that.

The proposed 2.5-acre storage area near the airstrip would bring truck traffic to within a few hundred yards of the cabins. The Recreation Opportunity Spectrum (ROS) for the East Delta as identified in the Revised Forest Plan is Primitive II. Upon initiation of activity associated with rights reserved under the 1982 CNI Settlement Agreement, the 521 Minerals Management Prescription applies to the project area (Revised Forest Plan Record of Decision, page 13;

Revised Forest Plan, Chapter 4, page 4-84). The ROS for the project area is Roded Natural (RN). The characteristics of a RN classification are:

- Access: Snowmachines, OHVs, developed trails, foot, bicycles, on designated routes only. Roads may be present. Roads maintained for high clearance vehicles only.
- Remoteness: Nearby sights and sounds of human activity may be present. Distant sounds may be heard.
- Social Encounters: Users should expect to encounter other groups.
- Visitor Impacts: Use noticeable but not degrading to resources. Rustic facilities may be constructed for users.
- Visual: Alterations away from travel corridors are few and subordinate to landscape.

Generally, noise from human activity will increase, visual evidence of activity will increase, and more people will be seen either working or recreating. The equipment storage area is relatively close to the private lodge and would be a visual intrusion into the area. When the barges are unloading, noise from trucks and equipment would be expected. The barges and trucks would also be visible from various sites. Moderate levels of human interaction may occur if groups of drilling workers come to fish at the river after work. These effects would last for the duration of the project. Upon completion of the project the area will gradually return to its previous “Very High Integrity”.

If these activities were to occur during the fishing and hunting seasons, there would be adverse effects for the guides and their clients. The clients come to the Katalla area because of the remote wilderness like quality¹⁵ (Kirk Ellis, Steve Ranney, Todd Rogers, personal communications). Activity that is more typical of an industrial setting would degrade the experience the clients are paying for. Kirk Ellis, a hunting guide, said that he would not use some of the areas where he normally hunts and would use more remote sites to avoid the people and the activity (personal communication). The main fishing area for the anglers, however, is the lower Katalla River, especially in the early part of the run before the fish move upstream. The anglers would be using the same areas where the barges and trucks are operating, so there would be direct exposure to the work activity.

After the original EA was written, ADF&G biologist Matt LaCroix has stated that barge traffic would not be permitted during the time pink salmon are spawning in the river. This is approximately from the beginning of August until mid-September. This coincides, for the most part, with the coho salmon fishing season, which runs for the months of August and September. Thus, truck and barge traffic would only affect the sportfishing for the last few weeks of September. Additionally, CEC has stated that if the Plan of Operations and permits are approved, the mobilization period when the most activity would take place could occur during the winter months of 2002 - 2003. This would mean that the barge activity in September would be at the reduced level of two to three barges per week. While this would cause some disturbance, it would be much less than previously anticipated.

¹⁵ The area is not within a designated Wilderness Area.

Alternative 2 - Under this alternative, barges would off load at a site near the end of the old roadway. Todd Rogers, lodge owner, said that the pool at that site is where the coho salmon congregate before migrating upstream and having barges anchored at that site would take away the best fishing spot for his clients. It is assumed that anglers paying for a remote Alaskan fishing experience would not enjoy fishing beneath a barge hauling oil derricks, drilling pipe, and other industrial equipment. This area would be unusable for the length of the unloading period, which could range from a few hours or up to a day, depending on the type of equipment being unloaded and whether they have to let the barge go dry and wait until the next tide cycle. Passing barges would also interrupt anglers fishing downstream since the river is relatively narrow (50-150 feet), and the fish would be holding in the deeper, narrow channel where the barge would be passing. The interruption would last for several minutes while the barges pass and another several minutes while the fish calm down from being disturbed. The sense of natural serenity and wilderness like quality that people seek in the outdoors would temporarily be lost.

As described above, only two to three barges per week are anticipated during the last two weeks of the coho season. Even if some of the barges have to stay an extra tide cycle, probably more than half the days will not have barge traffic.

If barges were in the river, it would be possible at that time of year for anglers to go farther upstream to fish. In the early part of the season, most of the coho salmon are in the lower river, but by the end of September many of the fish will have moved farther upstream. Anglers will have to travel farther than before (probably more than a mile) to escape disturbances from barges, but there will still be the opportunity for good fishing without interruptions.

Disturbance from truck traffic would be caused mainly by the noise, which, again, would detract from the sense of serenity and remoteness of the area. The noise would be restricted to the area near the unloading site, since the old roadway leads directly away from the river.

Alternative 3 - By off loading at a site 0.5 mile downstream, encounters between barges and anglers would be reduced in the upper section of the river, but there would be greater disturbance from the sound of trucks running parallel to the river. Trucks produce moderately loud noise, about 60 decibels (A-weighted, dBA) at 800 feet, (Aspen Environmental Group 1998) so anglers along the river would hear the trucks. Trucks would also be visible for the first 400 yards of the road until they enter a wooded area. At the lower site, barges would be able to use the river at lower tides, so truck traffic could be spread out over a greater number of days.

Barges off-loading at the downstream site would be able to travel upriver at an 11-foot tide and would have longer working periods. The work could then be spread over more days, lowering the intensity of traffic on some days. Being able to work longer may also reduce the need for barges to go dry and remain at the site until the next tide, which would reduce the visual impact. As stated in Alternative 2, however, there should be only two to three barges per week (and about two truckloads per barge) so the disturbance would not be constant or very frequent.

Having a road adjacent to the Katalla River could also increase competition for fishing areas between guided anglers and drilling site employees. For anglers coming from the drilling site,

the road would make more of the river easily accessible and expand the area these anglers would use. Encounters along the river between drill site employees and guided anglers would increase. Use of the road by vehicles and people on foot would detract from the solitude and wild character of the area.

Alternative 4 - Under this alternative the barges would unload on a gravel bar 550 feet downstream from the popular fishing pool described in alternative 2. Anglers walk along this gravel bar on their way upstream and could fish in the channel there, so there may be some displacement by the unloading activity. Unloading noises could be heard upstream at the pool. As described in Alternative 2, the number of barges should be reduced at this time, so the disturbances would be somewhat infrequent. Anglers could also travel farther upstream at this time of year to reduce the disturbances.

Noise

Alternative 1 - No Action. There would be no effects.

Alternatives 2, 3, and 4 - Noises from the drilling operations could reach the river and cabin area. The drilling site is approximately 2.5 miles from the river and cabins. The drill site is partially screened by tall trees, so some sounds could be muffled. Sound is affected by wind, which could reduce the noise levels or carry the sounds. Kirk Ellis, a cabin owner and guide in the area, said that noise from past drilling activity could be heard at the cabins when there was an east wind blowing.

The noise level of a conventional drilling rig is 55 dBA at 1,300 feet (US Department of Energy, 1993). Since sound levels decrease by 6 dBA when distance is doubled, the noise level at 2.5 miles would be about 35 dBA, which is about the level of a library or other quiet room (Minnesota Pollution Control Agency, 2002). Given the screening by the trees and some wind, noises may be audible, but not loud.

During the 1985 to 1986, drilling operations, there was a major increase in helicopter traffic and noise (Steve Ranney, personal communication). Noise from helicopters flying along the coast about one mile from the main fishing areas could be expected to be moderately loud - about 64 to 69 dBA for a Eurocopter A-star and 66 dBA for a Bell Jet 2-A - under calm wind conditions (USDA Forest Service, 1999). The cabins are about one-half mile from the coast and the noise would be expected to be 6 dBA higher there, although some sound would be muffled by the trees. Some of the disturbance will be mitigated by directing helicopter flights along the coast before turning inland to the drilling site, rather than flying directly over the cabins or fishing area. However, unless the helicopters make a long detour out to sea, the noise will still be loud.

Noises from barges are difficult to quantify because of the many different kinds of motors and the uncertainty as to whether the barges would be operating at full throttle in the river. It is assumed that the barges would be heard along the river, but it is uncertain whether they would be heard at the cabins. As mentioned earlier, truck noises along the river will be easily heard, but the two action alternatives would have somewhat different effects from truck noise at the cabins.

Again, wind and the screening effect of the trees around the cabins could help to muffle the sounds.

The truck noises at the proposed 2.5-acre equipment storage area near the airstrip would be much more audible, since the site would be within one-eighth to one-quarter mile of the cabins. The noise level would be about 54 to 60 dBA, which is in the range of normal conversation (Minnesota Pollution Control Agency, 2002).

Alternative 2 - If the barges were unloaded at the farthest upstream site, truck noises at the cabins one mile away would be about 42 dBA, which is in the quiet range, but still audible. Since the road leads directly away from the river and the cabins, the noise would diminish quickly.

Alternative 3 - The cabins are about one-half mile from the lower unloading site, so the potential noise level could be about 48 dBA, which is still not loud. The road would also lead away from the cabins, so the sounds would diminish quickly.

Alternative 4 - The landing site at the gravel bar is 550 feet closer to the cabins than in Alternative 2, so the effects would be similar. The proposed road also leads away from the cabins, so truck noises should diminish quickly.

Crowding of Hunting and Fishing Areas

Alternative 1 - No Action. There would be no effects.

Alternatives 2, 3, and 4 - One of the main concerns of the guides was that large numbers of drilling workers could be fishing and hunting in the areas that their clients use. Fishing clients may number from 14 to 20 in camp at any one time. In 1985 to 1986, when drilling was going on, 10 to 20 workers would fish at the river (Steve Ranney, personal communication). The number of hunters is not known, but generally the guided hunters are flown or boated to more remote areas in the valley to hunt. Since the workers would not have transportation, there wouldn't be as many conflicts with hunting.

Public comments on the original EA also expressed concern about drilling workers hunting bears and harming the local population. The harvest of bears increased in the 1980's when another drilling operation was going on. William Stevens, president of CEC, had discussed the issue with Dave Crowley, the area wildlife manager with ADF&G. Mr. Stevens (personal communication) wrote: "Since that conversation we have determined that no bear hunting will be allowed by employees, while staying at our camp and, as on any drill site, no unauthorized firearms will be allowed." Mr. Stevens also said that the only firearms that would be authorized would be for bear protection, with only designated people authorized to use them. With the restrictions on bear hunting and firearms, there should be little or no hunting by the drilling workers.

The effects on the fishing clients depend on a number of subjective factors and the clients' expectations. Some people who have experienced shoulder-to-shoulder fishing on the Kenai River may find it acceptable to have several people fishing a pool. Others who are expecting more pristine conditions may not wish to have anyone in sight. Since the clients are paying the

expense of flying into a remote area and staying at the lodges, their expectations for more pristine fishing conditions are probably fairly high. During the early part of the coho salmon run, when the fish have not yet moved up the river, there is about a mile of river to fish, but the fish would be concentrated in the pools. Twenty to 40 anglers would make the lower river area fairly crowded, and the experience would probably not please all of the clients. Later in the season anglers could spread up river, but they may have to go a long way to find solitude. Mitigation under all alternatives will include permitting motorized use along the road for work-related activity only, which would reduce the number of anglers traveling from the drilling site and would reduce the vehicular noise.

Mr. Stevens has proposed voluntarily limiting the number of drilling workers fishing on the river at any one time. This probably cannot be included as part of the permit requirements, since it would be beyond the authority of the federal government to regulate sportfishing normally regulated by the state or to restrict one individual's right to fish while permitting guided anglers to fish. Mr. Stevens has also said that freezer space would not be provided for workers' fishing activities, which would limit harvest.

Changes in Visual Quality

Alternative 1 - No Action. There would be no effects.

Alternatives 2, 3, and 4 - Under these alternatives, a 2.5-acre temporary storage area would be developed near the airstrip. This area could be screened from view by leaving a buffer of vegetation around the site, but the equipment stored there would still be visible to people arriving and departing by airplane, and people walking from the cabins to the lower river area.

Alternative 2 - Under this alternative one change would be the extension of the old roadway 25 feet to the river (the access ramp) where there would be the off-loading site for the barges. People fishing at that spot on the river would notice the cleared bank and the area could be seen from the air, but the change would be minimal. The only other change could be clearing up to 2.0 acres in the forested area for a staging site. The exact shape of the site has not been determined. If it were made as a long relatively narrow widening of the old roadway, then the change would not be as evident from the air as would a large square. Currently the old roadway is not readily apparent from the air because of the tall trees surrounding it. People on the ground would not see the clearing because it would be surrounded by trees.

If there is no activity after this project (no oil is found), the bank could be returned to its natural looking state by refilling the cut and revegetating the area. The cleared site would regenerate naturally, but the younger stand of trees would be evident for some time.

Alternative 3 - Under this alternative a 0.5 - mile road would be constructed along the east bank of the Katalla River. The first 400 yards would be visible to those people on the ground since the road would cross a flat grassy area. A two-acre staging site and anything on it would also be visible from the ground. The staging area, however, is not a storage area, so equipment there would be moved within a short time after it is unloaded. All of the road and staging area would be visible from the air. Since most people fly into the area, the road would be readily apparent.

This would affect the Scenic Integrity Objective to some degree. As in Alternative 2, a section of bank would be cleared for the landing site.

If the road were no longer used after this project, it would still be apparent for an indefinite period until the fill were removed to the level of the surrounding surfaces. After that the surfaces would revegetate quickly. In the section where the road would cut through the young Sitka spruce stand, the young trees would close the canopy over the open space as they grow.

Alternative 4 - Having the barges unload on a gravel bar, would make the operations more visible to those on the river. The road up the riverbank would also be visible. The 0.2-acre clearing on the bank should be screened from view by the vegetation buffer that would be left along the river. The road itself would be about 100 feet inland and would not be visible from the river. All of the development would be visible from the air. If the road were no longer used after this project, it would still be apparent for an indefinite period until the brush and logs placed under the rig matting were removed. After that the surfaces would revegetate quickly. In the section where the road would cut through the young Sitka spruce stand, the young trees would close the canopy over the open space as they grow.

Effects to Cabin Owner/Outfitter-Guide Business

Alternative 1 - No Action. There would be no effects.

Alternatives 2, 3 and 4 - Cabin owners/guides have expressed concern that the remote recreation experience they offer their clients would be degraded if project operations were to occur during the coho salmon fishing season and hunting season. If this were the case, the guides would probably lose some business (Kirk Ellis, Steve Ranney, personal communication). Mr. Ranney said that he would inform potential clients about the situation and that he wouldn't want to book clients if there will be a lot of barge activity or drilling workers competing for the fishing areas. Todd Rogers said that operations before August or after September would not hurt his business; but the unloading activity, presence of barges, and helicopter flights would be disruptive during the coho salmon season. The downstream unloading site proposed in Alternative 3 may be somewhat less disruptive to anglers, but overall, the combination of noise, traffic, and the loss of the ambience of a wild setting will diminish the recreational experience under the action alternatives. Mr. Ellis said that he would fly his hunting clients to more remote areas, but while they were in camp, the experience would be diminished.

As mentioned earlier, the ADF&G Habitat Division intends to prohibit barge traffic in the river when pink salmon are spawning. This will eliminate barge and truck disturbances for about six of the eight-week coho salmon fishing season. During the last two weeks, there are fewer clients, and the number of barges are expected to be only two to three per week. While this would not eliminate all of the disturbances to clients from barge and truck traffic, the effect will be smaller than originally anticipated. Some clients may feel that any barges or signs of development are not a part of the wilderness like experience, which could cost the guides some business. Increases in the number of people fishing, augmented by the drilling workers, could also deter clients. Hunting clients would be less affected by activity around the river if they are

flown to more remote areas for the actual hunts. The effect on hunting guides should be minimal except for the additional costs of flying clients that could have hunted near the Katalla camp.

The project could have some positive effects for the lodge and landowners. During the mobilization period before the camp at the drilling area is set up, workers will need accommodations. They could be lodged at the existing cabins, which would be a source of income for the owners in a season when they do not normally have clients. Government agency employees have already rented cabins while conducting surveys and other business. If full oil development were to occur, it is possible that the cabins could be used for lodging industry personnel or regulatory agency employees. The private lands could be leased for access, storage, or other purposes.

Economic Effects to Native Corporations, Local Economy

Alternative 1 - The economic effect of the No Action Alternative would include the loss of any possible gas and oil royalties CAC, its shareholders, and other Native Corporations could receive if payable quantities are found and further development is pursued. Since it is not known whether these quantities exist, no specific amounts can be calculated.

For the scope of the proposed activities, the No Action alternative would preclude the employment of up to 66 workers (two shifts of 66 workers) at peak times and 44 to 48 workers at other times. These would be full time positions for the duration of the project (William Stevens, president CEC, personal communication). Mr. Stevens said he hopes to hire at least 10% CAC shareholders, some of whom would presumably be “local” residents of Cordova, Tatitlek, and Chenega.

The No Action Alternative would also preclude whatever services and supplies the proposed activities would purchase locally. Mr. Stevens states that the local air services and some boats would be used to transport workers and equipment. Workers flying to and from Katalla would be expected to stay at Cordova hotels on occasion when crews are being switched and when flights are delayed, etc. Some supplies would be purchased in Cordova.

If payable quantities of oil and gas are found, additional jobs could be expected to be created in the local and regional economy. One commenter suggested that local businesses would become more efficient through economy of scale, reducing local prices for goods and services. This scenario is dependent on finding payable quantities of oil and gas. The No Action Alternative would not permit the exploration necessary to find out.

The possible positive benefits to land and lodge owners in the Katalla area described in the previous section would also be precluded by the No Action Alternative.

The No Action Alternative would preserve the present benefits the local (Cordova) economy derives from guided clients flying to and from the Katalla area, staying in local lodging establishments, making purchases of sports equipment and other items, renting cars etc. There are about 80 guided fisherman and unknown number of hunters per season, but it is not known how many stay in town before and after their trips. Presumably a certain number stay when

weather keeps them from flying to Katalla, but there is no data available. Approximately 14 seasonal jobs are created directly by the guiding services.

Alternatives 2, 3, and 4 - The action alternatives would do the opposite of the No Action Alternative. It would permit the proposed drilling activities that could provide the employment and other economic benefits previously described. As described in the section on the effects to the guiding businesses, the drilling activities could lead to the loss of some clients that would prefer a more pristine setting. We cannot estimate how many clients that would be or whether that would result in the loss of employment.

Issue 4: Consider the proposal in the context of the Roadless Area Conservation Rule.

The Roadless Area Conservation Rule of January 12, 2002, prohibits road construction and reconstruction activities (including temporary road construction) within inventoried roadless areas of the National Forest System. The Roadless Rule is enjoined from being implemented by a lawsuit filed in Idaho Federal District Court. The proposed action constitutes a prior existing reserved right (CNI Settlement Agreement 1982), and as such is unaffected by the proposed Roadless Rule. Recent interim direction by the Chief of the Forest Service has reserved authority for allowing activities within roadless areas to the Regional Forester when road access is needed for a reserved right, such as the CNI settlement agreement.

Alternative 1. No Action. There would be no effects.

Alternative 2 - The Bering Lake Roadless Area would be temporarily reduced by 742 acres (0.077%) over the life of the project. This is calculated on 2.5 miles of road with a 0.25-mile influence zone on either side of the road. The temporarily presence of heavy drilling equipment and approximately 66 people coming and going would reduce the natural integrity and opportunity for solitude along the road. The temporarily sounds of heavy trucks and drilling equipment would be noticeable along the road and in the vicinity of the private land where the drilling would take place.

Alternative 3 - The Bering Lake Roadless Area would be temporarily reduced by 1,045 acres (0.108%) over the life of the project. The temporarily presence of heavy drilling equipment and approximately 66 people coming and going would reduce the natural integrity and opportunity for solitude along the road. The temporarily sounds of heavy trucks and drilling equipment would be noticeable along the road and in the vicinity of the private land where the drilling would take place for the life of the project.

Alternative 4 - The Bering Lake Roadless Area would be temporarily reduced by 833 acres (0.092%) over the life of the project. The temporarily presence of heavy drilling equipment and up to 66 people coming and going would reduce the natural integrity and opportunity for solitude along the road. The temporarily sounds of heavy trucks and drilling equipment would be noticeable along the road and in the vicinity of the private land where the drilling would take place for the life of the project.

Issue 5: Monitoring: both of resources, e.g. water quality and oversight of operations.

Under all action alternatives the old roadway will be reopened, barges will travel over areas of pink salmon spawning habitat, and drilling workers would be expected to do some sportfishing on the Katalla River. The Forest Service will monitor these activities. Oversight of the drilling operations on private land will be conducted by the State of Alaska, since the state will be issuing permits for these activities and would be responsible for seeing that the terms of the permits are being met.

A Forest Service inspector will oversee the use and maintenance of the temporary road on National Forest land to make sure that it meets safety standards and to see that the bridges at the stream crossings are installed as proposed in the Plan of Operations. The plan states that there will be no need to use heavy equipment in the streams to install the bridges and that the streambanks will not be disturbed. This will protect fish habitat from sedimentation.

In this analysis it is assumed that pink salmon eggs in the gravel will not be disturbed by barges passing over them. A Forest Service biologist will monitor the effects of the propellers on the gravels to see if there is any disturbance. If there is any displacement of gravel and eggs, barges will need to travel at higher tides or carry less weight to increase the distance between the propeller and the gravel.

It would be expensive and logistically difficult to maintain a person on site at the Katalla River to conduct a creel census to determine the harvest of coho salmon. However, the Forest Service will ask for voluntary harvest reporting by the guided clients and the drilling workers. Occasional site trips will be made to corroborate the results. Visual escapement counts on the ground will be made if there are concerns about overharvesting.

Under Alternatives 2 and 4, a staging area up to 2.0 acres will need to be constructed along the old roadway. Forest Service personnel will conduct a sensitive plant survey prior to clearing to determine whether any sensitive species are present and whether the site would need to be moved. No sensitive plants have been found in nearby areas with similar habitats.

Under Alternative 3, a Forest Service inspector would oversee the construction of the new temporary road along the river and the detour around the eagle nest tree. Again, this person would ensure that the roads meet construction and safety standards. A staging area up to 2.0 acres will need to be located near the unloading area. Forest Service personnel will conduct a sensitive plant survey prior to clearing to determine whether any sensitive species are present and whether the site would need to be moved. No sensitive plants have been found in nearby areas with similar habitats. A sensitive plant survey would also be conducted for the detour road. Again, no sensitive species have been found in the nearby areas.

Cumulative Effects

Cumulative effects are the combined effects of past, present, and reasonably foreseeable future actions. As explained in the section on the existing conditions, the effects of past activities have been generally negated by the passage of time. The main existing effects are from the drilling activities on private land from 1985 to 1986: the 7.0 acres cleared for the operations site, the reserve pit, and the equipment that was left there. Forest Service employees had looked at the site when examining the old roadway in 1992 and noted that there were broken sacks of lime and concrete, but did not note any other spillage or contamination. Neither lime nor concrete are listed as hazardous materials. The current lodges and guiding services are not thought to be causing adverse effects. If oil and gas are found in production quantities during this exploratory drilling project, field development could follow which is outside the scope of this decision and would require additional approvals and review under the National Environmental Policy Act. Finding these quantities of oil is unlikely and would require an extensive separate analysis and approval of many components by many agencies (see Chapter 1, page 20 - 23 for information and additional approval and NEPA requirements for field development).

A possible future activity includes Chugach Alaska Corporation utilizing their easement and constructing the Carbon Mountain Road from the Copper River Highway to the Carbon Mountain area as shown on Map #1. Additional future activity includes an exercise of a road right-of-way from the Carbon Mountain area to the Point Martin and Strawberry Point on the coast as shown on Map #1. Chugach Alaska Corporation has a right of access from the private land to the coast as defined in Section 8A of the CNI 1982 Settlement Agreement. Although these actions are possible in the future, they are not considered reasonably foreseeable because CAC has not given any indication they intend to build these roads or applied for an easement to the Strawberry Point area. There would be no overlap of effects from these possible roads during the life of the proposed action.

The only presently foreseeable cumulative effect is the possibility of increased fishing pressure on the coho salmon population discussed below. The other effects of the proposed actions are all direct or indirect effects that have been disclosed in the previous effects sections.

Harvest of Fish by Fishing Guide Clients and Drilling Workers

Alternative 1 - No action. There would be no effects.

Alternatives 2, 3, and 4 - One concern is that an increased number of people in the area will lead to overharvesting of the coho salmon population. Under the existing conditions, there are about 80 clients per season staying at the cabins and fishing the Katalla River. There are no statistics available on the number of fish harvested by the clients. It is estimated that as many as 66 employees may be at the camp at various times, and presumably some will want to sportfish after work hours. One cabin owner/guide said that when the camp was in operation in 1985-1986, 10 to 20 workers would fish at the Katalla River and would generally keep their limits (Steve Ranney, personal communication).

The effect on the coho salmon population could be substantial if large numbers of anglers kept their limit of six fish a day regularly over the course of a season. It is possible that there would not be sufficient coho salmon spawning in the system to sustain production if the 80 guided

clients and 66 workers all kept a few limits (146 anglers x 2 limits (12 fish) = 1,752 fish harvested). This is a high estimate – obviously not all of the workers would care to fish or keep fish and not all of the clients keep fish - but this does indicate the need for monitoring of the harvest.

The actual number of coho salmon returning to the system is not known. The aerial survey index numbers have averaged around 4,600 from 1992 to 2001, but the last three years have been lower, averaging 2,900. The projected time line of the project could affect two fishing seasons (fall 2003, to the end of 2004), which would be half of the entire population, since coho salmon in this area generally have a four-year life cycle.

The ADF&G Sportfish and Commercial Divisions can make emergency closures or reduce limits if there is concern about overharvesting. However, it is difficult to monitor harvest in a remote area such as Katalla. The Forest Service will work with the employees, guides, and clients to persuade them to keep only as many as they can realistically eat and to practice catch and release. One guide says that he encourages his clients to practice catch and release, and they only keep them when there are lots of fish in the river (Todd Rogers, personal communication). Education on catch and release techniques and the reason behind it will help to protect the resource. Monitoring of the harvest will be conducted to establish whether a problem develops or not.

William Stevens, president of CEC, has proposed voluntarily limiting the number of drilling workers fishing on the river at any one time and has stated that he would not permit workers to use the freezers to store fish (which would disrupt camp operations). Workers could bring their catch to the camp cook for immediate consumption. These proposals should reduce the number of people fishing and the number of fish harvested.

Unavoidable Adverse Effects

Under all action alternatives the barging and unloading of supplies and storage of equipment will be visible and audible to those people using the area. If anglers are present, their fishing would be disrupted. Helicopter and small plane flights will also be needed, which will increase the noise levels. These activities would degrade the remote and wild experience that the anglers and hunters expect when they come to the Katalla area, and may affect the businesses of the cabin owners and outfitter/guides who are offering this experience during the hunting/fishing seasons during 2003 and 2004.

If the Plan of Operations and permits are approved in the near future, the main mobilization could be conducted in the winter of 2002 to 2003, which would reduce the effects on the other users in the area. However, an estimated two to three barges per week will still be needed to bring supplies as long as the operations continue, which could be until the end of 2004. Thus, some conflicts may arise in 2003 and 2004, although the effects would be lessened with the reduced number of barges.

Under all action alternatives there would be the loss of some habitat for wildlife, and in Alternative 3, a small section of slough that could provide coho salmon rearing habitat. The areas of the habitats involved are minimal, however, and would not harm the populations.

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