# APPENDIX N:

# Section 810 Analysis

- ANILCA Section 810 Analysis of Subsistence Impacts, March 19, 2018

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# APPENDIX N

# ANILCA SECTION 810 ANALYSIS OF SUBSISTENCE IMPACTS

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# 1. INTRODUCTION

The Donlin Gold Project Final Environmental Impact Statement (FEIS) analyzes a Donlin Gold, LLC (Donlin Gold) proposal to develop an open pit gold mine in southwest Alaska, 10 miles north of the village of Crooked Creek on the Kuskokwim River. The proposed Donlin Gold Project (Project) would build mining and ore processing facilities at the mine site, transportation facilities, and a 315-mile buried natural gas pipeline from Cook Inlet to the mine site to support electrical generation.

This analysis of subsistence impacts for the Donlin Gold Project is based on information included in the FEIS. The US Army Corps of Engineers is the lead agency for the FEIS, and the Bureau of Land Management (BLM) is a cooperating agency. Donlin Gold submitted applications to the BLM in July 2012 and January 2013 for a right-of-way (ROW) grant to construct, operate, maintain, and close a 97-mile portion of a 315-mile, 14-inch diameter, buried natural gas pipeline and associated buried fiber optic cable from the west side of Cook Inlet to the mine site in the Kuskokwim River watershed.

Section 810(a) of the Alaska National Interest Lands Conservation Act (ANILCA), 16 USC § 3120(a), requires that an evaluation of subsistence uses and needs should be completed for any Federal determination to "withdraw, reserve, lease, or otherwise permit the use, occupancy or disposition of public lands." As such, an evaluation of potential impacts to subsistence under ANILCA § 810(a) must be completed for this FEIS because the project requires a ROW grant from the BLM for the natural gas pipeline's proposed crossing of Federally managed lands.

The proposed 315-mile pipeline ROW would traverse approximately 97 miles of BLM land north and west of the Alaska Range in the Kuskokwim River valley, in discontinuous segments from about Milepost (MP) 168 to MP 310 of the proposed pipeline ROW. This represents about 30.8 percent of the total ROW length, with State of Alaska lands constituting about 65.5 percent, and ANCSA Corporation lands (Calista Corporation, The Kuskokwim Corporation [TKC], and Cook Inlet Region, Inc. [CIRI]) constituting 3.7 percent.

The pipeline is part of the energy supply infrastructure for the proposed open pit gold mine located approximately 10 miles north of the village of Crooked Creek. In addition to the pipeline and the mine site, the Project will include transportation infrastructure for barge transportation on the Kuskokwim River. This infrastructure will include an expansion of the existing port at Bethel and the development of a new port at Jungjuk Creek on the Kuskokwim River near the mine site. Ocean barges traveling to Bethel and river barges from Bethel to the mine's proposed port site would carry freight and diesel fuel up the Kuskokwim River through the Yukon Delta National Wildlife Refuge (YDNWR) for approximately 190 miles. The U. S. Fish and Wildlife Service (FWS) has designated authority for Federal fisheries management on the Kuskokwim River. The YDNWR Manager is the in-season manager for Federal subsistence fisheries on

Federally managed waters of the Kuskokwim River, pursuant to the delegation of authority from the Federal Subsistence Board.

There are six alternatives analyzed in this FEIS, which considers the impacts of the entire project including the mine site, transportation corridor, pipeline, and associated infrastructure. Two of the six alternatives analyzed in this FEIS involve variations of the pipeline component of the project. The Evaluation and Findings sections of this analysis contain summaries of each alternative. Detailed descriptions of the alternatives can be found in Chapter 2 of the FEIS.

Based on ANILCA § 810 and Alaska BLM Instructional Memorandum (IM) 2011-008, the BLM determined that the 810 Analysis will address the portion of the project requiring a BLM authorization (i.e., pipeline ROW), portions of the project which impact federally managed public lands and resources, and all aspects of the project that are dependent upon that authorization and the associated pipeline. This would include mine construction and operations, and road transportation aspects of the project because those project components would not go forward but for the pipeline, and the pipeline would not go forward but for those other components. This is consistent with National Environmental Policy Act (NEPA) requirements for evaluation of connected actions.

This analysis uses information presented in the FEIS to evaluate the potential impacts to subsistence pursuant to ANILCA § 810. Citations in this document are to studies which are also incorporated in the FEIS. Only information provided in the FEIS may be considered in this analysis of subsistence impacts. Additionally, the Army Corps of Engineers has not yet determined whether Alternative 2 is the Least Environmentally Damaging Practicable Alternative (LEDPA). The Corps determination will be considered by the BLM when making a final decision on whether to grant a ROW.

Chapter 1 of the FEIS describes the purpose and need for the proposed action, along with the regulatory and permitting authorities of the lead and cooperating agencies. Chapter 2 of the FEIS provides a detailed overview of the proposed action and six alternatives, including major components at the mine site, transportation infrastructure, and pipeline. Chapter 3 of the FEIS describes the affected environment, analysis area, and analyzes the potential direct and indirect environmental consequences of the proposed action and alternatives. Chapter 4 of the FEIS describes cumulative effects. This 810 analysis uses the information in the FEIS and presents the BLM findings of the effects of the proposed Donlin Gold Project to subsistence uses and resources.

### 1.1. Subsistence Evaluation Factors

Section 810(a) of ANILCA, 16 USC § 3120(a), requires that an evaluation of subsistence uses and needs should be completed for any Federal determination to "withdraw, reserve, lease, or otherwise permit the use, occupancy or disposition of public lands." As such, an evaluation of potential impacts to subsistence under ANILCA § 810(a) must be completed for the FEIS

because the project requires a BLM ROW grant for the natural gas pipeline's proposed crossing of Federally managed lands. ANILCA requires that this evaluation include findings on three specific issues:

1. The effect of use, occupancy, or disposition on subsistence uses and needs;
2. The availability of other lands for the purposes sought to be achieved; and,
3. Other alternatives that would reduce or eliminate the use, occupancy, or disposition of public lands needed for subsistence purposes (16 USC § 3120(a)).

The evaluation and findings required by ANILCA § 810 are set out for each of the six alternatives considered in the FEIS.

### 1.2. Determinations

Pursuant to ANILCA § 810, a finding that the proposed action may significantly restrict subsistence uses imposes additional requirements, including provisions for notices to the State of Alaska and appropriate regional and local subsistence committees, a hearing in the vicinity of the area involved, and the making of the following determinations, as required by ANILCA § 810(a)(3) prior to approving the proposed land use:

- Such a significant restriction of subsistence uses is necessary, consistent with sound management principles for the utilization of the public lands;
- The proposed activity will involve the minimal amount of public lands necessary to accomplish the purpose of the use, occupancy, or other disposition; and,
- Reasonable steps will be taken to minimize adverse effects upon subsistence uses and resources resulting from such actions.

If there is no positive finding (i.e. no significant restrictions to subsistence uses are expected to occur), then the determinations are not required.

To determine if a significant restriction of subsistence uses and needs may result from any one of the alternatives discussed in the FEIS, including their cumulative effects, the following factors in particular are considered in accordance with IM 2011-008:

- Abundance: The reduction in the availability of subsistence resources caused by a decline in the population or abundance of harvestable resources. This may include fish, wildlife, edible plants, house logs, firewood or drinking water, for example. Forces that might cause a reduction in abundance include adverse impacts on habitat, direct impacts on the resource, increased harvest, and increased competition from non-subsistence users.

- Availability: Reductions in the availability of resources used for subsistence purposes caused by alteration of their distribution, migration patterns, or location, and

- Access: Limitations on access to subsistence resources, including from increased competition for the resources, including physical and legal barriers.

This analysis begins with evaluations and findings for the No Action Alternative and for each of the six action alternatives discussed in Chapter 2, Section 2.3 of the FEIS. The cumulative case is evaluated in Chapter 4, Section 4.2 of the FEIS, and the affected environment and environmental consequences analysis is contained in Chapter 3 of the FEIS, including Section 3.2 for Soils, Section 3.6 for Groundwater Hydrology, Section 3.12 for Wildlife, Section 3.13 for Fish and Aquatic Resources, Section 3.19 for Environmental Justice, Section 3.21 for Subsistence, and Section 3.22 of the FEIS for Human Health. The information contained in the FEIS is the data used in this analysis.

## 1.3. Findings

The IM 2011-008 policy states that the Section 810 Evaluation shall conclude with a distinct finding that the proposed action and alternatives either may or will not significantly restrict subsistence uses for identified subsistence communities or groups.

A finding of "may significantly restrict" requires either 1) that the process be stopped for the action and the action prohibited; or 2) that the agency proceed to the notice and hearings step described below. A finding of "no significant restriction" concludes the Section 810 process.

A proposed action and/or alternatives would be considered to significantly restrict subsistence uses if, after consideration of any stipulations or protection measures included as a part of each alternative, that action or alternative can be expected to result in a substantial reduction in the opportunity to continue subsistence uses of renewable resources. Substantial reductions in the opportunity to continue subsistence uses generally are caused by large reductions in the abundance, or a major redistribution of resources; extensive interference with access; or, major increases in the use of those resources by non-subsistence users (IM 2011-008). A proposed action and/or alternatives may be found to "not create a significant restriction," but it may be appropriate for the analyst to identify and attempt to mitigate localized, individual restrictions created by an action.

The policy stated that the Findings shall be stated as either:

- This evaluation concludes that the action will not result in a significant reduction in subsistence uses; or

- This evaluation concludes that the action may result in a significant restriction to subsistence uses for the communities of _____ due to (specify causes).

The first Finding, above, is frequently referred to as a "Negative Finding" in that no significant restrictions are expected to occur. Likewise, the second Finding is commonly referred to as a "Positive Finding," in that significant restriction may be expected to occur.

In some cases, individual alternatives will fall below the "may significantly restrict" threshold, and only the cumulative case exceeds the threshold. Note that the cumulative effects analysis is not, in and of itself, a proposed action. Instead, the purpose of the cumulative effects analysis is to determine the effects of the proposed action and alternatives together with other past, present, and reasonably foreseeable future actions. In this way, a finding of "may significantly restrict" subsistence uses in the cumulative case is, in effect, a Positive Finding, even though the finding is only noted under the cumulative case. A Positive Finding in the cumulative case triggers the Notice, Hearing, and Determination requirements of ANILCA § 810(a).

### 1.4. Environmental Justice

In addition to ANILCA, Executive Order 12898 on Environmental Justice calls for an analysis of the effects of Federal actions on minority populations with regard to subsistence. Specifically, Environmental Justice is:

> The fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people, including a racial, ethnic, or socioeconomic group, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of Federal, state, local, and tribal programs and policies.

Section 4-4 of Executive Order 12898, regarding the subsistence consumption of fish and wildlife, requires Federal agencies to collect, maintain, and analyze information on the consumption patterns of populations who principally rely on fish and/or wildlife for subsistence, and to communicate to the public any risks associated with those consumption patterns. The BLM has reviewed the subsistence analysis for the proposed Donlin Gold Project and alternatives, located in Chapter 3, Section 3.21.6 (Environmental Consequences), and found it to comply with the requirements of the Environmental Justice Executive Order.

## 2. EVALUATION AND FINDINGS FOR ALTERNATIVES

The ANILCA § 810 evaluations and findings focus on potential impacts to the subsistence resources themselves, as well as access to resources, and economic and cultural issues that relate to subsistence use. The following evaluations are based on information relating to the environmental and subsistence consequences of the No Action Alternative, and Alternatives 2, 3A, 3B, 4, 5A and 6A, as outlined in the environmental analysis as presented in Chapter 3 and the cumulative case as presented in Chapter 4 of the FEIS.

Detailed descriptions of the Alternatives are in Chapter 2 of the FEIS. These descriptions include the proposed mine site, transportation facilities, and pipelines, during construction, while the mine is operational, and after mine closure. The analysis for each Alternative below includes a short summary of the Alternatives description otherwise described in detail in the FEIS.

## 2.1. Evaluation and Findings for Alternative 1 -- No Action Alternative

Alternative Summary: Alternative 1 of the Donlin Gold EIS is the No Action Alternative. Selection of this alternative would result in continued current management of BLM lands under the Southwest Management Framework Plan (1981) and the Ring of Fire Resource Management Plan (2008). Under the No Action Alternative, the mine site, transportation infrastructure, and natural gas pipeline would not be built and project-related impacts (both positive and negative) would not occur. The evaluations and findings presented here conclude that the impacts to subsistence as a result of this alternative would be nonexistent; however, jobs that are currently available for the Donlin Gold mine exploration activities would not continue and therefore income from those jobs would no longer be available to supplement subsistence activities.

(See Section 2.1.4 of this analysis for Findings of Alternative 1)

### *2.1.1. Alternative 1 -- Evaluation and the Effect of Use, Occupancy, or Disposition on Subsistence Uses and Needs*

Under the No Action Alternative, there would be no reduction in the abundance of harvestable resources used for subsistence purposes. There would be no adverse impacts on wildlife habitats, direct impacts on subsistence resources, or increased harvest and increased competition from non-subsistence users. There would be no reduction in the availability of subsistence resources caused by an alteration in their distribution, migration, or location. There would be no limitation on the access of subsistence users to harvestable resources, including physical and legal barriers.

The evaluations and findings presented here conclude that the impacts to subsistence as a result of this alternative would be nonexistent; however, jobs that are currently available for the Donlin Gold mine exploration activities would not continue and therefore income from those jobs would no longer be available to supplement subsistence activities.

### *2.1.2. Alternative 1 -- Evaluation of the Availability of Other Lands*

Under the No Action Alternative, the mine, transportation infrastructure, and natural gas pipeline would not be built. Therefore, there would be no need to evaluate other lands for the natural gas pipeline.

### *2.1.3. Alternative 1 -- Evaluation of Other Alternatives that Would Reduce or Eliminate the Use, Occupancy, or Disposition of Public Lands Needed for Subsistence Purposes*

Under the No Action Alternative, the mine, transportation infrastructure, and natural gas pipeline would not be built. Therefore, there would be no need to evaluate other ways to accommodate the proposed action.

### *2.1.4. Alternative 1 -- Summary of Findings*

The evaluations and findings presented here conclude that the No Action Alternative impacts to subsistence would be nonexistent; however, jobs that are currently available for the Donlin Gold mine exploration activities would not continue and therefore income from those jobs would no longer be available to supplement subsistence activities. The impacts to subsistence resources and access discussed above would be minimal, as the mine, transportation infrastructure, and natural gas pipeline would not be built. Project-related impacts (both positive and negative) would not occur under the No Action Alternative. This finding applies to the entire project area, involving the villages of Tuntutuliak, Napakiak, Napaskiak, Oscarville, Bethel, Kwethluk, Akiakchak, Akiak, Tuluksak, Kalskag, Upper and Lower Kalskag, Aniak, Chuathbaluk, Napaimute, Crooked Creek, Georgetown, Red Devil, Sleetmute, Stony River, McGrath, Nikolai, Tyonek, and Skwentna.

## 2.2. Evaluation and Findings for Alternative 2 -- Donlin Gold Proposed Action

Alternative Summary: Donlin Gold's Proposed Action would establish an open-pit, hard rock gold mine in southwestern Alaska, 10 miles north of the village of Crooked Creek, on land leased from the Calista Corporation. The Kuskokwim Corporation (TKC) has granted surface use rights to Donlin Gold. Donlin Gold also has legal control of approximately 13 acres in the Snow Gulch area per a lease agreement with Lyman Resources in Alaska, Inc. The proposed project would require 3 to 4 years to construct, followed by an active mine life of approximately 27 years. After the end of the Operations Phase, the mine site facilities, port facilities, and the pipeline would be closed and reclaimed as permit conditions require.

The three main project components include (detailed descriptions are included in Chapter 2 of the FEIS):

- Mine Site -- This component would include two open pits (that would merge into one), ore processing facilities, Waste Rock Facility (WRF), Tailings Storage Facility (TSF), water treatment plants, facilities to house the workforce, equipment to transport ore from the open pit to the processing plant, hydrologic control features (freshwater diversion dams, contact water dams, and a freshwater reservoir), and a power plant (Figure ES-2). The Mine Site would occupy a total area of approximately 14 square miles (9,000 acres). Figure 2.3-1 in the FEIS presents a general layout of the proposed Mine Site.

- Transportation Corridor – Alternative 2 would include shipping cargo from marine terminals in Seattle and Vancouver via ocean barges up the Kuskokwim River to a cargo terminal in Bethel. At Bethel, cargo would be transferred from ocean barges to river barges for towing up the Kuskokwim River to the upriver Angyaruaq (Jungjuk) Port site. Cargo would be transported by truck from the port to the Mine Site. This includes a 30-mile access road, a 5,000-foot dedicated airstrip, and up to an estimated 116 round trip river barges per season for the life of the mine. Additionally, improvements to the Bethel Yard Dock and are expected to be proposed for construction and operations by an independent party, and as such are not part of Donlin Gold's Proposed Action. Because those improvements are expected to occur only as the Donlin Gold Proposed Action moves forward, these improvements are being considered and evaluated as a connected action in the FEIS and this analysis of subsistence impacts pursuant to NEPA (40 CFR 1508.25). Connected Actions associated with the Bethel Yard Dock include the Bethel Cargo Terminal and Bethel Fuel Terminal and Tank Farm.

- Natural Gas Pipeline -- This component would include a 316-mile, 14-inch, buried steel natural gas pipeline to support power generation at the mine site, built from Cook Inlet to the mine site. Elements of the pipeline include the ROW corridor, fiber optic cable, above ground facilities, compressor station, and temporary work areas outside of ROW including winter access routes, borrow material sites, and airstrips.

(See Section 2.2.4 of this analysis for Findings of Alternative 2)

### *2.2.1. Alternative 2 -- Evaluation and the Effect of Use, Occupancy, or Disposition on Subsistence Uses and Needs*

Introduction: Section 3.21 of the FEIS details the direct and indirect effects of Alternative 2 on subsistence resource abundance and availability, access, competition, and socio-cultural effects (job, incomes, and shift work). The assessment of effects on subsistence practices from changes in resource abundance and availability draws on the analysis of biological effects provided in Section 3.12, Wildlife, and Section 3.13, Fish and Aquatic Resources of the FEIS. The analysis of impacts to access focuses on disturbance and displacement from traditional subsistence use areas based on spatial and seasonal overlaps between project activities and subsistence use areas for the affected communities. The analysis of restrictions due to competition examines the potential for the proposed project to introduce new users of fish and wildlife resources in the area of the proposed action.

#### *2.2.1.1. Mine Site*

Summary: The mine site's impacts on subsistence would be most pronounced for communities closest to the mine, including Georgetown and Crooked Creek, and on BLM lands north and east of Crooked Creek and north of the proposed Jungjuk Port site (Figure 3.15-1C, Generalized Land Status FEIS). The primary impacts to subsistence resources from general mine activities would

include fugitive dust, risks to migratory waterfowl, and the decrease of salmon production in the Crooked Creek watershed. More detailed evaluations of impacts to subsistence uses and resources from the mine site are described below.

#### 2.2.1.1.1. Fugitive Dust from Mine Activities

Federal lands adjacent to the mine would potentially be contaminated with dust emissions containing various particulate materials from ore processing and road maintenance. Existing soils and rock at the mine site naturally contain concentrations of mercury, arsenic and antimony (Section 3.2 FEIS, Table 3.2-4). Fugitive dust would be generated by processes such as drilling and blasting in the pit, waste rock and ore handling, road traffic, and wind erosion of exposed surfaces such as ore stockpiles and tailings beaches. Fugitive dust generated during Mine Site construction and operations could potentially result in elevated concentrations of metals in soils surrounding the Mine Site over time through dust deposition. The dust particulates would reflect the minerals in the source material. Soil quality could be affected by fugitive dust settling on soil, or gaseous mercury emissions that wash out of the atmosphere as wet or dry deposition. Gaseous mercury could be emitted from the mill facility, waste rock, and tailings pond water (Section 3.2.3.2.4 FEIS). Table 3.2-4 in the soils section of the FEIS estimates arsenic levels in soils from fugitive dust after mine closure could exceed Alaska Department of Environmental Conservation cleanup levels. Figure 3.2-10 of the FEIS shows the estimated fugitive dust deposition that would extend onto BLM lands south and east of the mine site.

The effects of fugitive dust on wildlife are described in Section 3.12.2.5.2 of the FEIS. The FEIS states that wildlife could be exposed to metals in dust during the construction and operations phases. Exposure could be through direct inhalation of dust or incidental ingestion of soil or food items. During the closure phase, wildlife may be affected by the presence of deposited mine site fugitive dust emissions in the soil.

Metals released from the soil due to the project's ground disturbing activities may affect wildlife. Table 3.12-4 in the FEIS shows that existing soil at the mine site contains concentrations of arsenic and mercury exceeding their respective Lowest Observed Effect Concentrations (LOECs) for protection of terrestrial plants, soil invertebrates, birds and mammals (LANL 2015), and that estimated soil concentrations of antimony, arsenic and mercury will increase by mine closure from fugitive dust. Arsenic and mercury levels at mine closure would exceed LOECs at mine closure (Table 3.12-4 FEIS).

The FEIS concludes that ground disturbing activities at the mine site would increase the risk of contaminated airborne dust inhalation and the spread of dust to soil, water, and vegetation in the area, which in turn could slow growth or cause changes in plant communities in the area (Section 3.12.2.5.2 & Section 3.10.3.2.3 FEIS).

The FEIS further concludes that the potential impacts from fugitive dust from the mine and associated roads could affect the abundance and availability of fish and wildlife, and slow

growth patterns or change overall plant communities for subsistence resources on BLM lands near the villages of Crooked Creek and Georgetown during mining construction and operations for approximately 30 years (Figure 3.2-10 FEIS). This impact would be the result of dust with exposed metals produced at the Mine Site (consisting mostly of waste rock with a small amount of ore) which has the potential of getting into soils and plants which may then be consumed by fish and wildlife. Estimated annual average concentrations of mercury due to the Project stack and fugitive dust sources near Crooked Creek and Georgetown are shown in Figure 3.8-5 and Figure 3.8-6 of the FEIS.

Based on the subsistence use data and maps for Crooked Creek and central Kuskokwim subregion communities areas (Figure 3.21-16 and Figure 3.21-63 FEIS) it does not appear that the BLM lands in proximity to the mine site are utilized for subsistence search and harvest areas. As such, fugitive dust would not result in significant impacts to subsistence uses on Federally managed public lands and resources.

#### 2.2.1.1.2. Impacts to Migrating Waterfowl

Per the FEIS, migratory birds may be at risk of injury or mortality from the tailings storage facility and contact water dam during operations during spring migration and from landing on the open water of the pit lake after mine closure. Migrating birds, particularly waterfowl and shorebirds, could be attracted to water associated with the mine, especially when surrounding wetlands are frozen. Migrating water birds may be at risk from ingestion of toxic water, food or sediments at the water storage features of the mine. Waterfowl (ducks, geese, and swans) and their eggs are important traditional subsistence species harvested in both spring and fall in upper Kuskokwim River communities (Section 3.21 FEIS).

Potential impacts from the pit lake to migrating waterfowl may affect birds migrating to breeding areas on Federal lands within the Yukon-Delta National Wildlife Refuge and BLM lands in the Innoko bottoms (Spragens 2016), both of which are an important subsistence resource for villages along the Kuskokwim River and villages in the Innoko bottoms area (Section 3.21 FEIS).

During the scoping meetings for the Donlin Gold Project Draft EIS, some parties expressed concern regarding the potential for migratory waterfowl to absorb contaminants from the Donlin Gold Project water containment facilities, including the contact water dam ponds, the tailings storage facility, and the pit lake. The potential impact of contamination of waterfowl from mine site water containment facilities is discussed and analyzed in Section 3.12, Wildlife. A summary of the Ecological Risk Assessment (ERA) is presented in the FEIS in Section 3.21, Subsistence. The ERA was prepared to analyze potential risk of wildlife exposure to toxic compounds and metals in the pit lake, but did not specifically focus on waterfowl.

Concern was also expressed during scoping meetings that the new areas of standing water associated with mine site facilities may attract waterfowl, or that waterfowl may be attracted to

areas of open water during migration. The ERA analysis, as well as the analysis potential impacts of contaminants on wildlife in Section 3.13, Wildlife, included a number of assumptions inherent in the risk assessment, including:

- Use of whole rock concentration data from boreholes to estimate future sediment concentrations;
- Overestimates of receptor exposure durations (assuming full year exposure, although some species migrate during winter months and the pit lake is expected to be frozen for up to seven months per year);
- Poor wildlife and bird habitat being the only habitat available adjacent to the pit lake and other water containment facilities, offering limited or no food sources, and unfavorable conditions for bathing or wading;
- Adjacency of other suitable, more productive natural water bodies in the vicinity of the pit lake;
- Low likelihood of large-scale flocks being attracted to these waters, as waterfowl populations do not typically fly over the mine site (incidences of attraction are associated with unpredictable, unusual, or anomalous weather or migration patterns);
- Conservative assumptions regarding dietary fractions of pit lake items; and,
- Assumption of 100 percent bioavailability of ingested sediments and food.

If a permit is issued, the Preferred Alternative in the FEIS will include the appropriate Best Management Practices (BMPs) that the project proponent would be required to follow. These BPMs include requirements for an avian protection and a wildlife protection plan during Construction and Operations for the project. Further wildlife protection mitigation measures were considered to prevent wildlife access to the mine site water containment facilities (see FEIS Chapter 5, Impact Avoidance, Minimization, and Mitigation). If permitted, Donlin Gold would undertake adaptive management actions should pit lake water quality fail to meet standards during monitoring. The project design incorporates many levels of regulating water quality to address potential issues (Chapter 2 FEIS).

Due to BMPs, mitigation measures and adaptive management actions described above, impacts to waterfowl would not result in significant impacts to subsistence uses.

#### 2.2.1.1.3. Impacts to Salmon from Reduced Flow in Crooked Creek

Pit dewatering during development and operation of the mine would reduce water flow in the lower reaches of perennial streams in the vicinity of the mine pit as compared to pre-mining conditions. This is due to reduction of groundwater discharge to streams, induced leakage from streams to the pit dewatering system, and the re-routing of water from American and Anaconda

Creeks for use in mining operations (Section 3.6 FEIS). Stream losses to groundwater are expected to occur mostly along a 2- to-3 mile stretch of Crooked Creek and its tributaries in closest proximity to the pit. The greatest reduction in streamflow due to losses to groundwater would be during winter months (December through March) because streamflow is naturally lower during those months and because under natural conditions during those months, most streamflow is the result of groundwater discharge to the creeks. In addition, the water treatment plant that would return water to Crooked Creek during summer months would not normally operate during the winter (Section 3.6 FEIS).

During mine development, the waste rock facility and construction of the open mining pits would substantially reduce flow in American Creek. Under low flow conditions, Crooked Creek streamflow at the confluence of American Creek is expected to be reduced by approximately one-third (28 percent through 33 percent) from December to March during year 20 of mine development, when the greatest groundwater impacts to streamflow from development would be anticipated. During average flow conditions, for comparison, it is expected flow reductions would range from 19 to 23 percent during those months. Annual average streamflow reduction is expected to be 17 percent under average flow conditions and 22 percent under low flow conditions (Section 3.6 FEIS).

Streamflow reductions were also evaluated considering a scenario with high hydraulic conductivity (high K) values in the groundwater flow model. Under this scenario at the confluence of American Creek, 46 to 67 percent of wintertime flow in Crooked Creek is expected to be lost under normal (50 percentile) flow conditions; while 69 to 100 percent of the wintertime streamflow is expected to be lost under low-flow conditions at Year 20. Average annual streamflow reduction of Crooked Creek at American Creek under the high hydraulic conductivity scenarios is expected to be 31 percent under average conditions and 46 percent under low flow conditions (Section 3.6 FEIS).

Under these predicted scenarios of reduced wintertime flow rates, Crooked Creek water levels may be too low for spawning salmon, and egg survival in spawning gravels may be limited or eliminated completely by low water and freezing conditions (Section 3.13.3.2.1 FEIS). These conditions would continue during mining (30 years) and after mine closure as the pit lake fills (50 years) and as pit water is pumped and treated in perpetuity to prevent ground water and surface water contamination. Salmon may be nearly or completely extirpated from Crooked Creek by hydrological changes from mine development, operation, and closure.

Potential impacts to salmon in Crooked Creek would affect the abundance and availability of fish for subsistence in the Kuskokwim River within the Yukon Delta National Wildlife Refuge. However, based upon the size of the Crooked Creek drainage, chinook, coho, chum, pink, and sockeye salmon production that would be lost to mine activity is believed to be relatively small compared to the total Kuskokwim drainage's salmon production (Section 3.13.2.3.2 FEIS). Remaining salmon resources in the Kuskokwim River drainage would be relied upon to address

any lost subsistence opportunities caused by reductions in Crooked Creek's productivity. Therefore, these impacts would not result in a significant restriction to subsistence uses.

#### *2.2.1.2. Transportation Infrastructure*

Summary: Transportation activities (barging of cargo and fuel) and infrastructure (the construction of a port at Angyaruaq (Jungjuk) on the Kuskokwim River) would impact the abundance and distribution of fish resources on the Kuskokwim River and interfere with subsistence access to the river, as described below. Barging will affect all villages on the river from Crooked Creek to the mouth of the Kuskokwim River. These villages include Bethel, Napaiak, Napaskiak, Oscarville, Kwethluk, Akiakchak, Akiak, Tuluksak, Upper and Lower Kalskag, Aniak, Chuathbaluk, Napaimute, and Crooked Creek. Impacts from barging include displacement of subsistence fishing activities by barges and tugs, disruption or reduced access to subsistence fishing activities and sites (set nets, fish wheels, processing rafts, etc.) along the river. Subsistence fish resources (salmon and resident fish species populations) may also be negatively affected by the magnitude and intensity of barge traffic proposed in Alternative 2. Effects to fish may increase when river water levels are low, as barge rafts will need to be uncoupled and barges towed individually or in pairs, or lighter barge loads per trip would be required to navigate to the Jungjuk port. This would require additional barge round trips on the river, and increase impacts to subsistence fishers on the Kuskokwim River and to subsistence fish resources.

##### 2.2.1.2.1. Barging Impacts to Fish and Birds

The potential impacts of industrial barge traffic on the Kuskokwim River to fish from displacement and stranding, propeller wash, bed scour and fish injury and mortality are described in Section 3.13, Fish and Aquatic Resources, of the FEIS.

The Kuskokwim River shipping season of 110 days is assumed to occur from June 1st to October 1st, allowing for two weeks of downtime to allow for occasional low flows. Between Bethel and Angyaruaq (Jungjuk) Port, available draft on the river is limited by the depth of water in the shallower sections of the river (Section 2.3.2.2.1 of the FEIS). Based on interviews with Kuskokwim River barge operators, currently there are approximately 68 round trip freight and fuel barge tows per year serving the villages upriver of Bethel (Section 3.23.1.3 of the FEIS). Alternative 2 proposes 89 additional round trip river barges per year during project construction and 116 round trip river barges per year during mine operations (Section 2.3.2.2.1 of the FEIS) which would result in almost a 200% increase in barge traffic along the Kuskokwim River.

The trips would likely impact spawning adult fish, eggs in spawning redds, and juvenile fish by disturbing, or causing their direct injury or mortality, potential displacement or stranding, and from river bed scour and siltation. The proposed increase in barging activity would potentially impact salmon, broad and humpback whitefish, sheefish, and rainbow smelt, all subsistence species important to villages on the Kuskokwim River (Section 3.13 of the FEIS).

Impacts to fish from river barges have been documented on other river systems and are discussed in Section 3.13, Fish and Aquatic Resources, of the FEIS. Propellers of tugs used to push river barges produce hydraulic forces that thrust through the water column and to the river bottom, causing displacement and mortality of adult fish, eggs, larvae and other aquatic life (Gutreuter et al. 2003, Killgore et al. 2005, Holland 1986). Fish displacement and stranding by passing barges have been documented on large river systems in Europe (Kucera-Hirzinger et al. 2009) and on the Columbia River in the U. S. (Pearson et al. 2006, Ackerman 2002).

Subsistence users on the Kuskokwim River harvest five species of Pacific salmon using drift gillnetting, set gillnetting, fish wheels, and hook and line methods of harvest (Section 3.21.5.5 FEIS). Season openings for salmon fishing (i.e. the time period that a specific type of fishing, such as subsistence, commercial or recreational fishing activities may occur) are limited, especially for Chinook salmon, due to low escapement numbers and conservation concerns. Barge traffic may disrupt the movement and distribution of migrating salmon and access to the river by subsistence fishers, and interfere with subsistence users' fish wheels, set nets, and drift nets. Barge traffic may displace or swamp smaller fishing boats, dislodge or break fish wheels, or cause nets to detach from their anchors and float away. These disturbances could cause subsistence users to miss the salmon season open dates or reduce their harvests because nets would be disturbed or have to be removed often as barges pass up and down the river during season open dates.

Spring waterfowl hunting takes place on the Kuskokwim River by subsistence users when the river breaks up, particularly for scoters. Barge traffic may disturb and disperse migrating birds and reduce access by subsistence users hunting on the river from boats.

In summary, potential impacts from the increase in barging on the Kuskokwim River may cause extensive interference with access to the river for subsistence users along the river due to the increase in barging traffic during the short subsistence season open dates for fisheries. The barging impacts may also cause large reductions in the abundance and availability of fish resources important to subsistence users on the Kuskokwim River within the Yukon Delta National Wildlife Refuge. Therefore, this evaluation concludes that Alternative 2 may result in a significant restriction to subsistence uses for the communities of Bethel, Tuntutuliak Napakiak, Napaskiak, Oscarville, Kwethluk, Akiachak, Akiak, Tuluksak, Upper and Lower Kalskag, Aniak, Chuathbaluk, Napaimute, and Crooked Creek due to a substantial reduction in the opportunity to continue uses of subsistence resources on the Kuskokwim River. Barging on the Kuskokwim River during construction and operation of the mine may cause extensive interference with access to the Kuskokwim River by subsistence users from villages along the river. It may cause a major redistribution of salmon, rainbow smelt, and whitefish, which are important subsistence resources for those villages.

### *2.2.1.3. Natural Gas Pipeline*

Summary: The effects to subsistence from construction and operation of the natural gas pipeline would affect the Cook Inlet villages of Tyonek, and Skwentna and the upper Kuskokwim villages of Nikolai, McGrath, and Takotna. The pipeline ROW intersects with the subsistence search and harvest areas of these villages, as shown in Section 3.21 of the FEIS. It may also affect the distribution and abundance of upland birds, moose, caribou and black bear sought by subsistence users in these villages. The increased access along the pipeline ROW may cause a major increase in use of these resources by non-subsistence users.

During construction, the effects of clearing the ROW, including trenching, drilling and the presence of machinery, pipeline transport, workers, and infrastructure on and along the pipeline ROW, would cause a redistribution of moose, caribou, black bear, and furbearers. It would negatively affect access to subsistence use areas and availability of subsistence resources. The effects would be temporary (3-4 years) and would not result in a significant restriction to these subsistence resources. However, during mine operations (27 years) the cleared ROW corridor would allow for increased access to subsistence resources by non-local residents using aircraft into the Farewell Airstrip. This could cause a major increase in competition for those subsistence resources along and adjacent to the pipeline ROW by non-subsistence users. Villages that may be adversely affected by increased access to and competition in the area include McGrath, Nikolai, and Takotna.

#### 2.2.1.3.1. Impacts from Increased Access along the Gas Pipeline Right-of-Way

Under Alternative 2, the 315-mile long pipeline ROW crosses approximately 97 miles of BLM land north and west of the Alaska Range in the Kuskokwim River valley, in discontinuous segments of the proposed pipeline ROW from about Milepost (MP) 168 to MP 310. This represents about 30.8 percent of the total ROW length, with State of Alaska lands constituting about 65.5 percent, and ANCSA corporation lands (Calista Corporation, The Kuskokwim Corporation [TKC], and Cook Inlet Region, Inc. [CIRI]) constituting 3.7 percent.

During construction, 14,100 acres of wildlife habitat would be cleared along the entire length of the pipeline, with approximately 4,329 acres cleared on BLM lands. Construction activities and noise would affect the availability of subsistence resources beyond the pipeline corridor during the estimated 3 to 4 year construction period (Section 3.21.6.3.3 FEIS). Access through the active construction area would be limited during construction activities. During mine operations (estimated 27 years), the buried pipeline ROW would not be fenced and would be brushed every 10 years to provide for visual monitoring (Chapter 2 FEIS).

The pipeline corridor may affect subsistence activities and may increase access to Federal lands by non-subsistence users such as sport hunters and fishers, and recreational users such as snow machine riders taking advantage of a newly established corridor into an undeveloped portion of rural Alaska. The newly cleared ROW corridor access may provide increased access north and

west of the Alaska Range for fly-in sport hunters and trappers who are currently utilizing the Farewell Airstrip and may therefore affect the abundance and availability of moose, caribou black bear and furbearers, which are important subsistence resource for the villages of McGrath, Takotna and Nikolai (Figure 3.21-69 FEIS).

Increased activity and access from the Farewell Airstrip and along the nearby gas pipeline right-of way may cause major increases in the disturbance and use of moose, caribou, black bear and furbearer subsistence resources by recreational sport hunters and commercial outfitters. These are important subsistence resources for the villages of McGrath, Takotna, and Nikolai. This evaluation concludes that Alternative 2 may result in a significant restriction to subsistence use for the communities of McGrath, Takotna and Nikolai due to a substantial increase in competition for subsistence resources along the natural gas pipeline at the Farewell Airstrip.

#### 2.2.1.3.2. Impacts to Sheefish & White Fish Spawning Areas

Sheefish are an important subsistence fish on the Kuskokwim River, and are harvested in the lower river (Fall et al. 2007) and upper river (Krauthoefer et al. 2007, Brown et al. 2012) in spring. Sheefish provide a source of fresh fish prior to salmon runs. Residents of Telida also harvest sheefish in August and September at the mouth of Highpower Creek, within the Kuskokwim River watershed (Williams et al. 2005). Sheefish spawn in very few locations in the Kuskokwim River watershed. Sheefish have been described in only four areas, including the Big River, the Middle Fork Kuskokwim River, at the confluence of East Fork and the Tonzana River, and lower Highpower Creek (Stuby 2012). Sheefish are migratory and make long movements related to feeding, spawning and overwintering. They generally spawn in the upper portions of the Kuskokwim watershed in the fall and overwinter in the lower river (Stuby 2012).

Broad whitefish and humpback whitefish are also important to the regional subsistence economy of the Kuskokwim River watershed. These fish make up greater than half of the non-salmon fish harvest (Coffing 1991, Krauthoefer et al. 2007). Broad and humpback whitefish spawn in a limited number of locations in the Kuskokwim watershed. Both species migrate upstream to spawn in October and move downstream to overwinter in the lower river and exhibit fidelity to feeding and spawning areas (Harper et al. 2012). Spawning areas for both species are in the middle reaches of the Big River (Harper et al. 2012).

Under Alternative 2, the ROW for the proposed Donlin gas pipeline crosses the upper reaches of the Big River and Middle Fork Kuskokwim River, about 30 miles upstream of where sheefish, broad whitefish, and humpback whitefish spawn. Open-cut crossings of these tributaries are proposed in winter (Chapter 2 FEIS). Open-cut crossings involve excavation of the trench across the river using excavators operated from the riverbank and within the stream channel to dig the trench to lay the pipe. Potential impacts to anadromous and resident fish would involve sediment loads generated from trenching operations moving downriver, adversely affecting sheefish, humpback whitefish, and broad whitefish eggs incubating in gravels on spawning grounds (Section 3.13.3.2.3 FEIS). It would potentially impact known spawning areas on the Big River

and Middle Fork Kuskokwim River, which are classified as Essential Fish Habitat under the Magnuson-Stevens Act. Impacts to these spawning areas would have consequences for the entire Kuskokwim watershed, as spawning areas for these whitefish species are limited and produce fish that travel throughout the watershed and are an important subsistence resource.

Potential impacts from the natural gas pipeline ROW may affect the abundance and availability of sheefish and whitefish on the Big River and Middle Fork of the Kuskokwim River on nearby BLM lands. These fish are an important subsistence resource for the villages of McGrath, Takotna and Nikolai, as well villages on the Kuskokwim River within the Yukon Delta National Wildlife Refuge. However, with the incorporation of BMPs per the FEIS and due to the short duration of trenching activities, these impacts are not expected to result in a significant restriction to subsistence resources.

#### *2.2.1.4. Subsistence and Economic Development*

The socioeconomic benefits and impacts of the project are described in Section 3.18 of the FEIS. The proposed mine under Alternative 2 would provide income from employment during both construction and operations of the mine. This would allow employed subsistence users to better afford fuel and equipment necessary for subsistence activities. Project employment and incomes would benefit 25 to 29 percent of area households during the estimated 3 to 4 year construction period and 5 to 9 percent of households during the estimated 27 year operation period (Section 3.21 FEIS). Higher mean income levels are associated with lower subsistence productivity at the community level (Wolfe and Walker 1987), suggesting households with jobs and incomes participate less in subsistence activities, and that subsistence productivity may increase with lower median income at the community level. Outmigration and adverse effects of rotation work shifts may also affect up to half of households with project employment, with greater impacts in the smaller communities with more concentrated project employment (Section 3.21 FEIS).

#### *2.2.1.5. Spill Scenarios*

Summary: Under Alternative 2, spills of hazardous materials necessary for the mining operation such as fuel and cyanide would have the potential to impact subsistence species and subsistence harvest patterns, depending on the amount and location of the spill. Section 3.24, Spill Risk, in the FEIS identifies hazardous materials, describes existing response capacities, and reviews probabilities of spills of various sizes. The fate and behavior of spilled materials is outlined, followed by a set of nine specific spill scenarios to be analyzed in detail. For this Section 810 analysis, nine spill scenarios used in the FEIS are outlined with an analysis of potential impacts to subsistence resources and uses. Spill scenarios are considered to have a low probability of occurring; however, such scenarios would have a high consequence to subsistence resources if they occurred.

Under Alternative 2 the following spills scenarios and impacts are identified:

### Scenario 1: Ocean Barge Rupture at Sea

In this scenario, approximately 735,000 gallons of diesel would be released from a grounding south of the Kuskokwim River mouth. Of this volume, approximately half of the spilled gallons (367,500) would reach the shore. This spill could have the potential to affect hundreds of miles of shoreline and could affect near shore subsistence activities. This spill scenario would impact subsistence resources and use on Federal lands within the Yukon Delta National Wildlife Refuge. The magnitude and duration of the impact would depend on the location and volume of the spill, season of the year, and clean up and emergency response time. Indirect effects of the spill would include contamination of marine and coastal subsistence resources and would be more impacting if the spill occurred during salmon runs. The effect of this spill scenario would have major impacts to fish subsistence resources on the Kuskokwim River.

### Scenario 2: River Barge Release

The spill scenario indicates that up to 37,817 gallons would be released from a breach of the double hull and two compartments in the fuel barge. Timely response and clean up might recover half of this amount (approximately 18,908 gallons). The spill impact would affect fish and water birds in the Kuskokwim River, including Chinook salmon and migratory birds. The effect of this spill scenario would have major impacts to subsistence resources on the Kuskokwim River.

### Scenario 3: Tank Farm Release

Storage of diesel fuel would occur in tank farms located in Dutch Harbor, Bethel, Angyaruaq (Jungjuk) Port, and at the mine site. Secondary containment structures are generally engineered to hold 110 percent of the volume of the largest tank. The spill scenario for this material estimates that the entire tank contents are released but contained within the secondary containment structure. The effect of this spill to subsistence resources would depend on the location and volume of the spill, season of the year, the length of time the spill was in secondary containment and clean up and emergency response time.

### Scenario 4: Tanker Truck Release

Tanker truck spills would occur at the Jungjuk Port during transfer operations from barges to port storage tanks, from storage tanks to tanker trucks, or on the port road to the mine. The spill scenario is for loss of up to 13,500 gallons, with recovery dependent on whether tundra or water bodies are affected. The effect of this spill to subsistence resources would depend on the proximity to wetlands and waterways, season of the year, and clean up and emergency response time; but the effects could be major if it contaminates wetlands or reaches the Kuskokwim River.

### Scenario 7: Cyanide Release

If cyanide came into contact with water, both aquatic and terrestrial mammals could be adversely affected. Cyanide reacts readily in the environment and degrades or forms complexes and salts of varying stabilities. It is toxic at very low concentrations to all living organisms. The effect of a cyanide spill on subsistence resources would depend on the volume of cyanide and location of the spill, but it could have major effects on freshwater and marine environments.

Scenario 8: Mercury Release

If elemental mercury is spilled, some of it would be emitted as gaseous mercury that could be highly toxic to animals. If spilled mercury escapes cleanup efforts, it would be subject to natural methylation processes and would add incrementally to the mercury levels in the ground and air, thus increasing the chronic exposure of aquatic biota and fish. Mercury persists in the environment, and bio-accumulates within food webs, potentially increasing exposure to fish-eating animals. The effect of wind born dust from trucks on the port road, or release of mercury vapor during ore processing, could have effects on fish, terrestrial wildlife, and vegetation.

Scenario 9: Partial Tailings Dam Failure

A tailings dam failure would release contaminated tailings and water into Crooked Creek and the Kuskokwim River. The impacts to subsistence resources and uses would include reduced access for local subsistence users and contaminated water resources important for terrestrial wildlife and fish, including salmon and resident fish populations. A tailings dam failure could not be cleaned up easily and quickly, its effects would continue long-term, and the failure would affect subsistence fish resources in communities downriver from the mine. This scenario would have major impacts to subsistence resources for the entire Kuskokwim River watershed.

### *2.2.2. Alternative 2 -- Evaluation of the Availability of Other Lands*

The proposed Donlin Gold Project extends from the west side of Cook Inlet through the natural gas pipeline ROW to the mine site located 10 miles north of the village of Cooked Creek. Transportation infrastructure includes the mine access road and upriver barge landing at Angyaruaq (Jungjuk) Port and the connected action involving improvements to the Bethel Yard Dock, Bethel Fuel Storage, and Dutch Harbor Fuel Storage facilities. Large segments of the proposed project are outside of BLM lands. The mine site and the transportation infrastructure would not be located on Federal land. As noted above, the BLM-managed portion of the pipeline ROW is located in discontinuous segments from about Milepost (MP) 168 to MP 310 of the proposed pipeline ROW, amounting to about 30.7 percent of the total ROW length (Figure 3.15-1B FEIS).

Barges transporting fuel and cargo from Bethel on the Kuskokwim River pass through Federal lands within the Yukon Delta National Wildlife Refuge, although the bed of the river itself is under state ownership. The Kuskokwim River cannot be avoided if barging is used for transportation during construction and operation of the mine.

As described in the FEIS, the proposed pipeline ROW in the preferred alternative was designed and engineered to optimize many environmental and economic considerations. The most direct routes are the most economic, if environmental hazards, such as permafrost and hazardous slope conditions, are to be avoided. Ridgelines were used where possible to minimize wetlands impacts**.** The ROW configuration was designed to minimize overlap and proximity with the Iditarod National Historic Trail and to avoid Alaska Native allotments**.** From MP 169 to MP 204,

the proposed ROW partially overlaps with six townships of Federal lands with some non-Federally managed lands within five miles away (Figure 3.15-1B FEIS). From MP 220 to MP 235, and from MP 255 to MP 310, the proposed pipeline corridor crosses large contiguous blocks of BLM lands, which would virtually preclude alternative routing to avoid BLM lands. It is unlikely that alternative non-Federal lands can feasibly substitute for the proposed ROW segments on BLM lands due to geography and the need for proper engineering design.

McGrath, Nikolai, and Takotna have documented subsistence use areas for large mammals and berries in the vicinity of MP 175, west of Windy Fork, within BLM lands of the ROW (see Figure 3.21-60 and Figure 3.21-62 FEIS). These three communities have documented use areas for large mammal harvest in the vicinity of MP 150 of the pipeline ROW, near Farewell, but this is outside of BLM lands.

Crooked Creek residents have documented subsistence use areas for moose in the George River basin where the pipeline ROW crosses the East Fork George River and the George River (approximately MP 280–295) (Figure 3.21-16 FEIS).

### *2.2.3. Alternative 2 -- Evaluation of Other Alternatives that Would Reduce or Eliminate the Use, Occupancy, or Disposition of Public Lands Needed for Subsistence Purposes*

Alternatives that would reduce or eliminate the use of public lands needed for subsistence purposes include Alternative 1 (No Action). Section 2.4 in the FEIS, Alternatives Considered but Eliminated from Detailed Analysis, discusses other alternatives that were considered, but eliminated from analysis due to economic or technological disadvantages, or because they did not meet the purpose of the proposed action to produce the gold resource discovered on Calista Corporation and TKC lands at the Donlin Gold site.

### *2.2.4. Alternative 2 -- Summary of Findings*

The following section presents a summary of the findings for Alternative 2, where the finding is that the activity may cause a significant restriction to subsistence uses. Findings of no significant restriction are not listed here.

#### *2.2.4.1. Barging on Kuskokwim River*

As outlined in Section 2.2.1.2 of this analysis, Alternative 2 may result in a significant restriction to subsistence uses for the communities of Bethel, Tuntutuliak Napakiak, Napaskiak, Oscarville, Kwethluk, Akiachak, Akiak, Tuluksak, Upper and Lower Kalskag, Aniak, Chuathbaluk, Napaimute, and Crooked Creek due to a substantial reduction in the opportunity to continue uses of subsistence resources on the Kuskokwim River. Barging on the Kuskokwim River during construction and operation of the mine may cause extensive interference with access to the Kuskokwim River by subsistence users from villages along the river. It may cause a major

redistribution of salmon, rainbow smelt, and whitefish, which are important subsistence resources for those villages.

*2.2.4.2. Pipeline Right-of-way Access by Non-Subsistence Users*

As outlined in the analysis in Section 2.2.1.3, Alternative 2 may result in a significant restriction to subsistence use for the communities of McGrath, Takotna and Nikolai due to a substantial increase in competition for subsistence resources along the natural gas pipeline at the Farewell Airstrip. Increased activity and access at the Farewell Airstrip and along the nearby gas pipeline right-of way may cause major increases in the disturbance and use of moose, caribou, black bear and furbearer subsistence resources by recreational sport hunters and commercial outfitters. These are important subsistence resources for the villages of McGrath, Takotna, and Nikolai.

## 2.3. Evaluation and Findings for Alternative 3A -- Reduced Diesel Barging: LNG Powered Haul Trucks

Alternative Summary: Alternative 3A would use liquefied natural gas (LNG) instead of diesel to power the large (+300-ton payload) trucks that would move waste rock and ore from the open pits. These large trucks would account for approximately 75 percent of the total annual diesel consumption under Alternative 2. This alternative does not propose using LNG for the trucks hauling cargo and fuel on the mine access road from the Angyaruaq (Jungjuk) port. During operations, Alternative 3A would reduce the barging of diesel fuel on the river compared to Alternative 2. Other than increased throughput, the natural gas pipeline component would be the same as Alternative 2.

The primary differences between this alternative and Alternative 2 are the addition of the LNG plant and storage tanks near the mine site processing plant, reduced consumption of diesel, reduced barge trips, reduced on-site diesel storage, and increased natural gas consumption. At present, LNG-powered haul trucks are not commercially available. However, the technology to use natural gas products (such as LNG or compressed natural gas) in other industrial applications is proven and equipment manufacturers, such as Caterpillar, are actively developing dual fuel (diesel and natural gas) options for the mining industry. Caterpillar expects that equipment such as haul trucks will be commercially available and proven suitable for arctic conditions before mining equipment would be procured. If that did not occur, this alternative would not be feasible.

(See Section 2.3.4 of this analysis for Findings of Alternative 3A)

### *2.3.1. Alternative 3A -- Evaluation and the Effect of Use, Occupancy, or Disposition on Subsistence Uses and Needs*

Introduction: Evaluation and the Effect of Use, Occupancy, or Disposition on Subsistence Uses and Needs for Alternative 3A are largely similar to those analyzed for Alternative 2 in Section 2.2 above. Effects on subsistence uses from changes in subsistence resources and access to

subsistence resources in the vicinity of the mine site and along the pipeline route would be the same as in Alternative 2, since there would be no change in the mine or pipeline route associated with Alternative 3A. Competition for resources and socio-cultural impacts to subsistence practices would be the same as Alternative 2. The areas where Alternative 3A impacts are different than Alternative 2 are analyzed below.

#### *2.3.1.1. Transportation Infrastructure*

Alternative 3A proposes a reduction in river barge traffic by about one-third as compared to Alternative 2. This reduction would translate into larger time intervals between barges which would reduce the potential effects on riverine habitat and subsistence resources, and potential barge interference with subsistence fishing gear, fish camps, and boat access along the river.

Under Alternative 2, total barge round trips would be 116 per year (232 one-way trips). This includes 58 cargo round trips and 58 diesel fuel round trips. Under Alternative 3A, total annual barge round trips would be reduced to 77, representing 154 one-way trips. This includes 19 diesel fuel barge round trips and 58 cargo barge round trips (Table 2.3-8 FEIS).

Subsistence resources and access to the river would be affected by barge traffic under Alternative 3A, but to a lesser degree than Alternative 2 (reduced by 78 total one way trips) (Table 2.3-34 FEIS). Riverine habitats and fish resources would still be affected by barge traffic and reductions in abundance and major redistribution of fish resources important to subsistence may occur. Barges under Alternative 3A would cause extensive interference with boat access by subsistence users on the Kuskokwim River.

#### *2.3.1.2. Spill Scenarios*

Under Alternative 3A, spill impacts to subsistence are the same as those found in Alternative 2, except that a new scenario on release of LNG is relevant.

Scenario 6: Liquefied Natural Gas (LNG) Release

LNG spills could be small (pinhole leaks from the storage tanks or spills while fueling the LNG-fueled trucks) or large (LNG-fueled truck accident or unlikely rupture of LNG plant storage tank with release of up to 55,000 gallons of LNG). If released, LNG would transition back to a gaseous phase. If a large amount of LNG is spilled on water within a short period of time, the relatively warmer temperature of the water would cause the LNG to rapidly transition to its gaseous phase. The impacts to subsistence from an LNG release would depend on the location, magnitude, and duration of the spill.

### *2.3.2. Alternative 3A -- Evaluation of the Availability of Other Lands*

Alternative 3A would make no change in the ROW alignment, so the evaluation of alternative lands would be the same as Alternative 2, Section 2.2.2.

### *2.3.3. Alternative 3A -- Evaluation of Other Alternatives that Would Reduce or Eliminate the Use, Occupancy, or Disposition of Public Lands Needed for Subsistence Purposes*

Alternative 3A would make no change in the ROW alignment, so the evaluation of other alternatives that would reduce or eliminate the use, occupancy, or disposition of public lands needed for subsistence purposes would be the same as Alternative 2, Section 2.2.3.

### *2.3.4. Alternative 3A -- Summary of Findings*

The following section presents a summary of the findings for Alternative 3A, where the finding is that the activity may cause a significant restriction to subsistence uses. Findings of no significant restriction are not listed here.

#### *2.3.4.1. Barging on Kuskokwim River*

For the transportation infrastructure component, the number of barge trips in Alternative 3A would be reduced compared to Alternative 2. However, the number of trips is still an increase compared to the current number of barge trips, would impact subsistence fish resources and use of the river, and may result in the significant restriction to subsistence uses for Kuskokwim River communities outlined in Alternative 2.

This evaluation concludes that Alternative 3A may result in a significant restriction to subsistence uses for the communities of Bethel, Tuntutuliak, Napakiak, Napaskiak, Oscarville, Kwethluk, Akiachak, Akiak, Tuluksak, Upper and Lower Kalskag, Aniak, Chuathbaluk, Napaimute and Crooked Creek due to a substantial reduction in the opportunity to continue harvest of subsistence resources on the Kuskokwim River. As described for Alternative 2, barging on the Kuskokwim River during construction and operations of the mine would cause extensive interference with access to the Kuskokwim River by subsistence users from villages along the river, would cause a large reduction in abundance, and would cause a major redistribution of salmon, rainbow smelt, and whitefish which are important subsistence resources for those villages.

#### *2.3.4.2. Pipeline Right-of-way Access by Non-Subsistence Users*

Impacts to subsistence from the gas pipeline ROW for Alternative 3A would be the same as for Alternative 2. As with Alternative 2, this evaluation concludes that Alternative 3A may result in a significant restriction to subsistence use for the communities of McGrath, Takotna, and Nikolai due to a substantial increase in competition for subsistence resources along the natural gas pipeline at the Farewell Airstrip. Increased activity and access from the Farewell Airstrip and along the nearby gas pipeline right-of way may cause major increases in the disturbance and use of moose, caribou, black bear and furbearer subsistence resources by recreational sport hunters and commercial outfitters. These are important subsistence resources for the villages of McGrath, Takotna and Nikolai.

## 2.4. Evaluation and Findings for Alternative 3B -- Reduced Diesel Barging: Diesel Pipeline

Alternative Summary: Under Alternative 3B, an 18-inch diameter diesel pipeline would be constructed from Cook Inlet to the mine site to reduce diesel barging on the Kuskokwim River. A natural gas pipeline would not be constructed; natural gas would not be used in Alternative 3B. Diesel from the pipeline would be used to fuel the mine's power generation facilities, mobile vehicle fleet, and equipment (Section 2.2.4 FEIS).

The diesel pipeline would be buried and located in the same corridor proposed for the natural gas pipeline under Alternative 2, with an additional 19-mile segment between Tyonek and the start of the proposed corridor for the natural gas line, for a total of 334 miles. This additional segment would cross the Beluga River using Horizontal Directional Drilling. Alternative 3B would require improvements to the existing Tyonek North Foreland Barge Facility and transportation of diesel fuel in Cook Inlet. It would also require a robust leak detection system and pre-positioned response infrastructure and equipment along the pipeline route. Alternative 3B would also eliminate the barging of diesel fuel after construction (Section 2.3.4 FEIS)

The primary differences between this alternative and Alternative 2 are the replacement of the natural gas pipeline with a diesel fuel pipeline, reduced barge trips due to elimination of diesel barging, increased consumption of diesel, and no natural gas consumption. In addition, some of the construction infrastructure would be required to remain through operations to provide for a reasonable diesel spill response capability. This would necessitate maintaining some of the construction facilities and most of the airstrips in a usable condition throughout the operating life of the pipeline (Section 2.3.4.3 FEIS). Modifications may be required to some of the proposed airstrips to make them suitable for multi-season (as opposed to just winter) use and additional Hercules C- 130 capable airstrips and staging areas would be required (Table 2.3-37 FEIS). The airstrips required for spill response capacities include the nine new airstrips proposed as facilities to support construction in Alternative 2 (Table 2.3-28 FEIS), plus three additional Donlin Gold proposed airstrips: Puntilla Airstrip, Tatlawiksuk Airstrip, and George River Airstrip.

(See Section 2.4.4 of this analysis for Findings of Alternative 3B)

### *2.4.1. Alternative 3B -- Evaluation and the Effect of Use, Occupancy, or Disposition on Subsistence Uses and Needs*

Introduction: Evaluation and the Effect of Use, Occupancy, or Disposition on Subsistence Uses and Needs for Alternative 3B are largely similar to those analyzed for Alternative 2 in Section 2.2 above. Effects on subsistence uses from changes in subsistence resources and access to subsistence resources in the vicinity of the mine site would be the same as in Alternative 2, since there would be no change in the mine associated with Alternative 3B. Socio-cultural impacts to subsistence practices would be the same as Alternative 2. The areas where Alternative 3B impacts are different than Alternative 2 are analyzed below.

#### *2.4.1.1. Transportation Infrastructure*

Alternative 3B would be reduce the number of barge trips as compared to Alternative 2, but would still involve 58 total round trips, which may result in significant reduction in subsistence uses for communities on the Kuskokwim River as outlined in Alternative 2. In addition, diesel fuel spills from the pipeline in Alternative 3B would likely affect subsistence fish resources on BLM lands along the pipeline ROW, the extent of which would depend on the volume of fuel spilled, season of year, and proximity of the spill to watersheds. Diesel tanker traffic in Alternative 3B would increase the potential for fuel spills in Cook Inlet and collisions with marine mammals, which would affect subsistence resources for the village of Tyonek.

#### *2.4.1.2. Diesel Pipeline*

Alternative 3B analyzed the impacts of the nine airstrips described under Alternative 2, plus three additional proposed airstrips at Puntilla, Tatalwiksuk, and George River. Under this alternative, all 12 airstrips would remain open for diesel spill response capabilities, as compared to Alternative 2 which would reclaim any newly constructed airstrips associated with pipeline construction. Gravel roads would remain in place along the ROW for spill response (Section 2.3.4.3 FEIS). The potential increase in access by hunters from outside the area using those airstrips and gravel roads would likely cause increased competition impacts as compared to Alternative 2. Access by non-subsistence users resulting in increased competition for resources would occur along the pipeline corridor and would affect subsistence users from villages along the ROW, including Tyonek, Skwentna, Red Devil, Stony River, and Sleetmute along with the upper Kuskokwim villages of Nikolai, McGrath, and Takotna.

#### *2.4.1.3. Spill Scenarios*

Under Alternative 3B, the likelihood of Spill Scenarios 2 through 4 (river barge, tank farm, and tanker truck releases) occurring would be reduced due to decreased barge activity, but impacts would be of the same type and intensity as those discussed under Alternative 2. Scenarios 7 and 8 (cyanide and mercury releases) would have the same impacts on subsistence as described for Alternative 2. Rupture of an ocean-going barge in Cook Inlet and a diesel pipeline release are new scenarios associated with this alternative.

Scenario 1: Ocean Barge Rupture at Sea (Cook Inlet)

During the operations and closure phases, diesel fuel would be delivered by ocean-going vessels to a fuel dock at Tyonek or Port MacKenzie, resulting in an increased spill risk from ocean barge rupture in Cook Inlet. Diesel fuel spills could occur if a tanker ran aground or was otherwise compromised; however, only one or two barge compartments would be expected to fail. In the event of such an occurrence, the direct impacts would be as described in Scenario 1 above under Alternative 2 and would depend on the size of the spill, wind and weather, the extent of dispersion, cleanup response time, and time of year. If a spill occurred during the summer, it would impact salmon runs in Cook Inlet. Fuel spills in Cook Inlet would also impact Cook Inlet

Belugas. The effect of this spill scenario would have major impacts to subsistence resources in Cook Inlet.

Scenario 5: Diesel Pipeline Release

Spills from the proposed pipeline, associated pump stations, valves, or pigging facilities could occur during project operation. A spill on land may have less impact than a spill in water, depending on the location, since spills in water could potentially have a wider footprint and affect various fish species that are important subsistence resources for many communities. If the spill reached a river at a pipeline crossing, the effects of the spill would be much like a river barge spill. The pipeline crosses several streams that are habitat for spawning salmon and some resident fish species. Underground pipeline leaks may go undetected and contaminate water resources over long periods of time. The spill scenario was for a major rupture and a large volume of diesel spilled, namely 422,000 gallons or more. A spill of this scale could result in major impacts to water bodies, wetlands and vegetation, birds, fisheries, and marine mammals affecting subsistence resources and uses.

### *2.4.2. Alternative 3B -- Evaluation of the Availability of Other Lands*

Alternative 3B would make no change in the ROW alignment, so the evaluation of alternative lands would be the same as Alternative 2, Section 2.2.2.

### *2.4.3. Alternative 3B -- Evaluation of Other Alternatives that Would Reduce or Eliminate the Use, Occupancy, or Disposition of Public Lands Needed for Subsistence Purposes*

Alternative 3B would make no change in the ROW alignment, so the evaluation of other alternatives that would reduce or eliminate the use, occupancy, or disposition of public lands needed for subsistence purposes would be the same as Alternative 2, Section 2.2.3.

### *2.4.4. Alternative 3B -- Summary of Findings*

The following section presents a summary of the findings for Alternative 3B, where the finding is that the activity may cause a significant restriction to subsistence uses. Findings of no significant restriction are not listed here.

#### *2.4.4.1. Barging on Kuskokwim River*

For the transportation infrastructure component, the decreased number of barge trips in Alternative 3B would reduce impacts compared to Alternative 2; however, the frequency of cargo barge trips may still impact subsistence fishing and use of the river and may result in significant restrictions to subsistence uses for Kuskokwim River communities outlined in Alternative 2.

This evaluation concludes that Alternative 3B may result in significant restrictions to subsistence uses for the communities of Bethel, Tuntutuliak, Napakiak, Napaskiak, Oscarville, Kwethluk,

Akiachak, Akiak, Tuluksak, Upper and Lower Kalskag, Aniak, Chuathbaluk, Napaimute and Crooked Creek due to a substantial reduction in the opportunity to continue uses of subsistence resources on the Kuskokwim River. Barging on the Kuskokwim River during construction and operations of the mine would cause extensive interference with access to the Kuskokwim River by subsistence users from villages along the river, and would cause a major redistribution of salmon, rainbow smelt, and whitefish, which are important subsistence resources for those villages.

#### *2.4.4.2. Pipeline Right-of-way Access by Non-Subsistence Users*

This alternative analyzed the impacts of the nine airstrips described under Alternative 2, plus three additional proposed airstrips at Puntilla, Tatalwiksuk, and George River. Under that alternative, all 12 airstrips would remain open for diesel spill response capabilities (rather than being closed after construction as under Alternative 2). Gravel roads would remain in place along the ROW for spill response (Section 2.3.4.3 FEIS). The potential increase in access by hunters from outside the area using those airstrips and gravel roads would likely cause increased competition impacts compared to Alternative 2. Access by non-subsistence users resulting in increased competition for resources would occur along the pipeline corridor and would affect subsistence users from villages along the ROW, including McGrath, Takotna, Nikolai, Tyonek, Skwentna, Red Devil, Stony River, and Sleetmute.

Therefore, this evaluation concludes that Alternative 3B may result in a significant restriction to subsistence resources for the communities of McGrath, Takotna, Nikolai, Tyonek, Skwentna, Red Devil and Sleetmute due to a substantial increase in competition for subsistence resources along the diesel pipeline and at the 12 airstrips that would remain open for spill response. Increased access at the 12 Airstrips and along the diesel pipeline right-of way would cause a major increase in the use of moose, caribou, black bear and furbearer subsistence resources by non-subsistence users. These are important subsistence resources for the villages of McGrath, Takotna, Nikolai, Tyonek, Skwentna, Red Devil, Stony River, and Sleetmute.

### 2.5. Evaluation and Findings for Alternative 4 -- Birch Tree Crossing Port

Alternative Summary: Alternative 4 would move the upriver port site from Angyaruaq (Jungjuk) (under Alternative 2) to Birch Tree Crossing, located about 124 river miles upriver from Bethel. This would reduce the barging distance for freight and diesel out of Bethel bound for the mine site. The same volume of cargo and diesel fuel would be transported by barge as in Alternative 2. A 76-mile, all-season gravel access road would link this port site to the Donlin Gold Project mine site.

The mine site portion for Alternative 4 would be the same as Alternative 2.

The natural gas pipeline under Alternative 4 would be the same as Alternative 2.

There would be no other substantive changes to other project components as described for Alternative 2.

(See Section 2.5.4 of this analysis for Findings of Alternative 4)

### *2.5.1. Alternative 4 -- Evaluation and the Effect of Use, Occupancy, or Disposition on Subsistence Uses and Needs*

Impacts to subsistence from the mine site, pipeline, and transportation infrastructure components for Alternative 4 would be the same as those analyzed for Alternative 2 in Section 2.2 above. Effects on subsistence uses from changes in subsistence resources and access to subsistence resources in the vicinity of the mine site and along the pipeline route would be the same as in Alternative 2, since there would be no change in the mine or pipeline route associated with Alternative 4. Competition for resources and socio-cultural impacts to subsistence practices would be the same as Alternative 2. The areas where Alternative 4 impacts are different than Alternative 2 are analyzed below.

#### *2.5.1.1. Transportation Infrastructure*

The barging distance on the Kuskokwim River would be less than for Alternative 2, but river villages down river from Aniak would still experience the same level of barge traffic as in Alternative 2.

The road from the Birch Tree Crossing site would cross the Owhat River watershed, which is an important area for subsistence activities by residents from Aniak, Chuathbaluk, and Napaimute (Figure 3.21-20 FEIS). Access to subsistence resources would likely be reduced during road operations because hunting and trapping could be prohibited in the immediate vicinity of the road. The port site would be partially reclaimed at the end of Mine Site operation. Sheet piles would be removed and the area around the barge landing would be recontoured. A barge landing and the full access road would be maintained for delivery of WTP reagents, equipment, fuel, and supplies, as well as to provide access to the project site for long-term monitoring and operating the pit lake water treatment plant (Section 2.3.5.2 FEIS). The Birch Tree Crossing port site would also displace set net and drift net fishing locations opposite the downstream mouth of Aniak Slough.

#### *2.5.1.2. Spill Scenarios*

Under this alternative, the likelihood of Scenario 2 (river barge release) occurring would be reduced due to reduced barging distances; however, the impacts would be of the same types as those discussed under Alternative 2. Impacts under Scenarios 1, 3, 4, 7, and 8 (ocean barge, tank farm, tanker truck, cyanide, and mercury releases) for Alternative 4 would be the same as those discussed under Alternative 2. The risk of fuel spills from tanker trucks in Alternative 4 is increased compared to Alternative 2, due to the longer road from the river to the mine.

### *2.5.2. Alternative 4 -- Evaluation of the Availability of Other Lands*

Alternative 4 would make no change in the ROW alignment, so the evaluation of alternative lands would be the same as Alternative 2, Section 2.2.2.

### *2.5.3. Alternative 4 -- Evaluation of Other Alternatives that Would Reduce or Eliminate the Use, Occupancy, or Disposition of Public Lands Needed for Subsistence Purposes*

Alternative 4 would make no change in the ROW alignment, so the evaluation of other alternatives that would reduce or eliminate the use, occupancy, or disposition of public lands needed for subsistence purposes would be the same as Alternative 2, Section 2.2.3.

### *2.5.4. Alternative 4 -- Summary of Findings*

The following section presents a summary of the findings for Alternative 4, where the finding is that the activity may cause a significant restriction to subsistence uses. Findings of no significant restriction are not listed here.

#### *2.5.4.1. Barging on Kuskokwim River*

Impacts to subsistence for the transportation infrastructure are the same as for Alternative 2, but would impact fewer villages on the Kuskokwim River because of the shorter distance to the Birch Tree Crossing port site. Barge traffic would not travel as far to the Birch Tree Crossing port site, but Alternative 4 may result in impacts to the availability and abundance of subsistence on BLM lands south of the access road from the port to the mine, affecting the villages of Aniak, Chuathbaluk, and Napiamute.

This evaluation concludes that Alternative 4 may result in a significant restriction to subsistence uses for the communities of Bethel, Tuntutuliak, Napakiak, Napaskiak, Oscarville, Kwethluk, Akiachak, Akiak, Tuluksak, Upper and Lower Kalskag, Aniak, and Chuathbaluk due to a substantial reduction in the opportunity to continue uses of subsistence resources on the Kuskokwim River. Barging on the Kuskokwim River during construction and operations of the mine would cause extensive interference with access to the Kuskokwim River by subsistence users from villages along the river, and would cause a major redistribution of salmon, rainbow smelt, and whitefish, which are important subsistence resources for those villages.

#### *2.5.4.2. Pipeline Right-of-way Access by Non-Subsistence Users*

This evaluation also concludes that Alternative 4 may result in a significant restriction to subsistence uses for the communities of McGrath, Takotna and Nikolai due to a substantial increase in competition for subsistence resources along the natural gas pipeline at the Farewell Airstrip. Increased activity and access from the Farewell Airstrip and along the nearby gas pipeline ROW would cause major increases in the disturbance and use of moose, caribou, black

bear and furbearer subsistence resources by recreational sport hunters and commercial outfitters. These are important subsistence resources for the villages of McGrath, Takotna and Nikolai.

## 2.6. Evaluation and Findings for Alternative 5A -- Dry Stack Tailings

Alternative Summary: Alternative 5A incorporates an alternate tailings method, using the dry stack tailings (DST) method instead of the subaqueous tailings method that would be used under Alternative 2. This alternative would use filter-presses and vacuum-filters to increase the solid content to more than 80 percent. This alternative was suggested during scoping to avoid the potential for releases from the tailings dam proposed under Alternative 2.

The dry stack TSF and operating pond would be located in the Anaconda Creek Valley in the same general location as under Alternative 2.

This alternative includes two options:

- Unlined Option: The dry stack TSF would not be lined with a Linear Low-Density Polyethylene (LLDPE) liner.
- Lined Option: The dry stack tailings would be underlain by a pumped overdrain layer throughout the footprint, with an impermeable LLDPE liner below.

The tailings would be spread and compacted in lifts, creating a "dry stack" that would be approximately 412 feet high and extend a maximum length of 1.6 miles from the upper dam crest. The ultimate combined operating pond and dry stack footprint would be 2,463 acres. During Closure, the tailings would be covered with soil, an LLDPE cover, and vegetated.

The transportation corridor under Alternative 5A would be the same as Alternative 2.

The natural gas pipeline under Alternative 5A would be the same as Alternative 2.

(See Section 2.6.4 in this analysis for Findings of Alternative 5A)

### *2.6.1. Alternative 5A -- Evaluation and the Effect of Use, Occupancy, or Disposition on Subsistence Uses and Needs*

Impacts to subsistence from the mine site and pipeline components for Alternative 5A would be the same as those analyzed for Alternative 2 in Section 2.2 above. Effects on subsistence uses from changes in subsistence resources and access to subsistence resources in the vicinity of the mine site and along the pipeline route would be the same as in Alternative 2, since there would be no change in the mine or pipeline route associated with Alternative 5A. Competition for resources and socio-cultural impacts to subsistence practices would be the same as Alternative 2. The areas where Alternative 5A impacts are different than Alternative 2 are analyzed below.

#### *2.6.1.1. Transportation Infrastructure*

Alternative 5A would require seven additional diesel fuel barge trips per year as compared to Alternative 2, for a total of 123 round trip barge trips annually (Section 2.3.6.2 FEIS). This barge traffic increase would increase the potential for diesel fuel spills on the river, further impact subsistence resources, and further restrict subsistence access to the Kuskokwim River. See Alternative 2 impacts in Section 2.2.1.2 for detailed analysis of impacts.

#### *2.6.1.2. Spill Scenarios*

Direct and indirect impacts of Alternative 5A under Scenarios 1 through 4, and 7 and 8 (ocean or river barge, tank farm, tanker truck, cyanide, and mercury releases) would be the same as those discussed under Alternative 2. The impacts of Scenario 9 (tailings dam failure) would be less than Alternative 2, because dry stacking the tailings would reduce the potential of tailings dam failure.

### *2.6.2. Alternative 5A -- Evaluation of the Availability of Other Lands*

Alternative 5A would make no change in the ROW alignment, so the evaluation of alternative lands would be the same as Alternative 2, Section 2.2.2.

### *2.6.3. Alternative 5A -- Evaluation of Other Alternatives that Would Reduce or Eliminate the Use, Occupancy, or Disposition of Public Lands Needed for Subsistence Purposes*

Alternatives that would reduce or eliminate the use of public lands needed for subsistence purposes include Alternative 1 (No Action). Section 2.4, Alternatives Considered but Eliminated from Detailed Analysis, discusses other alternatives that were considered, but eliminated from detailed analysis due to economic or technological disadvantages, or because they did not meet the purpose of the proposed action to produce the gold resource discovered on Calista Corporation and TKC lands at the Donlin Gold site.

### *2.6.4. Alternative 5A -- Summary of Findings*

The following section presents a summary of the findings for Alternative 5A, where the finding is that the activity may cause a significant restriction to subsistence uses. Findings of no significant restriction are not listed here.

#### *2.6.4.1. Barging on Kuskokwim River*

With the increase in impacts from barge traffic in Alternative 5A as compared to Alternative 2, Alternative 5A may result in a significant restriction to subsistence uses for the communities of Bethel, Tuntutuliak, Napakiak, Napaskiak, Oscarville, Kwethluk, Akiachak, Akiak, Tuluksak, Upper and Lower Kalskag, Aniak, Chuathbaluk, Napaimute, and Crooked Creek due to a substantial reduction in the opportunity to continue the harvest of subsistence resources on the Kuskokwim River. Barging on the Kuskokwim River during construction and operations of the

mine would cause extensive interference with access to the Kuskokwim River by subsistence users from villages along the river, and would cause a major redistribution of salmon, rainbow smelt, and whitefish, which are important subsistence resources for those villages.

#### *2.6.4.2. Pipeline Right-of-way Access by Non-Subsistence Users*

This evaluation also concludes that Alternative 5A may result in a significant restriction to subsistence uses for the communities of McGrath, Takotna and Nikolai due to a substantial increase in competition for subsistence resources along the natural gas pipeline at the Farewell Airstrip. Increased access at the Farewell Airstrip and along the nearby gas pipeline right-of way would cause major increases in the use of moose, caribou, black bear and furbearer subsistence resources by non-subsistence users. These are important subsistence resources for the villages of McGrath, Takotna and Nikolai.

## 2.7. Evaluation and Findings for Alternative 6A -- Modified Natural Gas Pipeline Alignment: Dalzell Gorge Route

Alternative Summary: Alternative 6A, Dalzell Gorge Route, would realign the natural gas pipeline between MP 106.5 to 152.7, a distance of 46.2 miles, or 14.6 percent of the Alternative 2 pipeline alignment. The pipeline ROW under Alternative 6A would be slightly shorter, at 313 miles, compared to 316 miles for Alternative 2. In the affected segment, the Alternative 6A alignment would be to the west of the proposed action and would traverse Dalzell Gorge. No Federal lands are involved in this proposed segment of the pipeline alignment.

While less land overall would be impacted, Alternative 6A, Dalzell Gorge Route, would require 4.1 miles of additional access roads overall, and 11 material sites involving 391 acres of disturbance. New gravel airstrips would be constructed at Pass Creek and Tatina. Fourteen potential water sources have been identified for construction of the segment of pipeline in this alternative. The Dalzell Gorge Route would cross Happy River and the South Fork of the Kuskokwim River using HDD.

The mine site facilities under Alternative 6A would be the same as Alternative 2.

The transportation corridor under Alternative 6A would be the same as Alternative 2.

(See Section 2.7.4 of this analysis for Findings of Alternative 6A)

### *2.7.1. Alternative 6A -- Evaluation and the Effect of Use, Occupancy, or Disposition on Subsistence Uses and Needs*

Impacts to subsistence from the mine site and transportation infrastructure components for Alternative 6A would be the same as those analyzed for Alternative 2 in Section 2.2 above. Effects on subsistence uses from changes in subsistence resources and access to subsistence resources in the vicinity of the mine site and transportation infrastructure would be the same as in

Alternative 2, since there would be no change in the mine or barging associated with Alternative 6. Socio-cultural impacts to subsistence practices would be the same as Alternative 2. The areas where Alternative 6A impacts are different than Alternative 2 are analyzed below.

#### *2.7.1.1. Natural Gas Pipeline*

The pipeline ROW for Alternative 6A would be three miles shorter than in Alternative 2, potentially reducing impacts to subsistence resources by creating less ground and vegetation disturbance along the ROW. Two additional airstrips would be constructed at Pass Creek and Tatina for construction of this portion of the pipeline (Section 2.3.7.3 FEIS). These airstrips would likely increase access to hunters from outside of the area and increase competition for subsistence resources such as moose. . In the affected segment, the Alternative 6A alignment would be to the west of the proposed action and would traverse Dalzell Gorge. No Federal lands are involved in this proposed segment of the pipeline alignment.

#### *2.7.1.2. Spill Scenarios*

Direct and Indirect impacts of Alternative 6A under Scenarios 1 through 4, and 7 and 8 (ocean or river barge, tank farm, tanker truck, cyanide, and mercury releases) would be the same as those discussed under Alternative 2.

### *2.7.2. Alternative 6A -- Evaluation of the Availability of Other Lands*

Alternative 6A would make no change in the ROW alignment as it crosses Federally managed public lands, so the evaluation of alternative lands would be the same as Alternative 2, Section 2.2.2.

### *2.7.3. Alternative 6A -- Evaluation of Other Alternatives that Would Reduce or Eliminate the Use, Occupancy, or Disposition of Public Lands Needed for Subsistence Purposes*

Alternative 6A would make no change in the ROW alignment as it crosses Federally managed public lands, so the evaluation of other alternatives that would reduce or eliminate the use, occupancy, or disposition of public lands needed for subsistence purposes would be the same as Alternative 2, Section 2.2.3.

### *2.7.4. Alternative 6A -- Summary of Findings*

As Alternative 6A does not change any of the project components on Federally managed public lands or resources, impacts to subsistence from the mine site, transportation infrastructure, and pipeline components of Alternative 6A would be the same as for Alternative 2.

## 2.8. Evaluation and Findings for the Cumulative Case

Cumulative Case Summary: The cumulative case evaluates the impact of the proposed action (Alternative 2) in conjunction with past, present, and reasonably foreseeable future actions in the FEIS Analysis Area. Reasonably foreseeable actions are summarized in Table 4.2-1 of the FEIS.

The past and present actions that have influenced subsistence are incorporated into the current baseline conditions described in Section 3.21.5: Community Harvest Patterns. Federal and State regulations with a complex history govern subsistence uses and resources in the region, as described in Section 3.21.3, Subsistence, Regulatory Environment. Changes in subsistence resource abundance and availability, particularly the decline of moose in Game Management Unit 19 and the decline of Kuskokwim River Chinook stocks, have also influenced current harvest practices. Sociocultural changes have and will likely continue to influence subsistence production, as described in Section 3.21.6.1.3, Subsistence, Potential Socio-cultural Impacts. However, subsistence uses continue in communities and associated traditional use areas throughout the FEIS Analysis Area, providing continuity in social organization, identity, and cultural beliefs. The geographic area of consideration for cumulative effects on subsistence practices extends widely across the FEIS Analysis Area and includes:

- Habitat and migratory range for subsistence resources such as caribou herd ranges, salmon migratory ranges, and migratory waterfowl ranges.
- The traditional subsistence use areas for communities potentially affected by the project. These areas can be quite extensive, from hundreds to thousands of square miles, as noted in Table 3.21-27, and displayed in maps throughout Section 3.21.5, Community Harvest Patterns in the FEIS. The reasonably foreseeable future actions relevant to impacts to subsistence resources include:
- Oil and gas exploration and development in Cook Inlet, particularly projects affecting the northwest portion of Cook Inlet.
- Mineral exploration and mining.
- Commercial Fishing, including fisheries in the Bering Sea with a bycatch of Western Alaska-bound salmon, and intercept fisheries that take Western Alaska-bound salmon.
- Tourism, recreation, sport hunting and fishing, particularly if recreational and guided sport hunting and recreational fishing were to increase in the Kuskokwim River basin.

These reasonably foreseeable future actions would likely induce little change to subsistence resource abundance and availability, access to subsistence resources, competition for subsistence resources, or sociocultural effects on subsistence uses. However, factors contributing to a further decline in Kuskokwim River Chinook stocks represent an adverse impact that may result in a significant restriction in subsistence uses of Chinook and other salmon species in the

Kuskokwim River, caused by a large reduction in the abundance and a major redistribution of subsistence salmon resources.

(See Section 2.8.4 of this analysis for Findings of the Cumulative Case)

### *2.8.1. Cumulative Case -- Evaluation and the Effect of Use, Occupancy, or Disposition on Subsistence Uses and Needs*

With the implementation of Alternative 2, there would be direct and indirect impacts to subsistence practices and a contribution to cumulative effects on subsistence resources and practices. Overall, the impact on subsistence resources from the proposed project and past, present, and reasonably foreseeable future actions could result in some harvest decrease and slightly increase competition for resources, although there would be minimal impact to access.

The cumulative effects for Alternatives 3A and 3B would be similar to Alternative 2. However, these alternatives would have a lower volume of barge traffic on the Kuskokwim River over the life of the project and a reduced potential for impacts to riverine habitat, subsistence resources, and subsistence activities associated with the river. Alternative 3B would contribute to cumulative effects to subsistence resources and practices.

The cumulative effects for Alternatives 4, 5A, and 6A would be similar to Alternative 2, and contribute to cumulative effects to subsistence resources, uses, and needs.

Past, ongoing, and reasonably foreseeable future actions were identified in the Project Area (see Section 4.2). These include past mining operations as well as mineral exploration and other small-scale placer mining activities; oil and gas exploration and development activities near Cook Inlet; ground-disturbing activities near communities and tributaries, including gravel extraction; seasonal barging to serve villages along the Kuskokwim River; ongoing subsistence and commercial fishing activities and other boating-related traffic along the main river channel; community water supply development; waste disposal; fuel spills; and new roads and airport improvements. Such past and ongoing activities, combined with natural events, have contributed in variable ways to adverse effects on anadromous and resident fish populations and aquatic habitat by altering flow regimes and drainage patterns; diminishing water quality from riverbank erosion, turbidity, and sedimentation; and degrading the extent of productive habitat conditions. In addition, the run size and escapement of certain stocks of salmon (particularly king and chum salmon in Crooked Creek) and, to a certain extent, other anadromous and resident fish populations, have diminished in recent years due to a range of factors that are not fully understood by resource managers or the scientific community. The various components of the proposed project (Alternative 2) may result in an incremental increase of impacts of variable intensities that would contribute to the cumulative effects on fish and aquatic resources in the drainages within the Project Area during all three project phases. The cumulative effects on fish and aquatic resources of the proposed project in combination with those of other past, ongoing, and reasonably foreseeable future projects, are expected to increase over the life of the project.

The effects of predicted climate impacts may increase in later project years due to warming temperatures and altered precipitation patterns and thus could exacerbate identified cumulative effects. Shifts in fish populations may occur due to subsequent habitat and precipitation or temperature changes, affecting subsistence resources as well.

The geographic area of consideration for cumulative effects on wildlife extends widely across the EIS Analysis Area and includes habitat and migratory range for mammal and bird populations that use the area where direct and indirect impacts of the project would occur. Past, ongoing, and Reasonably Foreseeable Future Actions were identified in the Project Area, including small-scale placer mining and other ground-disturbing activities and access for recreation and subsistence activities (Section 4.2 FEIS). These actions have removed or modified some wildlife habitat and cause behavioral disturbance of terrestrial mammals and birds in some adjacent areas. The ongoing or future similar activities would likely induce minimal overall changes to available bird and terrestrial mammal habitats, or use of them, when considering the availability of similar habitat in the region. The existing harvest levels for large mammals, particularly moose, tend to maintain the population near the limit of sustainable harvest. The project activities combined with existing activities and human presence in the vicinity may cause some species of wildlife or birds to avoid areas in which project activities or human presence occurs. However, many species would be expected to habituate to noise, human presence, and other activities. Changes would be expected to be incremental on a regional scale. Climate impacts over time may result in changes in habitat, such as an increase in woody vegetation, as well as changes in fire regime with potentially greater fire extent or severity. Shifts in wildlife populations may occur due to subsequent habitat changes (changes in food, forage, or shelter, for example), large-scale biome shifts, and precipitation or temperature trend changes. Past, ongoing, and reasonably foreseeable future actions were identified in the Project Area including commercial fishing, shipping/barging of fuel and supplies, and other marine traffic (Section 4.2 FEIS). These actions have provided a level of activity that could adversely affect marine mammals through risk of vessel strikes, behavioral disturbance, and potential fuel spills. In addition, there has been some subsistence hunting of marine mammals in the area. Under Alternative 2, the main types of impact for marine mammals would be behavioral disturbance or risk of injury or mortality from barges or during in-water construction at the ports. The slow speed of the barges would be expected to reduce impacts. Populations of marine mammals are limited in the river where the port construction would occur, reducing impacts. Overall, the combined impact on wildlife from the proposed project and past, present, and future actions is expected to be geographically or temporality limited within a large area. While the individual impact of the proposed project is measurable, the cumulative effect is still considered to be limited, given the limited area of disturbance over the region.

### *2.8.2. Cumulative Case -- Evaluation of the Availability of Other Lands*

The cumulative case would make no change in the ROW alignment, so the evaluation of alternative lands would be the same as Alternative 2, Section 2.2.2.

### *2.8.3. Cumulative Case -- Evaluation of Other Alternatives that Would Reduce or Eliminate the Use, Occupancy, or Disposition of Public Lands Needed for Subsistence Purposes*

Alternatives that would reduce or eliminate the use of public lands needed for subsistence purposes include Alternative 1 (No Action). Section 2.4, Alternatives Considered but Eliminated from Detailed Analysis, discusses other alternatives that were considered, but eliminated from detailed analysis due to economic or technological disadvantages, or because they did not meet the purpose of the proposed action to produce the gold resource discovered on Calista Corporation and TKC lands at the Donlin Gold Project site.

### *2.8.4. Cumulative Case -- Summary of Findings*

The cumulative case for the proposed Donlin Gold Project may result in significant restriction to subsistence uses for the communities of Bethel, Tuntutuliak, Napakiak, Napaskiak, Oscarville, Kwethluk, Akiachak, Akiak, Tuluksak, Upper and Lower Kalskag, Aniak, Chuathbaluk, Napaimute, and Crooked Creek on the Kuskokwim River due to large reductions in the abundance of Chinook salmon and a major redistribution of salmon resources on the Kuskokwim River.

# 3. NOTICE AND HEARINGS

A finding that the proposed action may significantly restrict subsistence uses imposes additional requirements, including provisions for notices to the State of Alaska and appropriate regional and local subsistence committees, as well as a hearing in the vicinity of the area involved.

ANILCA § 810(a) provides that no "withdrawal, reservations, lease, permit, or other use, occupancy or disposition of the public lands which would significantly restrict subsistence uses shall be effected" until the Federal agency gives the required notice and holds a hearing in accordance with ANILCA § 810(a)(1) and (2). In the draft 810 analysis, published with the Draft EIS as Appendix N, the BLM made a preliminary finding that all alternatives and the cumulative case presented in the Draft EIS met the "may significantly restrict" threshold. As a result, public hearings were held in the potentially affected communities in conjunction with the Draft EIS public meetings.

Notice of the Draft EIS meetings was posted in the on the Army Corps of Engineers website and the BLM ePlanning website. In conjunction with the Draft EIS meetings, BLM held ANILCA § 810(a) Subsistence public hearings on the following dates and locations:

| **Location** | **Date** |
|---|---|
| Aniak | January 20, 2016 |
| Crooked Creek | January 21, 2016 |
| Anchorage | January 28, 2016 |
| Bethel | February 1, 2016 |

| | |
|---|---|
| Quinhagak | February 16, 2016 |
| Akiak | February 17, 2016 |
| Nunapitchuk | March 17, 2016 |
| Tyonek | March 25, 2016 |
| McGrath | March 26, 2016 |
| Lower Kalskag | April 5, 2016 |
| Holy Cross | April 6, 2016 |
| Chuathbaluk | April 11, 2016 |

## 4. SUBSISTENCE DETERMINATIONS UNDER ANILCA § 810(A)(3)(A), (B), AND (C)

ANILCA § 810(a) provides that no "withdrawal, reservation, lease, permit, or other use, occupancy or disposition of the public lands which would significantly restrict subsistence uses shall be effected" until the Federal agency gives the required notice and holds a hearing in accordance with ANILCA §810(a)(1) and (2), and makes the three determinations required by ANILCA § 810(a)(3)(A), (B), and (C). The three determinations that must be made are: 1) That such a significant restriction of subsistence use is necessary, consistent with sound management principles for the utilization of the public lands; 2) That the proposed activity will involve the minimal amount of public lands necessary to accomplish the purposes of such use, occupancy, or other such disposition; and 3) That reasonable steps will be taken to minimize adverse impacts to subsistence uses and resources resulting from such actions [16 U.S.C. § 3120(a)(3)(A), (B), and (C)].

Through feedback provided during the scoping meetings, the BLM, as part of the Draft EIS, made a preliminary determination that Alternatives 2, 3A, 3B, 4, 5A and 6A may significantly restrict subsistence uses for the communities of Tyonek, Skwentna, McGrath, Nikolai and Takotna, Bethel, Tuntutuliak, Napakiak, Napaskiak, Oscarville, Kwethluk, Akiachak, Akiak, Tuluksak, Upper and Lower Kalskag, Aniak, Chuathbaluk, Napaimute Red Devil, Sleetmute, Stony River, and Crooked Creek.

The BLM also made a preliminary determination that the cumulative case may significantly restrict subsistence uses for the communities of Bethel, Tuntutuliak, Napakiak, Napaskiak, Oscarville, Kwethluk, Akiachak, Akiak, Tuluksak, Upper and Lower Kalskag, Aniak, Chuathbaluk, Napaimute and Crooked Creek.

Therefore, the BLM undertook the notice and hearing procedures required by ANILCA § 810 (a)(1) and (2) in conjunction with release of the Donlin Gold Project Draft EIS in order to solicit public comment from the potentially affected communities of Aniak, Crooked Creek, Bethel, Qunihagak, Akiak, Nunapitchuk, Tyonek, McGrath, Lower Kalskag, Holy Cross, and Chuathbaluk, as well as from all subsistence users. A public meeting and 810 hearing was also held in Anchorage. The dates of the meetings held are listed in section 3 above.

### 4.1. Significant Restriction of Subsistence Use is Necessary, Consistent with Sound Management Principles for the Utilization of Public Lands

The BLM authorizes ROWs to fulfill its responsibilities under the authority of Section 28 of the Mineral Leasing Act of 1920, as amended. Donlin Gold filed a ROW application with the BLM for the proposed project across Federal lands. The BLM is responsible for providing a ROW across Federal lands for the proposed natural gas pipeline, while providing protections for specific habitat, resources and uses. Therefore, the BLM finds that issuance of a ROW for this action would be necessary and consistent with sound principles for the utilization of public lands.

### 4.2. The Proposed Activity Will Involve the Minimum Amount of Public Lands Necessary to Accomplish the Purposes of Such Use, Occupancy or Other Disposition

The BLM has determined that Alternative 2 involves the minimum amount of public lands necessary to accomplish the purpose of the proposed activity, which is to grant a ROW for a natural gas pipeline for the project. The pipeline would be necessary to supply energy to operate the proposed Donlin Gold Mine. An alternative that varied the pipeline route (Dalzell Gorge route Alt 6A), and the no action alternative were also analyzed. All other alternatives (3A-LNG trucks, 3B-Diesel pipeline, 4-BirchTree Crossing Port, 5A-Dry Stacking of Tailings) would not change the proposed pipeline route, nor the need for a ROW across Federal public lands.

Alternatives that would reduce or eliminate the use of public lands needed for subsistence purposes include Alternative 1 (No Action). Section 2.4 in the FEIS, Alternatives Considered but Eliminated from Detailed Analysis, discusses other alternatives that were considered that involve less Federal public lands, but were eliminated from analysis due to economic or technological disadvantages, lack of feasibility, or because they did not meet the purpose of the proposed action to produce the gold resource discovered on Calista Corporation and TKC lands at the Donlin Gold site.

### 4.3. Reasonable Steps will be taken to Minimize Adverse Impacts upon Subsistence Uses and Resources Resulting from Such Actions

The following design features, best management practices, agency mitigation, monitoring, and adaptive management opportunities are discussed in Chapter 5 of the FEIS. These proposed measures are designed to protect various subsistence resources and their habitat and to reduce negative impacts from the proposed Donlin Gold mine. Given these steps, the BLM has determined that the proposed action includes all reasonable steps to minimize adverse impacts on subsistence uses and resources.

### *4.3.1. All Components*

**A12** -- Where practicable, construction and maintenance schedules would seek to minimize impacts on subsistence hunting and fishing, with the understanding that some construction activities must also take advantage of seasonal and environmental conditions.

**A13** -- Donlin Gold would implement a "no hunting/fishing policy" for employees at work sites to minimize competition from employees for local resources.

**A14** -- The project design includes the development and implementation of a Construction Communications Plan to inform the public and commercial operators of construction activities.

**A19** -- The project design includes shift work schedules to maximize opportunities for employees to remain active in subsistence harvest efforts during Construction and Operations Phases.

**A23** -- Surfaces would be progressively reclaimed throughout operation. Sediment controls would include site grading and capping of erodible material, revegetation, and re-routing of surface runoff to reestablish natural conditions.

### *4.3.2. Mine Site*

**M2** -- At the Tailings Storage Facility (TSF) dry beach, the project design includes installing silt fences, removing snow from active placement areas only, and using polymer suppressant to minimize dust.

**M11** -- Numerous locations and combinations of locations were analyzed for TSF and WRF layouts during the alternatives development process. These are summarized in Appendix C. The layout of major mine facilities was designed to minimize wetland impacts and limit effects on water quality to the American and Anaconda Creek watersheds. The 404(b)(1) analysis will document the steps taken to minimize wetlands impacts.

**M13** -- Water management planning at the mine site would assist in controlling the flow of groundwater at the pit and other major facilities (WRF, TSF), as well as controlling the potential effects of groundwater flow on water quality downgradient of the mine. This would be accomplished through design elements such as dewatering wells, collection of groundwater infiltration through and around the TSF at the SRS pond, and lake level maintenance following closure. A variety of groundwater monitoring activities would also be planned. M13 broadly covers design features of the water management plan, with details available in Chapter 2, Alternatives. Chapter 3 sections provide design and impact analysis pertaining to individual resources.

**M14** -- During the Operations Phase, concurrent reclamation activities (e.g., certain tiers and areas within the WRF) would be conducted immediately after construction and stabilization and whenever practicable in disturbed areas no longer required for active mining.

**M21** -- The mine plan incorporates the concept of design for closure. This incorporates methods for safe and efficient closure of the mine as an integral part of the planned mine design and operations. Implementing design for closure can have the effect of minimizing disturbance and the re-handling of materials.

### *4.3.3. Transportation*

**T1** -- Ocean and river fuel barges would be double-hulled and have multiple isolated compartments for transporting fuel to reduce the risk of a spill.

**T3** -- The barge operations system was designed to avoid the need for dredging the navigation channel in the river.

**T6** -- Donlin would implement barge guidelines for operating at certain river flow rates, and conduct ongoing surveys of the Kuskokwim River navigation channel to identify locations that should be avoided to minimize effects on bed scour and the potential for barge groundings. As part of the proposed operation, equipment will be available to free or unload/lighten barges in the event of groundings. The equipment will be available as part of ongoing operations; it will not all be dedicated standby equipment.

**T9** -- The project design includes a communication program to keep local communities informed of the schedules and current status of barge traffic, as well as to minimize displacement of subsistence fishing by barges (see Appendix W for Donlin Gold's Barge Communication Plan). Donlin Gold would consult with people experienced with navigation on the Kuskokwim River to incorporate local knowledge as the company designs its barging operations and guidelines.

**T10** -- To reduce impacts on existing river traffic and potential for groundings and accidents, Donlin would establish navigational aids and develop procedures for queuing in narrow channels. Donlin Gold vessels would use state-of-the-art navigation and communication equipment.

**T14** -- River pilots would be used for all tug and barge traffic between the mouth of the Kuskokwim River and Bethel (see Appendix W for Donlin Gold's Barge Communication Plan).

### *4.3.4. Pipeline*

**P3** -- The project design includes a natural gas pipeline to decrease the amount of barging needed to transport diesel fuel. The design decision to use a natural gas pipeline instead of barging 110 Mgal of diesel per year was developed in response to community concern about barge traffic levels.

**P7** -- Appropriate notices, warning signs, and flagging would be used to promote public safety. Barricades may also be used around dangerous areas such as open trenches during construction.

**P12** -- The project design includes routing of the pipeline and siting of the related compressor station along an existing corridor in Susitna Flats State Game Refuge to minimize impacts.

**P16** -- Donlin Gold will coordinate with and help educate people who want to travel in the area during the pipeline construction period through its Public Outreach Plan to either allow controlled access through or within construction zones or provide alternate access.

### *4.3.5. Best Management Practices*

- Designing and installing culverts and bridges on transportation routes for fish passage;
- Implementation of Stormwater Pollution Prevention Plans (SWPPPs) and/or Erosion and Sediment Control Plans (ESCPs), and use of industry standard BMPs for sediment and erosion control;
- Development and maintenance of ODPCPs, SPCC Plans, and FRPs;
- Use of BMPs, such as watering and use of dust suppressants, to control fugitive dust;
- Preparation and implementation of a Stabilization, Rehabilitation, and Reclamation Plan (SRRP);
- Compliance with Alaska Department of Natural Resources (ADNR) Dam Safety requirements through certificates of approval to construct and operate dams to include preparation of Emergency Action Plans and completion of a Failure Modes Effects Analysis (FMEA);
- Appropriate bonding/financial assurance required by ADNR and BLM;
- Compliance with ADNR Temporary Water Use Authorization conditions for water withdrawal, such as screening requirements to avoid fish entrainment or injury, establishing water withdrawal rates and volumes, and as appropriate timing of water withdrawal to avoid fish migration, spawning, and incubating eggs;
- Monitoring of water withdrawals to ensure permitted limits are not exceeded;
- Preparation of a Wildlife Avoidance and Human Encounter/Interaction Plan;
- Verification that project vessels are equipped with proper emergency towing equipment in accordance with 18 AAC 75.027(f);
- Development of Blasting Plans;

- Development of Invasive Species Prevention and Management Plans (ISPMPs) and application of industry-standard BMPs relating to nonnative invasive species (NNIS) prevention and management;

- Compliance with Section 106 Programmatic Agreement (PA) and Cultural Resources Management Plan (CRMP), including adequate survey prior to ground-breaking activities and protocol for inadvertent discovery of cultural resources;

- Verifying pipeline integrity with visual and other non-destructive inspections of welds, hydrostatic testing, use of in-line inspection tools, and aerial inspections; and,

- Use of cathodic protection (specific method to be determined in final design) for corrosion protection of the steel pipeline.

#### *4.3.6. Agency mitigation*

**Mit 12** -- Where practicable and in compliance with FAA and safety requirements, establish recommended minimum flight altitudes (>1,500 feet is recommended to minimize impacts to Dall sheep and other wildlife when these animals are present in the vicinity of the work).

**Mit 15** -- Install signs that clearly distinguish trails from the pipeline ROW at points where the pipeline crosses trails to guide trail users to stay on the trail and off the pipeline ROW where the two are not co-located. As practicable, revegetate, or otherwise block access to, a narrow strip of the pipeline ROW where it crosses the trail to help steer and keep trail users on the trail, and to reduce the visual effect of the pipeline ROW crossing.

Apply measures to further restrict public access to the ROW to reduce indirect effects.

Close the pipeline ROW to Off Highway Vehicle (OHV) and snowmachine use, where appropriate and based on land ownership, to minimize increased recreational access.

**Mit 18** -- Donlin Gold should consult with the Alaska Department of Fish and Game and local subsistence users for current information and traditional knowledge to identify locations and times when subsistence activities occur, and to the extent practicable, minimize impacts to these activities. The Donlin Advisory Technical Review and Oversight Committee (DATROC) may serve to facilitate consultation, as appropriate.

**Mit 19** -- Maintain communication throughout all project phases with subsistence users concerning perception of ecological risk or potential exposure of waterfowl or fish to contamination. A communication method is important to address concerns and perceptions about contamination. The communication may include monitoring and testing of bird carcasses and fish, if appropriate. Biological monitoring may include fish tissue, feathers, and animal hair to detect any changes in contaminant concentrations. DATROC may serve to facilitate communication, as appropriate.

**Mit 26 --** Develop a Subsistence Plan and Report that would incorporate BMPs for the mine operations to maintain or improve subsistence activities and avoid potential conflicts. The plan may be developed with input from the local subsistence users, and may be organized through efforts from DATROC.

The plan may include monitoring of mine activities to ensure that subsistence resources are adequately protected throughout the active mine life and Post-Closure. The plan may also include an adaptive management framework where certain monitoring activities may no longer be needed, but additional monitoring may be required based on the results of previous years' activities.

Implement a two-way communications strategy to keep local communities informed of the schedules and current status of barge traffic, and keep Donlin Gold informed of the location and timing of commercial and subsistence fishing activities. The communication plan should include Bethel, due to the volume of traffic moving through Bethel Port. (Donlin Gold's Barge Communication Plan is available in Appendix W).

**Mit 36 --** Where appropriate, employ seasonal timing restrictions on blasting, as stipulated by resource agencies, to reduce noise related effects of blasting during sensitive subsistence hunting activities (e.g., fall moose hunting).

**Mit 82 --** Include speed limits in barge guidelines proposed as a design feature and identify periods of limited or suspended barging, to the extent practicable. Limit barging or restricted timing of barges during key commercial or subsistence fishing periods and in critical habitat areas (Cook Inlet and Kuskokwim Bay) to avoid periods of concentrated animal activity. Suspend barging during the smelt spawn (May) until the spawn is over.

### *4.3.7. Monitoring and adaptive management being considered by the project proponent*

**Mon 2 --** Develop adaptive management plan(s) in conjunction with local communities. Involve residents when determining parameters and performance standards, as appropriate.

**Mon 41 --** Monitor and test bird carcasses and fish, if and where appropriate, as part of a communication strategy to address perceived risk throughout the project. Designate a point of contact for monitoring and testing procedures.

**Mon 44 --** Monitoring to evaluate the relationship between vessel speeds and wave heights of representative barge tows in potential hotspot areas during the first years of construction would help determine what barge operational measures are needed (if any) to minimize or avoid risks relative to the displacement and/or stranding of small out migrant salmon and other young-of-year fishes, as well as commercial and subsistence fishing.

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