

## 4.2 LAND OWNERSHIP, MANAGEMENT, AND USE

The Environmental Impact Statement (EIS) analysis area for land ownership and management includes the project footprint (including material sites) and use of those and adjacent lands. Potential direct and indirect impacts include:

- Change in land ownership status if a lease was to be issued, an easement was to be altered or vacated, or if additional access were legally acquired
- Change in/ or conflict with land management as a result of the project
- Change in land use from an existing or allowed land use

Indirect effects to lands adjacent to the project are discussed under specific resources, such as recreation in national parks.

The magnitude of impact is determined by the number of acres impacted or the distance (in miles) from the project components. The duration is described in relation to the phase of the project (construction, operations, closure, or post-closure). For example, long term is considered to be for the life of the project (i.e., years to decades), and short term would be for the construction phase (i.e., months to years). The likelihood that the project would have an impact, and the geographic extent of impacts, are discussed for land ownership, management, and use. Mitigation measures that would reduce project impacts are discussed in Chapter 5, Mitigation.

Scoping comments showed concerns regarding limiting access to State-owned lands for recreation and waterfront usage, ensuring consistency with land use plans and goals of the landowners, and addressing long-term patterns that could allow for additional development. Comments also requested that impacts to Native Allotments and Native corporation lands be disclosed. The following sections address these and other issues.

### 4.2.1 Summary of Key Issues

**Table 4.2-1: Summary of Key Issues for Land Ownership, Management, and Use**

Impact Causing Project Component	Alternative 1a	Alternative 1 and Variants	Alternative 2 and Variants	Alternative 3 and Variant
<b>Mine Site</b>				
Land ownership	The mine site would be entirely on lands owned by the State of Alaska, which can issue authorization for the life of the project.			
Land management	The mine site would be managed for multiple use, including habitat protection and mineral development. MCO 393 would be addressed by the State of Alaska during permitting. The LPB also issues permits and authorizations.			
Land use	Land use at the mine site would change from minimal disturbance from exploration and subsistence activities to intense industrial development.			
<b>Transportation Corridor</b>				
Land ownership	63% would be owned and managed by the State of Alaska 37% would be owned and managed by ANCSA village corporations	63% State of Alaska 37% ANCSA village corporations	40% State of Alaska 1% ANCSA regional corporations 57% ANCSA village corporations 2% Native Allotments	30% State of Alaska. >1% ANCSA regional corporations 70% ANCSA village corporations 1% Native Allotments

**Table 4.2-1: Summary of Key Issues for Land Ownership, Management, and Use**

Impact Causing Project Component	Alternative 1a	Alternative 1 and Variants	Alternative 2 and Variants	Alternative 3 and Variant
	No variants	Kokhanok East Ferry Terminal Variant: 65% State of Alaska 35% ANCSA village corporations Summer-Only Ferry Operation Variant: 64% State of Alaska 36% ANCSA village corporations Pile-Supported Dock Variant would be the same as above	Summer-Only Ferry Operations Variant: 42% State of Alaska 1% ANCSA regional corporations 55% ANCSA village corporations 3% Native Allotments Pile-Supported Dock Variant would be the same Newhalen River North Crossing Variant: 44% State of Alaska 1% ANCSA regional corporations 53% ANCSA village corporations 2% Native Allotments	Concentrate Pipeline Variant would be the same as above
Land management	<p>The State manages lands for multiple uses, including mineral development, which does not preclude a mine access road.</p> <p>LPB and KPB also issue permits and authorizations.</p> <p>Uses on surface and subsurface lands privately owned by Alaska Native corporations are subject to the approval of the landowners, including Native Allotments.</p> <p>There would be no direct effects to federal lands, but indirect impacts from the project may result in modification of active management considerations.</p>			
Legal access	R.S. 2477 ROWs: 2 17(b) easements: 3 Public access easements: 1	R.S. 2477 ROWs: 0 17(b) easements: 1 Public access easements: 1	R.S. 2477 ROWs: 1 17(b) easements: 2 Public access easements: 2	R.S. 2477 ROWs: 1 17(b) easements: 2 Public access easements: 2
Land use	<p>The mine and port access roads would introduce a land use change from an undeveloped area primarily used for subsistence and recreation to an industrially used transportation system with trucks making 35 daily round trips.</p> <p>The ferry would cause increased summer traffic and an additional use to the lake during winter, with the potential to interfere with other uses of the ice for local transportation and subsistence activities.</p>	Impacts would be similar to those for Alternative 1a.	Impacts would be similar to those for Alternative 1a except for the Williamsport-Pile Bay Road, which would change from intermittent seasonal use to year-round industrial use with trucks making 35 daily round trips.	Impacts would be similar to those for Alternative 1a for the mine access road from Eagle Bay to the mine site, and similar to Alternative 2 from Diamond Point to Pile Bay. An access road would be developed along the Alternative 2 natural gas pipeline corridor, changing land use from previously undeveloped with some subsistence and recreational use associated with industrial truck traffic.

**Table 4.2-1: Summary of Key Issues for Land Ownership, Management, and Use**

Impact Causing Project Component	Alternative 1a	Alternative 1 and Variants	Alternative 2 and Variants	Alternative 3 and Variant
	No variants	Kokhanok East Ferry Terminal Variant would be the same as Alternative 1. Summer-Only Ferry Operations Variant would have no impacts to use in the winter, but would have twice the amount of truck and ferry traffic in the summer. Pile-Supported Dock Variant would be the same as Alternative 1.	Summer-Only Ferry Operations Variant would have no impacts to use in the winter, but would have twice the amount of truck and ferry traffic in the summer. Pile-Supported Dock Variant would be the same as Alternative 2.	Concentrate Pipeline Variant would be the same as Alternative 3, but would have less truck traffic.
<b>Port Site</b>				
Land ownership	100% State of Alaska		100% Native Allotments	58% ANCSA village corporations 42% Native Allotments
	No variants	Pile-Supported Dock Variant would be the same as Alternative 1.	Pile-Supported Dock Variant would be the same as Alternative 2.	Concentrate Pipeline Variant would be the same as Alternative 3.
Land management	Amakdedori port would be on lands owned by the State and managed with guidelines for waterfront development.		Uses on surface and subsurface lands privately owned on Native Allotments are subject to the approval of the landowners.	
Land use	Amakdedori port would introduce artificial features to a previously undeveloped location, changing the land use from an undeveloped area used for subsistence and cultural uses to industrial ship traffic and storage activities		At the Diamond Point port site, the area would change from active resource extraction to an industrial port. There would also be changes associated with industrial ship traffic in Iliamna Bay.  The Concentrate Pipeline Variant would have additional changes in Iniskin Bay.	
<b>Natural Gas Pipeline—Onshore</b>				
Land ownership	16% State of Alaska 84% ANCSA village corporations >1% Private	51% State of Alaska 48% ANCSA village corporations 1% Private	12% State of Alaska 7% ANCSA regional corporations 80% ANCSA village corporations >1% Native Allotments >1% Private	21% State of Alaska 57% ANCSA regional corporations 21% ANCSA village corporations >1% Native Allotments >1% Private
	No variants	Kokhanok East Ferry Terminal Variant: 39% State of Alaska 60% ANCSA village corporations 1% Private	No variants	No variants

**Table 4.2-1: Summary of Key Issues for Land Ownership, Management, and Use**

Impact Causing Project Component	Alternative 1a	Alternative 1 and Variants	Alternative 2 and Variants	Alternative 3 and Variant
Land management	The pipeline would cross subsurface lands owned by Cook Inlet Region, Inc., and various village corporations. Uses on surface and subsurface lands privately owned by Alaska Native corporations are subject to the approval of the landowners. Lands managed by the State of Alaska would be the same as the transportation corridor.			
Land use	Effects on land use would be similar to the transportation corridor. The pipeline compressor station on the Kenai Peninsula would add to the existing industrial development.	Impacts would be the same as those for Alternative 1a.	Impacts would be the same as those for Alternative 1a except that the ROW from Pile Bay to the mine access road would introduce a land use change from a mostly undisturbed area to a utility corridor.	Impacts from the mine access roads and pipeline compressor station would be similar to those for Alternative 1a. The impacts to the Williamsport-Pile Bay Road and Diamond Point port would be similar to those for Alternative 2.
<b>Natural Gas Pipeline—Offshore Cook Inlet</b>				
Land Management	The pipeline would cross the OCS of Cook Inlet. The BOEM has management authority over the Alaska OCS. The BSEE provides oversight of the OCS for safety, environmental protection, and conservation of resources.			

Notes: See Section 3.2, Land Ownership, Management, and Use, for complete land ownership information.

% = percent

ANCSA = Alaska Native Claims Settlement Act

BOEM = Bureau of Ocean Energy Management

BSEE = Bureau of Safety and Environmental Enforcement

KPB = Kenai Peninsula Borough

LPB = Lake and Peninsula Borough

MCO = mineral closing order

OCS = outer continental shelf

ROW = right-of-way

R.S. = Revised Statute

## 4.2.2 No Action Alternative

Under the No Action Alternative, federal agencies with decision-making authorities on the project would not issue permits under their respective authorities. The Applicant's Preferred Alternative would not be undertaken, and no construction, operations, or closure activities specific to the Applicant's Preferred Alternative would occur. Although no resource development would occur under the Applicant's Preferred Alternative, Pebble Limited Partnership (PLP) would retain the ability to apply for continued mineral exploration activities under the State's authorization process (ADNR 2018-RFI 073) or for any activity not requiring federal authorization. In addition, there are many valid mining claims in the area, and these lands would remain open to mineral entry and exploration by other individuals or companies.

It would be expected that current State-authorized activities associated with mineral exploration and reclamation, as well as scientific studies, would continue at levels similar to recent post-exploration activity. The State requires that sites be reclaimed at the conclusion of their State-authorized exploration program. If reclamation approval is not granted immediately after the cessation of activities, the State may require continued authorization for ongoing monitoring and reclamation work as it deems necessary.

Land use activities at the mine site, such as exploration or cessation of field activities, would occur in accordance with the requirements of the State of Alaska as the landowner. Such activities may result in a reversion of use (i.e., cessation of activity) or continuation of the existing use (i.e., exploration). Land ownership and management of the mine site, ports, and transportation and natural gas pipeline corridors would remain the same. Because the project would not be permitted as proposed, the No Action Alternative would have no new impacts on existing land ownership, management, and use.

### **4.2.3 Alternative 1a**

#### **4.2.3.1 Land Ownership**

For a description of land ownership under Alternative 1a, see Section 3.2, Land Ownership, Management, and Use. No land in the project footprint would be conveyed or sold, although an Uplands Mining Lease and associated authorizations may be acquired for mining activities and facilities on State lands. Temporary use permits (if issued), easements, and rights-of-way (ROWS) for the transportation corridor and natural gas pipeline corridor would be sought for State and Alaska Native Claims Settlement Act (ANCSA) Native corporation lands to construct and operate the project, if approved (see Appendix E, Laws, Permits, Approvals, and Consultations Required). This would result in a change in land status and an encumbrance on use at the mine site and along the route of the mine and port access roads, ferry terminals, and pipeline on both sides of Cook Inlet and including the alternative variants. The duration of the effect would be long term and the likelihood of the effect would be certain under Alternative 1a.

A tidelands lease would also be required by the State of Alaska for in-water facilities at the Amakdedori port site; this would include wetlands and other waters. These changes in land status constitute a direct impact, neither beneficial nor adverse, as there are no competing uses of encumbered lands at this time. The impact would last through the duration of the project, and after closure as long as the project components were in use. There would be no aspects of the project developed on federal- or municipal-owned lands.

#### **4.2.3.2 Land Management**

##### **State Management**

**Mine Site**—The majority of the mine site would be on State-owned lands in units R06-05, R06-23, and R06-24 of the Bristol Bay Area Plan (BBAP). Additionally, a small portion of the bulk tailings storage facility embankment, a portion of the tailings storage facility main seepage pond embankment, and the north water treatment plant discharge would be in R06-30.

Lands encumbered by State of Alaska mining claims by PLP are managed under the Alaska Lands Act, which would be guided by the BBAP and further managed by the Alaska Reclamation Act, the Mine Operation Act, and the Alaska Administrative Code on mining reclamation. The State of Alaska made much of their land selections in the BBAP planning area because of its mineral potential (ADNR 2013a). The BBAP specifies that these lands are to be retained in public ownership and managed for multiple uses—including recreation, timber, minerals, and fish and wildlife—as well as natural scenic, scientific, and historic values. This does not preclude construction of the mine or related facilities. Mineral development may be authorized after a robust public process and with the appropriate stipulations or measures identified as needed to protect fish, wildlife, or their habitats (ADNR 2019-RFI 125). The project would generally be consistent with the plan's goals for the use of subsurface resources, which call for making metallic and non-metallic minerals available to contribute to the mineral inventory and independence of the US generally and Alaska specifically, while protecting the integrity of the environment and affected

cultures. When potentially conflicting uses are designated in a management unit, the BBAP provides guidelines to allow various uses to occur without unacceptable consequences (ADNR 2019-RFI 125).

Unit R06-05 is managed for a variety of uses, including mineral exploration and development, protection of fish and wildlife resources, and dispersed recreation. Unit R06-24 consists of small portions of the upper North and South Fork Koktuli river corridors that flow through Unit R06-23 and Unit R06-30. Mineral development in Unit R06-24 as defined in the BBAP should be performed in such a manner as to ensure that impacts to the anadromous and high-value resident fish streams are avoided or reduced to levels deemed appropriate in the state and federal permitting processes related to mineral deposit development of the project. Specifically, such development should ensure the protection of the streams affected by MCO 393 and their associated riverine habitats, which includes the area within 100 feet of the ordinary high-water mark. The management intent for Unit R06-23 states that the habitat resources of those two stream corridors are to be managed like R06-24.

The BBAP acknowledged areas where mineral or habitat resources were known, taking such areas into consideration when establishing land use designations and, subsequently, classifications. If applications are submitted for this project, the State would adjudicate those applications based on statutes, regulations, and policies (ADNR 2019-RFI 125). Modification of active management for fish and wildlife protection would be necessary as a result of the project through the life of the mine and into post-closure. Potential conflicts between management plans and development of the project would be addressed and mitigated during the State permitting process and may require permit conditions to accommodate additional plan direction related to fish and wildlife management.

**Transportation Corridor and Pipeline**—Some of the transportation corridor and natural gas pipeline (and alternative variants) would be on State-owned lands managed under the guidance of the BBAP (see Section 3.2, Land Ownership, Management, and Use). The plan specifies that these lands are to be retained in public ownership and managed for a multiple use designation that does not preclude construction of the mine and port access roads. Modification of active management for fish and wildlife protection would be necessary in the immediate transportation and pipeline corridors and nearby McNeil River State Game Sanctuary and Refuge. The impact would be certain and long term, lasting through the life of the mine and into post-closure.

Iliamna Lake is managed as a navigable waterbody under the BBAP. The lake is co-designated for public recreation, dispersed tourism, and habitat. The designations allow for development to the extent that essential habitat and recreation values are maintained. These designations do not preclude construction and operations of the project's north and south ferry terminals, nor the ferry route across the lake.

**Amakdedori Port**—Amakdedori port, the southern end of the port access road, and the pipeline compressor station on the Kenai Peninsula would fall under the management of the State's Kenai Area Plan. The plan has management guidelines for the development of transportation and utilities that include protection of hydrologic systems and roads near wetlands or other waters. The plan also provides guidelines for waterfront development with regard to soil erosion and fuel storage (ADNR 2001). These guidelines would not preclude the development of Amakdedori port or the pipeline facilities on the Kenai Peninsula.

Because the project would not be counter to the State's planned land management of the area, project construction, operations, maintenance, or closure on State lands would not result in adverse direct or indirect effects on management of State lands. However, as described above, modification of active management may be necessary in some areas for the duration of the project and into post-closure.

### **Borough Management**

The mine site, the majority of the transportation corridor, and a portion of the natural gas pipeline corridor would be within the boundaries of the Lake and Peninsula Borough (LPB). The LPB issues development permits; however, no direct or indirect effects on land management in the LPB would occur outside of permit reviews and authorizations. Any permits from a borough would be issued with permit stipulations that would address potential land use conflicts as well as socioeconomic and fiscal impacts to residents and villages.

Amakdedori port and a portion of the transportation corridor and natural gas pipeline corridor on the western side of Cook Inlet would be located in the Kenai Peninsula Borough (KPB). The KPB Comprehensive Plan does not contain goals, objectives, or implementation actions specific to development of the project on lands in the KPB. However, the KPB does regulate development on the floodplain, in the coastal zone, and near certain anadromous fish streams throughout the borough. No direct or indirect effects on land management in the KPB would occur, outside of permit reviews and authorizations.

### **Alaska Native Regional and Village Corporation Management**

Portions of the mine and port access roads (including the Kokhanok spur road, and crossings of the Gibraltar and Newhalen rivers) would cross surface lands owned by Alaska Peninsula Corporation and Iliamna Natives Limited. The natural gas pipeline corridor would cross subsurface lands owned by Cook Inlet Region, Inc., and Bristol Bay Native Corporation. Uses on these surface and subsurface lands privately owned by Alaska Native corporations are subject to the approval of the landowners. Any activity would be conducted in accordance with lease and surface use agreements that PLP would establish with the landowners. Project construction, operations and maintenance, or closure would not result in adverse direct or indirect effects on management of these lands.

### **Federal Management**

Under this alternative, the Bureau of Safety and Environmental Enforcement (BSEE) has jurisdiction over the submerged lands seaward of State jurisdiction (3 nautical miles from shore); the pipeline would cross Cook Inlet over this federal jurisdiction. The natural gas pipeline would impact federal management on the outer continental shelf (OCS), which would factor into future decisions on oil and gas leasing. The Bureau of Ocean Energy Management (BOEM) has management authority over the Alaska OCS, and BSEE provides oversight of the OCS for safety, environmental protection, and conservation of resources.

The US Coast Guard (USCG) has authority over locations and clearances of bridges and causeways in or over navigable waters of the US. The USCG authorization is required for the bridges over the Gibraltar and Newhalen rivers and has set forth implementing regulations. The project would require permitting and federal oversight but would have no direct or indirect impact to federal management.

Besides the entities discussed above, no physical project-related infrastructure would be developed on any federal land or in other legislatively designated areas. Therefore, project construction, operations, or closure would not result in any direct effects on the management, ownership, or use of federal lands. However, project-related activities could indirectly and cumulatively affect the environment, resources, and visitor experience of four federal management units: Lake Clark National Park and Preserve, Katmai National Park and Preserve, Kachemak Bay National Estuarine Research Reserve, and the Alagnak Wild River. There is a small likelihood that adaptation in land management may be needed in response to potential adverse indirect impacts, such as noise and visual disturbance to recreationists and wildlife from

project components or alternative variants. The indirect impact of displacement of visitors or disruption of the visitor experience would be low in intensity. These impacts would be distant from the project location for recreation and wildlife, but would be long term, lasting through construction and operations. These indirect impacts are discussed in relevant resource sections of this EIS. See Section 4.5, Recreation; Section 4.11, Aesthetics; Section 4.19, Noise; and Section 4.23, Wildlife Values, for discussions of impacts on those resources.

### **Local Management**

Under Alternative 1a, no physical project-related infrastructure would be developed on lands that are in local jurisdiction under guidance of community plans. Therefore, project construction, operations, or closure would not result in any direct effects on the ownership, management, or use of local lands. However, project-related activities could indirectly affect the environment and resources of local communities. Those impacts are discussed in relevant resource sections of this EIS.

### **Legal Access**

There is a Revised Statute (R.S.) 2477 ROW that runs from the community of Pile Bay to the community of Iliamna (RST 396). Alternative 1a project components would bisect the ROW at several locations (see Section 3.2, Land Ownership, Management, and Use). The natural gas pipeline would also cross RST 1641, between the northern shore of Iliamna and the mine access road. Where a R.S. 2477 ROW would be impacted from construction or operations of the project, alternate access or marked crossings would be provided as appropriate. The magnitude of land ownership changes, although certain and long term, would not be apparent due to very low existing levels of use of the easement. Most local residents travel on Iliamna Lake via boat or snowmachine and not on this ROW.

The project area encompasses several section line easements. These easements would not prohibit development of a pipeline ROW or access roads across the affected section lines. Access to the easements would not be prohibited, although any future use may need to account for the presence of the mine access road and pipeline, if permitted and constructed.

The port access road would intersect an ANCSA Section 17(b) easement on the southern shore of Iliamna Lake (EIN 17b C5). The road would not prevent access to the easement, and crossing points would be sign-posted, with appropriate traffic controls established to ensure public safety, if needed (PLP 2018-RFI 027). The mine access road would intersect EIN 15f C5, and the natural gas pipeline would intersect EIN 6b; the impacts would be the same as for the port access road.

One state public access easement exists (ADL 230875) along the pipeline route in Iliamna Lake (see Section 3.2, Land Ownership, Management, and Use); it is an easement for communication networks (there are fiber optic cables in Iliamna Lake) and other utilities. Development of the project would not prohibit access to the easement, although PLP would need to be in contact with easement holders to ensure that construction would not affect existing infrastructure. There would be no impact on access to the easement.

There are no R.S. 2477 ROWs, easements, or other legal access mechanisms in the mine site safety boundary.

#### **4.2.3.3 Land Use**

As discussed in Section 3.2, Land Ownership, Management, and Use, the prevalent land uses around the EIS analysis area are undisturbed landscape and natural habitat, low-intensity recreational activities, and subsistence activity. Land development in the Bristol Bay area is

generally limited to the areas in and around geographically isolated communities, fish processing facilities, and small fishing and hunting lodges. Mining exploration activities have occurred in the project area and at other mineral deposits in the region.

Project construction, operations, and closure would not affect small-scale mining and exploration activities that may currently occur in the project vicinity. Residential and commercial uses in surrounding communities would not be directly affected by the project, but could expand based on employment and support service opportunities, an indirect effect. End land use and designation (post-closure) would be determined by the State.

**Mine Site**—The magnitude of impact to land use at the mine site would be in the change from minimal disturbance from exploration activities to intense industrial development. This would constitute an acute and obvious change that would last over the life of the project. The area affected would represent only a small portion of the total land area owned and managed by the State in the Bristol Bay watershed. Subsistence activity, cultural education, and recreation would be excluded from the vicinity of the mine site at the mine site safety boundary (PLP 2018-RFI 058) during construction and operations (see Section 4.5, Recreation; and Section 4.9, Subsistence). Land use would change again at closure of the mine, because the site would be restored as required by the State of Alaska and no longer used for mining. It could again be used for transportation and subsistence activities as resources once again become available.

**Transportation Corridor**—Construction of the mine and port access roads would introduce artificial features, vehicle traffic, and other activities to a previously undeveloped location, thereby changing land use. The magnitude of impact would be in the undeveloped locations that would now experience 35 daily round trips of industrial trucks along the transportation corridor. The access roads would be restricted to mine-related traffic and some controlled use by local residents and businesses and would not facilitate land use associated with non-resident recreation and tourism activities. These impacts would include the crossings of the Gibraltar and Newhalen rivers.

The ferry operating daily on Iliamna Lake would represent an addition to the watercraft currently used in open water; however, the ferry would present a new use of the lake during the winter, with the potential to interfere with other uses of the ice for local transportation and subsistence activities throughout the life of the project. The geographic extent would be the lake itself, and the likelihood of the impact would be certain when the lake is frozen. The road transportation corridor would remain in place upon project closure to support monitoring activities, although the ferry would cease operations and the intensity of use from the project would decrease. Depending on any agreements between the State and LPB with local input, some level of local use of the corridor may continue. These remaining features would constitute a permanent effect; the magnitude would be a moderate shift from an undisturbed landscape with low levels of intermittent use to transportation infrastructure supporting an industrial use.

**Natural Gas Pipeline Corridor**—The natural gas pipeline would be in the transportation corridor, extending from Amakdedori port to the south ferry terminal, crossing Iliamna Lake, coming ashore between Iliamna and Newhalen, and travelling north until co-locating with the mine access road to the mine site. There would be some land use changes in that segment between Iliamna Lake and the mine access road, although there is an existing road parallel so changes would be minimal. Any potential future use of the corridor would have to accommodate the presence of the pipeline. At the compressor station on the Kenai Peninsula, where the pipeline would connect to existing infrastructure, the land currently has some industrial development. The magnitude of impact would be in the additional development from construction of the compressor station, with restricted access lasting throughout the life of the project, but overall land use in that area would not change.

Where the pipeline would cross Iliamna Lake and Cook Inlet, it would introduce a new use to the lake and this portion of the inlet that would last for the life of the project. During construction, there may be some short-term disruption to current uses of these waterbodies; during operations, there would be minimal disruption to Cook Inlet uses due to pipeline maintenance and repairs. The pipeline would remain in place in post-closure; however, depending on agreements reached, service could extend beyond the life of the project.

**Amakdedori Port Site**—Construction at the port site would introduce an industrial port facility to a previously undeveloped location that is currently used for occasional subsistence and cultural education purposes. The magnitude of the impact would be the land use in the geographic area of the port that would change with the addition of industrial ship traffic, truck traffic, and storage activities. Because of security concerns, it is likely that any use of the physical footprint of the port site without coordination with PLP would be displaced (including cultural education at the specific site); adjacent use activities, such as commercial fishing, could be affected. However, current access to the port site is limited and existing use activities are intermittent; overall impacts would therefore be long term, lasting for the life of the project, but small in magnitude. Amakdedori port would remain in place until project closure, when the port would no longer be needed to support reclamation and monitoring activities. The likelihood of impacts to land use at the port site would be certain under Alternative 1a.

#### **4.2.4 Alternative 1**

##### **4.2.4.1 Land Ownership**

For a description of land ownership under Alternative 1, see Section 3.2, Land Ownership, Management, and Use. As with Alternative 1a, no land in the project footprint would be conveyed or sold, although an Uplands Mining Lease may be acquired, and associated authorizations permits may be sought for mining activities and facilities on State lands. Temporary use permits, easements, and ROWs for the transportation corridor and natural gas pipeline would be issued to construct and operate the project if approved. The magnitude of the impact on land ownership would be in the change in land status and an encumbrance on use along the routes of the mine, port access roads, and pipeline. The types of impacts would be the same as described under Alternative 1a, but would affect different areas, ANCSA village corporation owners, and communities along the mine access road. A new or amended tidelands lease may be sought from the State of Alaska. The impacts to land ownership would be long term in duration and would be certain under Alternative 1.

##### **4.2.4.2 Land Management**

Land management under Alternative 1 would be similar to Alternative 1a for state, borough, and local management; the impacts to land management would be similar to those discussed above, but would affect different areas, ANCSA village corporation owners, and communities along the mine access road.

##### **Legal Access**

There are no State-recognized R.S. 2477 ROWs in the footprint of Alternative 1.

The project area encompasses several section line easements from the mine site to Cook Inlet; impacts would be similar to Alternative 1a.

The port access road would cross the same ANCSA 17(b) easement (EIN 17b C5) and state public access easement (ADL 230875) in Iliamna Lake as Alternative 1a, although the number

and locations of the crossings would be different. Impacts would be the same as discussed for Alternative 1a, and there would be no impact on access to the easements.

#### **4.2.4.3 Land Use**

Impacts to land use at the mine site and the Kenai Peninsula pipeline compressor station would be the same as discussed under Alternative 1a.

The impact to the transportation corridor along the port road would be the same as Alternative 1a; impacts along the mine access road would be similar, although in a different location. Impacts to summer or winter transportation and subsistence use of Iliamna Lake would be the same as discussed for Alternative 1a.

As with Alternative 1a, the area at the Amakdedori port site would change from active resource extraction to an industrial port, with changes associated with an increase of project-related industrial ship traffic in Kamishak Bay. These impacts would be evident, certain, and would last for the duration of the project.

#### **4.2.4.4 Alternative 1—Kokhanok East Ferry Terminal Variant**

The impacts to land ownership, management, and use would be same as described previously under Alternative 1a and Alternative 1. This variant would be on lands owned by the State of Alaska and Alaska Peninsula Corporation, although acreage would be different than Alternative 1. This variant would not impact additional easements or legal access.

#### **4.2.4.5 Alternative 1—Summer-Only Ferry Operations Variant**

The impacts to land ownership and management would be same as previously described under Alternative 1a and Alternative 1, except that during winter there would be no new use of Iliamna Lake and there would be no impacts to other uses of the lake from the project. During the summer, the magnitude would be in the increased amount of truck traffic and ferry traffic, which would double on the access roads and lake, respectively, with increases in potential impacts to other users during that period. Conversely, there would be no truck and ferry traffic in the winter. In terms of duration, impacts would be every summer throughout the life of the project; the likelihood would be certain under this variant. Land ownership under this variant would not be different.

#### **4.2.4.6 Alternative 1—Pile-Supported Dock Variant**

The impacts to land ownership, management, and use would be same as previously described under Alternative 1.

### **4.2.5 Alternative 2—North Road and Ferry with Downstream Dams**

#### **4.2.5.1 Land Ownership**

For a description of land ownership under Alternative 2—North Road and Ferry with Downstream Dams, see Section 3.2, Land Ownership, Management, and Use. The Diamond Point port would be on lands owned on Native Allotments. As with Alternative 1a, no land in the project footprint would be conveyed or sold, although an Uplands Mining Lease may be acquired, and associated authorizations permits may be sought for mining activities and facilities on State lands. Temporary use permits, easements, and ROWs for the transportation corridor and natural gas pipeline would be issued to construct and operate the project if approved. The magnitude of the impact on land ownership would be in the change in land status and an encumbrance on use along the routes of the mine, port access roads, and pipeline. The types of impacts would be the same as described

in Alternative 1a, but would affect different areas, ANCSA village corporation owners, and communities along the transportation corridor and port site. Pedro Bay Native Corporation has stated that it will not grant access to PLP on their lands at this time. A new or amended tidelands lease may be sought from the State of Alaska. Impacts to land ownership would be long term in duration and would be certain to occur under Alternative 2.

#### **4.2.5.2 Land Management**

State management at the mine site, transportation corridor, and on the Kenai Peninsula would be the same as Alternative 1a, but would affect different areas along the port access road. There would be no port facilities on State-owned lands. Although the route traverses different management units, the management intent is the same, and the impacts are the same as Alternative 1a.

As with Alternative 1a, the mine site, the majority of the transportation corridor, and a portion of the natural gas pipeline corridor would be in the LPB. The Diamond Point port and a portion of the transportation corridor and the natural gas pipeline corridor on the western side of Cook Inlet would lie in the KPB. Impacts for borough management in these locations would be similar to borough management for Alternative 1a.

Land use of surface and subsurface lands privately owned by Alaska Native corporations are subject to the approval of the landowners (including where the transportation corridor would cross the Newhalen River). Any activity would be conducted in accordance with lease and surface use agreements that PLP would establish with the landowners. Project construction, operations, maintenance, or closure would not result in long-term, adverse, direct, or indirect effects on management of these lands.

The Diamond Point port would be located on Native Allotments. The lands are held in trust by the federal government and generally require Bureau of Indian Affairs (BIA) oversight for sales, gift deeds, leases, permits, partitions, ROWs, and sand and gravel leases. Impacts on land use from development of the Diamond Point port would be minimally adverse changes to land management at the port site; however, there would be an increase in ship traffic. The changes would be certain to occur under Alternative 2 and would last for the life of the mine.

Federal land management under Alternative 2 would be similar to Alternative 1a in that project construction, operations, or closure would not result in any direct effects on the management, ownership, or use of federal lands. The Alternative 2 transportation corridor would be approximately 4 miles closer to Lake Clark National Park and Preserve than Alternative 1a, and project transportation activities may be more noticeable to park users; but it would be farther from both the Katmai National Park and Preserve and the McNeil River State Game Sanctuary and Refuge. Effects of project-related activities on the environment, resources, and visitor experience of the federal management units listed for Alternative 1a would be long term and certain under Alternative 2.

Management of BSEE jurisdiction would be the same as Alternative 1a. The USCG would have authority over the bridge crossing the Newhalen River. The project would require permitting and federal oversight, but would have no direct or indirect impact to federal management.

Under Alternative 2, no physical project-related infrastructure would be developed on lands that are in local jurisdiction. Impacts would be the similar to those under Alternative 1a.

The ferry route for Alternative 2 would cross near the islands on Iliamna Lake, where there is a conservation easement in place. Under the terms of the easement, there can be no development on those lands. The easement would not prevent the passage of vessels through those areas.

## **Legal Access**

Alternative 2 would cross the same R.S. 2477 ROW as Alternative 1a (RST 396), although the number and locations of crossings would be different and would occur primarily between Knutson Bay and Pile Bay.

The project area encompasses several section line easements from the mine site to Cook Inlet, and impacts would be similar to Alternative 1a.

The natural gas pipeline would intersect one Section 17(b) easement, on the northern shore of Iliamna Lake (EIN 30a C5 D1); the transportation corridor and natural gas pipeline would intersect one Section 17(b) easement, also on the northern shore of Iliamna Lake (EIN 15f C5). The project would not prevent access to the easements, and crossing points would be sign-posted, with appropriate traffic controls established to ensure public safety (PLP 2018-RFI 027). There would be no effect on legal access.

Alternative 2 would intersect the same public access easement in Iliamna Lake as Alternative 1a (ADL 230875). Although the number and locations of the crossings would be different, impacts would be similar. The natural gas pipeline and transportation corridor under Alternative 2 would intersect one additional public access easement (ADL 232949; see Section 3.2, Lands Ownership, Management and Use). The project would not prevent access to the easement, and crossing points would be sign-posted, with appropriate traffic controls established to ensure public safety (PLP 2018-RFI 027). Therefore, project effects on this and other easements would not occur.

### **4.2.5.3 Land Use**

Impacts to land use at the mine site and the Kenai Peninsula pipeline compressor station would be the same as discussed under Alternative 1a.

Impacts to land use from the transportation corridor would be similar to Alternative 1a for the mine access road from the Eagle Bay ferry terminal to the mine site (including where the transportation corridor would cross the Newhalen River) and for the ferry use across Iliamna Lake, although they occur at different locations. The transportation corridor under Alternative 2 includes construction of a port access road in the vicinity of and in places overlapping the current Williamsport-Pile Bay Road, which is used for the summer season portage of fishing boats and some cargo from Cook Inlet to the Bristol Bay fishery. Construction could cause some disruption to pre-existing traffic, and pre-existing traffic would use the improved Williamsport-Pile Bay Road, which would have increased heavy industrial use. The change would be high intensity, certain under Alternative 2, and would last for the life of the project. After closure, the road would revert to the current level of use, although it may increase slightly. As a beneficial impact, an improved route with reduced grade could entice use by additional boat owners and lake cargo services.

At the Diamond Point port site, the magnitude of effects on land use would be in the change from active construction of a quarry to an industrial port. Changes associated with an increase of project-related industrial ship traffic in Iliamna Bay would occur, and truck traffic would increase along the road connecting Diamond Point to the Williamsport-Pile Bay Road. These adverse impacts would be noticeable and would last through the duration of the project.

The natural gas pipeline from Pile Bay to the mine access road from Eagle Bay ferry terminal would introduce a change in land use by converting a mostly undisturbed area to an area with a utility corridor. These impacts would be certain, low intensity, and last until the pipeline is decommissioned, which could extend beyond the life of the project depending on agreements reached.

#### **4.2.5.4 Alternative 2—Summer-Only Ferry Operations Variant**

Impacts to land ownership and management would be same as described under Alternative 1, except at a different location. As with Alternative 1, during the winter, there would be no new project use of Iliamna Lake and there would be no impacts to other uses of the lake from the project. There would be no truck traffic along the access roads in the winter. During the summer, the magnitude of truck traffic and ferry traffic would double. The additional footprint for this variant would be entirely on lands owned by ANCSA village corporations and Native Allotments. The likelihood of impact would be certain under this variant, and the impact would be long term, lasting for the life of the project.

#### **4.2.5.5 Alternative 2—Pile-Supported Dock Variant**

The impacts to land ownership, management, and use would be same as described under Alternative 1, except at a different location. The additional footprint for this variant would be entirely on lands owned by ANCSA regional and village corporations.

#### **4.2.5.6 Alternative 2—Newhalen River North Crossing Variant**

The impacts to land ownership, management, and use would be same as described under Alternative 2.

### **4.2.6 Alternative 3—North Road Only**

#### **4.2.6.1 Land Ownership**

For a description of land ownership under Alternative 3—North Road Only, see Section 3.2, Land Ownership, Management, and Use. The Diamond Point port would be on lands owned on Native Allotments and ANCSA village corporations. As with Alternative 1a, no land in the project footprint would be conveyed or sold, although an Uplands Mining Lease may be acquired, and associated State authorizations may be sought for mining activities and facilities on State lands. Temporary use permits, easements, and ROWs for the transportation corridor and natural gas pipeline (including alternative variants) would be issued to construct and operate the project, if approved. The magnitude of the effect on land ownership would be in a change in land status and an encumbrance on use along the routes of the mine, port access roads, and pipeline. The types of impacts would be the same as described in Alternative 1a; they would affect roughly the same areas, ANCSA corporations, landowners, and communities as Alternative 2, but bridging the gap between ferry terminals with a road and natural gas pipeline corridor. Pedro Bay Native Corporation has stated that it will not grant access to PLP on their lands at this time. The access road would be in the same area as Alternative 2 and follow the Alternative 2 natural gas pipeline route. Long-term impacts on land ownership would be certain under Alternative 3.

#### **4.2.6.2 Land Management**

Land management under Alternative 3 would be similar to Alternative 2 for state, borough, federal, and local management, except that the road would be co-located with the natural gas pipeline corridor and there would be no ferry operation. The transportation corridor would transect the same ANCSA native corporation lands as the transportation corridor and natural gas pipeline under Alternative 2 (including where it would cross the Newhalen River), and the impacts to land management would be similar to those of the transportation corridor under Alternative 1a and Alternative 2.

## **Legal Access**

Under Alternative 3, the transportation corridor and natural gas pipeline would bisect the same R.S. 2477 ROW (RST 396), and Section 17(b) easements (EIN 30a C5 D1 and EIN 15f C5) as in Alternative 2, and the impacts would be similar. There would be no crossings of public access easements in Iliamna Lake, but the listed easement also crosses Cook Inlet at Iliamna Bay, and the impacts would be similar to Alternative 2.

The project area encompasses several section line easements from the mine site to Cook Inlet, and impacts would be similar to Alternative 1a.

### **4.2.6.3 Land Use**

Impacts to land use at the mine site and the Kenai Peninsula pipeline compressor station would be the same as discussed under Alternative 1a.

The impact to the transportation corridor along the Williamsport-Pile Bay Road would be similar to Alternative 2, with the addition of road access and associated truck traffic along the natural gas pipeline route to Pile Bay. From Pile Bay to the mine site, impacts to the transportation corridor would be similar to Alternative 2 along the mine and port access roads, including where the transportation corridor would cross the Newhalen River. There would be no impacts to summer or winter transportation and subsistence use of Iliamna Lake, compared to Alternative 1a, Alternative 1, and Alternative 2.

At the Diamond Point port site, Alternative 3 would introduce additional industrial uses in an undeveloped area. There would be reconstruction of the Williamsport-Pile Bay Road and increased traffic levels. There would also be changes associated with an increase of project-related industrial ship traffic in Iliamna Bay. These impacts would be evident, certain, and would last through the duration of the project.

### **4.2.6.4 Alternative 3—Concentrate Pipeline Variant**

The concentrate pipeline would be constructed adjacent to the natural gas pipeline; therefore, impacts to land ownership and management would be the same as described previously under Alternative 3. Under this variant, the magnitude of the increase in use of the Williamsport-Pile Bay Road would be lower because of less project-related truck traffic as concentrate would be shipped by pipeline.

## **4.2.7 Cumulative Effects**

Potential cumulative impacts to lands include incremental change in land ownership, management, legal access, and land use. The magnitude of impact is determined by the number of acres impacted or the distance in miles from the project components. The cumulative effects analysis area for lands includes the EIS analysis area and encompasses the footprint of the project, including alternatives and variants, the expanded mine footprint (including road, pipeline and port facilities), and any other reasonably foreseeable future actions (RFFAs) in the vicinity of the project that would result in potential synergistic and interactive effects. In this area, a nexus may exist between the project and other past, present, and RFFAs that could contribute to a cumulative effect on lands and ownership.

Some of the actions identified in Section 4.1, Introduction to Environmental Consequences, are considered to have no potential of contributing to cumulative effects on land ownership and use in the analysis area. These include offshore-based developments; activities that may occur in the analysis area but are unlikely to result in any appreciable impact on land use (e.g., tourism,

recreation, fishing, and hunting); or actions outside of the cumulative effects analysis area (e.g., Donlin Gold, Alaska LNG).

#### **4.2.7.1 Past and Presents Actions**

Past and present actions in the analysis area that have resulted in the land ownership pattern in the area include the Alaska Statehood Act, ANCSA, and the Alaska National Interest Lands Conservation Act. These include land status changes over time as lands selected under the Statehood Act and ANCSA are conveyed, and as additional easements and ROWs are developed. Land uses in the analysis area are primarily fish and wildlife habitat, low-intensity recreational activities, and subsistence. Outside of community settlements, some industrial and commercial land uses do exist in the analysis area, including those associated with mineral exploration and activity near the mine site and other mineral deposits; the Diamond Point port site, which is used for resource extraction; seasonal use of the Williamsport-Pile Bay Road; and commercial fishing in Cook Inlet. However, with the exception of these commercial and industrial land uses, the majority of the analysis area is characterized by low-intensity land uses; therefore, the area is generally in a natural state.

#### **4.2.7.2 Reasonably Foreseeable Future Actions**

The RFFAs identified in Section 4.1, Introduction to Environmental Consequences, that could contribute cumulatively to land ownership, use, or management impacts and are carried forward in this analysis include project expansion, exploration of mining claims, oil and gas development in Cook Inlet, road improvement projects, and continuance of recreation activities in the greater regional area.

The No Action Alternative would not contribute to cumulative effects on land ownership, management, legal access, or land use.

Collectively, the project alternatives with RFFAs' contribution to cumulative effects on land ownership, management, legal access, or land use are summarized in Table 4.2-2.

**Table 4.2-2: Contribution to Cumulative Effects on Land Ownership, Management, and Use**

Reasonably Foreseeable Future Actions	Alternative 1a	Alternative 1	Alternative 2 and Variants	Alternative 3 and Variant
<p>Pebble Mine Expanded Development Scenario</p>	<p><b>Mine Site:</b> The mine site footprint would have a larger open pit and new facilities to store tailings and waste rock and to manage water, which would contribute to land use changes and additional encumbrance of land. Cumulative effects to specific land uses, such as subsistence, recreation, and cultural resources, are discussed in those sections.</p> <p><b>Other Facilities:</b> The north access road would be extended east from the Eagle Bay ferry terminal to a new deepwater port site at Iniskin Bay. Diesel and concentrate pipelines would be co-located with the road. The ferry and port access road under Alternative 1a would continue to operate to transport freight. This would introduce vehicle and vessel transportation uses along the north access corridor and new port facility, although there would be a reduction in truck traffic along both road corridors. Pipeline construction would have potentially limited impacts on land use from trenching activities. The construction and operation of other facilities would add intensity to activities (more traffic) and potentially more infrastructure to the Iliamna Lake area.</p> <p><b>Magnitude:</b> The Pebble mine expanded development scenario project footprint would impact approximately 31,892 acres. It would affect more acres than either Alternative 2 or Alternative 3, given that two transportation corridors would be constructed and operated instead of one.</p> <p><b>Duration/Extent:</b> The duration/extent of cumulative impacts to land use would be incremental changes in ownership and intensity of use over the long-term</p>	<p><b>Mine Site:</b> Identical to Alternative 1a.</p> <p><b>Other Facilities:</b> A north access road, and concentrate and diesel pipelines would be constructed along the Alternative 3 road alignment, and extended to a new deepwater port site at Iniskin Bay.</p> <p><b>Magnitude:</b> Overall expansion would affect 32,418 acres, more acres than the other Alternatives. Impacts to land use from mine expansion would be similar to Alternative 1a.</p> <p><b>Duration/Extent:</b> The cumulative impacts to land use and ownership would be similar in duration and extent to Alternative 1a, although affecting more acres.</p> <p><b>Contribution:</b> The contribution to cumulative effects would be more than Alternative 1a, and more than Alternative 2 and Alternative 3.</p>	<p><b>Mine Site:</b> Identical to Alternative 1a.</p> <p><b>Other Facilities:</b> The north access road would be extended east from the Eagle Bay ferry terminal to a new deepwater port site at Iniskin Bay. Concentrate and diesel pipelines would be constructed along the Alternative 3 road alignment and extended to a new deepwater port site at Iniskin Bay. This would introduce vehicle and vessel transportation uses along the new road-connected portion of the north access corridor and new port facility.</p> <p><b>Magnitude:</b> Overall expansion would affect fewer acres (31,528) than the other Alternatives, given that a portion of the north access road and all of the gas pipeline would already be constructed. Impacts to land use from mine expansion would be less than Alternative 1a.</p> <p><b>Duration/Extent:</b> The cumulative impacts to land use and ownership would be similar in duration to Alternative 1a, although affecting fewer acres, given</p>	<p><b>Mine Site:</b> Identical to Alternative 1a.</p> <p><b>Other Facilities:</b> Overall expansion would use the existing north access road; concentrate and diesel pipelines would be constructed along the existing road alignment and extended to a new deepwater port site at Iniskin Bay. Truck traffic along the north access corridor would be reduced with operation of the concentrate pipeline.</p> <p><b>Magnitude:</b> Overall expansion would affect 31,541 acres, fewer acres than Alternative 1a and Alternative 1, given that the north access road and gas pipeline would already be constructed. Impacts to land use from mine expansion would be less than Alternative 1a.</p> <p><b>Duration/Extent:</b> The cumulative impacts to land use and ownership would be similar in duration and extent to Alternative 1a, although affecting fewer acres, given that only one transportation corridor would be constructed and operated.</p>

**Table 4.2-2: Contribution to Cumulative Effects on Land Ownership, Management, and Use**

Reasonably Foreseeable Future Actions	Alternative 1a	Alternative 1	Alternative 2 and Variants	Alternative 3 and Variant
	<p>development and operation of the expanded mine scenario. Changes to land ownership, management, and use would occur in two transportation access corridors instead of one, increasing the geographic extent.</p> <p><b>Contribution:</b> Expansion would affect land management and ownership in ways similar to the combined effects of Alternative 1 and Alternative 3, due to the development of the north access road, and the Iniskin Bay/Diamond Point and concentrate pipeline along the northern shore of Iliamna Lake to Iniskin Bay/Diamond Point, but over an operating life of 78 years followed by a period of closure. Effects of expansion would be similar to Alternative 3 with the Concentrate Pipeline Variant, minus the copper/gold concentrate truck traffic, and additive to the effects of Alternative 1. State permits and leases with the mine site would need to be amended and additional ROWs granted from State and ANCSA corporations. Additional tidelands leases might also be required. The proximity of expanded facilities to federal lands management units would be similar to a combination of Alternative 1 and Alternative 3 because the Pebble mine expanded development scenario would need to develop the Alternative 3 corridor for the concentrate export pipeline, and would need a port at Diamond Point and/or Iniskin Bay. The primary effects to the existing and surrounding land uses would be the expanded industrial use at the mine site and the introduction of industrial activities in two undeveloped areas over two transportation corridors instead of one over an extended timeframe. The effects would be</p>		<p>that only one transportation corridor would be constructed and operated.</p> <p><b>Contribution:</b> Cumulative impacts from Alternative 2, combined with the mine expanded development scenario to land ownership, management, legal access, and use, would be of lesser magnitude and geographic extent than Alternative 1a because there would be no development at Amakdedori, and the Alternative 1 transportation corridor would not be used. Alternative 2, in combination with the mine expanded development scenario, would contribute to the slow transition toward a more developed land use scenario, with more prevalent industrial, commercial, and transportation land uses. However, these changes to land use patterns would occur over a smaller geographic area and affect fewer acres than under Alternative 1a.</p>	<p><b>Contribution:</b> Under Alternative 3, project expansion would continue to use the existing Diamond Point port facility, would use the same natural gas pipeline, and would use the same north access road and Concentrate Pipeline Variant but extend diesel and concentrate pipelines to Iniskin Bay. The port site and associated facilities would be constructed at Iniskin Bay as discussed under Alternative 1a. Alternative 3, in combination with the mine expanded development scenario, would contribute to the slow transition toward a more developed land use scenario, with more prevalent industrial, commercial, and transportation land uses. Because the Pebble mine expanded development scenario would use the north access road system that would already be built under Alternative 3 and would not include any ferry operation, Alternative 3 combined with the expanded mine development scenario would have cumulative land ownership, management, legal access, and use</p>

**Table 4.2-2: Contribution to Cumulative Effects on Land Ownership, Management, and Use**

Reasonably Foreseeable Future Actions	Alternative 1a	Alternative 1	Alternative 2 and Variants	Alternative 3 and Variant
	<p>partially offset with the construction of the concentrate pipeline, in that copper/gold concentrate truck traffic would be eliminated. The contribution of the expanded mine scenario to cumulative impacts would be the extended duration of mining land uses over an area and acreage roughly double the size of the proposed alternative.</p>			<p>impacts of lesser magnitude and geographic extent than Alternative 1a, Alternative 1, or Alternative 2.</p>
<p>Other Mineral Exploration Projects</p>	<p><b>Magnitude:</b> Mining exploration activities would include additional borehole drilling, road and pad construction, and development of temporary camp facilities. Because they are currently permitted claims, mineral exploration is likely to continue in the analysis area for the mining projects listed above. Depending on the project, additional activity and infrastructure would be either continuation or a change in land use. Cumulative effects on specific land uses are discussed under subsistence, recreation, and cultural resources.</p> <p><b>Duration/Extent:</b> Exploration activities typically occur at a discrete location for one season, although a multi-year program could expand the geographic area affected in a specific mineral prospect. Table 4.1-1 identifies seven mineral prospects in the EIS analysis area where exploratory drilling is anticipated (four are in relatively close proximity to the Pebble Project).</p> <p><b>Contribution:</b> Exploration activities would continue to contribute to industrial uses in the analysis area. However, the magnitude of these activities would be generally sporadic, and summer-seasonal in duration.</p>	<p>Similar to Alternative 1a.</p>	<p>Similar to Alternative 1a.</p>	<p>Similar to Alternative 1a.</p>

**Table 4.2-2: Contribution to Cumulative Effects on Land Ownership, Management, and Use**

Reasonably Foreseeable Future Actions	Alternative 1a	Alternative 1	Alternative 2 and Variants	Alternative 3 and Variant
Oil and Gas Exploration and Development	<p><b>Magnitude:</b> Onshore oil and gas exploration activities could involve seismic and other forms of geophysical exploration, and in limited cases exploratory drilling. Additional activity and infrastructure would create change in land use in areas where there is currently no development. Offshore activities would have little additional impact as a continuation of existing offshore activity.</p> <p><b>Duration/Extent:</b> Seismic exploration and exploratory drilling are typically single-season, temporary activities. The 2013 BBAP amended plan shows 13 oil and gas wells drilled on the western Alaska Peninsula, and a cluster of three wells near Iniskin Bay. It is possible that additional seismic testing and exploratory drilling could occur in the EIS analysis area, but, based on historic activity, is not expected to be intensive.</p> <p><b>Contribution:</b> Onshore oil and gas development in the area would contribute cumulatively to changes in land use and management, with the magnitude dependent on the level of on- and offshore oil and gas development. Port development and use at Amakdedori, combined with on- and offshore exploration activities in Cook Inlet, would both contribute to more industrial use in the area.</p>	Similar to Alternative 1a.	Similar to Alternative 1a.	Similar to Alternative 1a.
Road Improvement and Community Development Projects	<p><b>Magnitude:</b> Road improvement projects would take place in the vicinity of communities and have impacts through grading, filling, and potential increased erosion. Communities in the immediate vicinity of project facilities, such as Iliamna, Newhalen, and Kokhanok, would have the greatest contribution to cumulative effects. Some limited road upgrades could</p>	Similar to Alternative 1a.	The footprint of the Diamond Point rock quarry in Alternative 1a coincides with the Diamond Point port footprint in Alternative 2 and Alternative 3. Cumulative impacts would likely be less under Alternative 2 due to	Similar to Alternative 2; less than Alternative 1a.

**Table 4.2-2: Contribution to Cumulative Effects on Land Ownership, Management, and Use**

Reasonably Foreseeable Future Actions	Alternative 1a	Alternative 1	Alternative 2 and Variants	Alternative 3 and Variant
	<p>also occur in the vicinity of the natural gas pipeline starting point near Stariski Creek, or in support of the previously discussed mineral exploration. Anticipated road improvement projects in the region include new transportation corridors currently being studied in the Lake and Peninsula Borough, such as the Williamsport-Pile Bay Road upgrade. Impacts would be similar to Alternative 3 because the road upgrade is in the same location as the north access road under Alternative 3.</p> <p>The proposed Diamond Point rock quarry has the potential to intensify industrial land uses in the area. The estimated area that would be affected is approximately 140 acres (ADNR 2014a).</p> <p><b>Duration/Extent:</b> Disturbance from road construction would typically occur over a single construction season. Land use would be limited to the vicinity of communities and Diamond Point.</p> <p><b>Contribution:</b> Other community development and infrastructure projects would contribute to a slow land use change in the region, from undeveloped, generally natural landscapes to more development. The changes would be in or near communities and would have a small effect on the overall project area. Transportation, infrastructure, energy, and utility RFFAs would also contribute to the slow transition toward a more developed land use scenario, with more prevalent industrial, commercial, and transportation land uses.</p>		<p>commonly shared project footprints with the quarry site.</p>	

**Table 4.2-2: Contribution to Cumulative Effects on Land Ownership, Management, and Use**

Reasonably Foreseeable Future Actions	Alternative 1a	Alternative 1	Alternative 2 and Variants	Alternative 3 and Variant
Other RFFAs	Other RFFAs described in Section 4.1, Introduction to Environmental Consequences, would change land ownership and management in the ways described above. There would be potential for some land conveyance and other changes in land ownership, such as encumbrance for an easement or a ROW, which might consequently cause changes to management actions. RFFAs that include current land uses (e.g., commercial fishing, subsistence, tourism, recreation, hunting and fishing, and scientific surveys and research) would continue along baseline trends. Increases in industrial and commercial land use could adversely affect some of these land uses, depending on measured and perceived changes in setting that affect the quality of resources and user experience.	Similar to Alternative 1a.	Similar to Alternative 1a.	Similar to Alternative 1a.
Summary of Project Contribution to Cumulative Effects	Overall, the contribution of Alternative 1a to cumulative effects on land use and ownership, when taking other past, present, and RFFAs into account, would be an incremental change in ownership and intensity of use over the long-term development and operation of the expanded mine scenario. These incremental changes would be moderate in terms of magnitude, duration, and extent, given the limited acreage affected, but would be a change from existing undeveloped lands.	Similar to Alternative 1a, although slightly more acres would be affected by expansion of the Pebble Mine.	Similar to Alternative 1a, although slightly fewer acres would be affected by expansion of the Pebble Mine.	Similar to Alternative 1a, although fewer acres would be affected by expansion of the Pebble Mine than under either Alternative 1 or Alternative 2.

Notes:  
 ANCSA = Alaska Native Claims Settlement Act  
 BBAP = Bristol Bay Area Plan  
 EIS = Environmental Impact Statement  
 RFFA = reasonably foreseeable future action  
 ROW = right-of-way