

16. CUMULATIVE IMPACTS

This chapter describes potential cumulative impacts of the proposed Port MacKenzie Rail Extension; that is, the impacts of the proposed rail line when added to the impacts of other past, present, and reasonably foreseeable future projects and actions. The Surface Transportation Board's (STB or the Board) Section of Environmental Analysis (SEA) based this cumulative impacts analysis on the results of the environmental and community resources analyses reported in Chapters 3 through 15 of this Draft Environmental Impact Statement (EIS) and information SEA collected and reviewed about relevant past, present, and reasonably foreseeable future projects and actions that could result in impacts in the same area as the proposed rail line.

16.1 Applicable Regulations

Council on Environmental Quality (CEQ) regulations that implement the National Environmental Policy Act (NEPA) define a cumulative impact as “the impact on the environment which results from the incremental consequences of an action when added to the past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions” (40 Code of Federal Regulations (CFR) 1508.7). To help Federal agencies assess cumulative impacts under NEPA, CEQ developed a handbook entitled *Considering Cumulative Effects under the National Environmental Policy Act*. SEA followed these guidelines in its evaluation of whether past, present, and reasonably foreseeable future projects and actions in the area of the proposed rail line could, when combined with potential impacts of constructing and operating the proposed rail line, cumulatively result in environmental impacts.

16.2 Affected Environment

The project area is generally located north of Anchorage, Alaska, on the opposite side of the Knik Arm of the Cook Inlet. The proposed rail line would connect the Port MacKenzie District in the Matanuska-Susitna Borough (MSB or Borough) to a point on the existing Alaska Railroad (ARRC) mainline between Wasilla and north of Willow, Alaska. The area is relatively rural, with a few recreational areas managed by the State of Alaska and the MSB located nearby. The area is within the MSB and the Susitna River valley, bounded by the Susitna River on the west, Knik Arm of Cook Inlet on the south and east, and Parks Highway and the existing ARRC main line on the north. The project area would lie within the Susitna Lowland, which is the landward extension of the Cook Inlet Depression. The depression is a structural basin that contains the lowland basins of the Susitna River, its tributaries, and several other rivers that flow directly into the head of Cook Inlet.

The project area is located in the Cook Inlet Basin Ecoregion, a gently sloping lowland basin characterized by a variety of wetland and woodland habitats including evergreen, deciduous, and mixed forest stands. The area provides habitat for wildlife including bear, moose, wolf, furbearers, fish, and birds. Cultural and historic resources are found within the project area including cabins and trails. The study area includes several designated recreation areas, including the Willow Creek State Recreation Area, Nancy Lake State Recreation Area, the Little

Susitna State Recreation River, and two state recreation sites on the northern and southern shores of Big Lake. The study area also includes the Susitna Flats and Goose Bay state game refuges.

16.3 Methodology

An agency should evaluate cumulative impacts along with the analysis of the overall impacts of each alternative. The CEQ recommends that an agency's analysis accomplish the following:

- Focus on the effects and resources in the context of the proposed action.
- Present a concise list of issues relevant to the anticipated effects of the proposed action or eventual decision.
- Reach conclusions based on the best available data at the time of the analysis.
- Rely on information from other agencies and organizations about reasonably foreseeable projects and actions that are beyond the scope of the analyzing agency's purview.
- Relate to the geographic scope of the proposed project.
- Relate to the temporal period of the proposed project.

16.3.1 Establish Boundaries

Based on the geographic scope encompassing the various proposed rail line segments and the varied resource characteristics, SEA determined that appropriate geographic boundaries for this cumulative impacts analysis are Parks Highway to the north, Cook Inlet to the south, Knik Arm to the east, and the Susitna River to the west. SEA determined that appropriate timeframes for this cumulative impacts analysis are the two-year construction period and indefinite operations.

16.3.2 Collect and Screen Project and Action Data

SEA researched and collected information about other future projects and actions that could have impacts that would coincide in time and space with potential impacts of the proposed Port MacKenzie Rail Extension. SEA interviewed appropriate key personnel from project proponent and/or permitting offices and agencies to identify various past, present, and reasonably foreseeable future projects and actions, and reviewed analyses and information about those projects and actions to identify which to include in the cumulative impacts analysis and/or as part of each resource area analysis. SEA then applied a screening process to determine if projects and actions were reasonable, foreseeable, and could be associated with potential cumulative impacts. Section 16.4 describes the projects SEA selected for inclusion in the cumulative impacts analysis; Figures 16-1 through 16-3 show the locations of those projects.

16.3.3 Evaluate Potential Cumulative Impacts

SEA evaluated cumulative impacts for situations in which planned or reasonably foreseeable future projects and actions could overlap with the proposed Port MacKenzie Rail Extension in terms of geographic area and/or timeframe. Where available, SEA used existing relevant project data to analyze specific impacts resulting from other projects or actions; however, complete

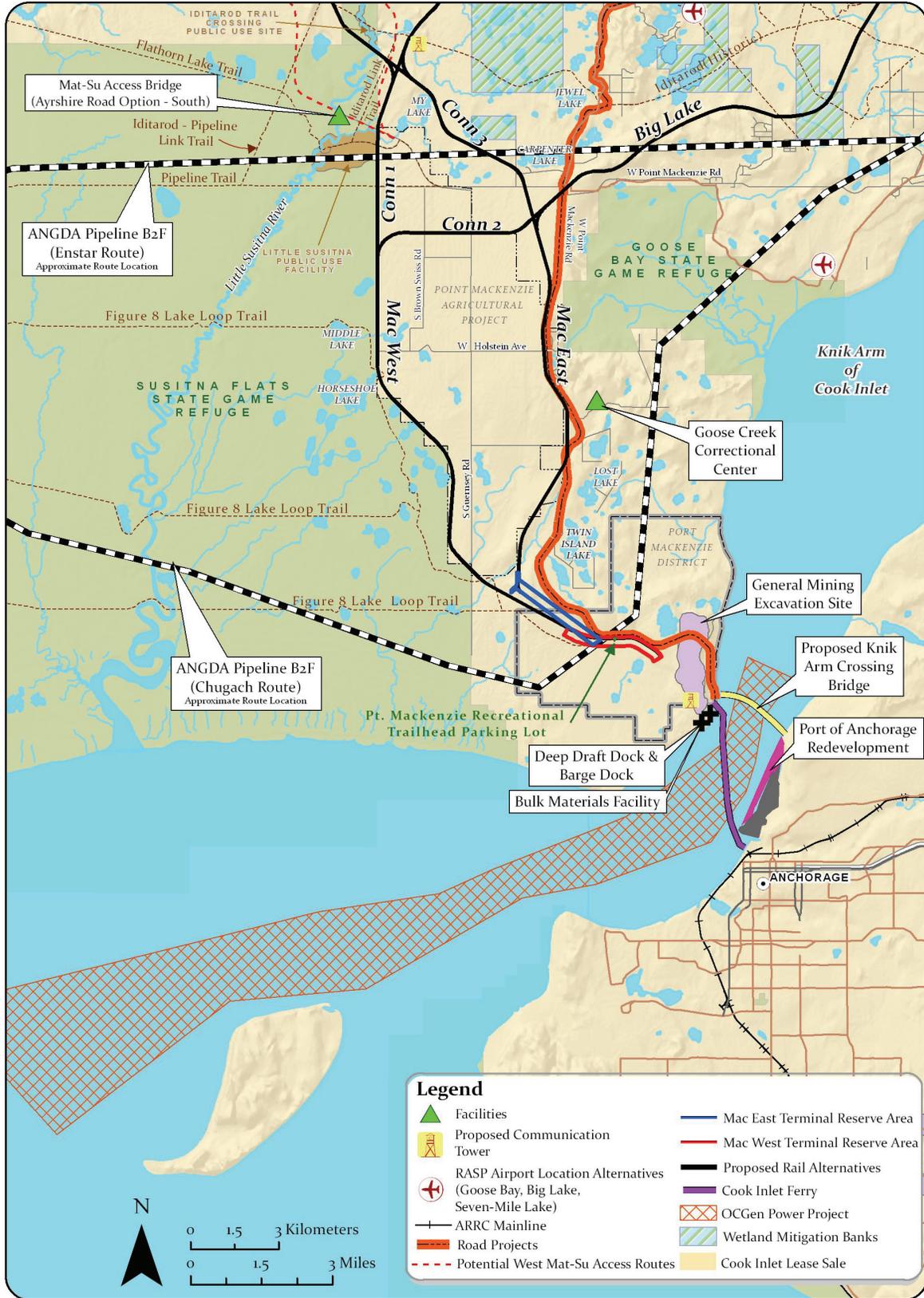


Figure 16-1. Other Projects Located Near the Mac East, Mac West, and Connector Segments

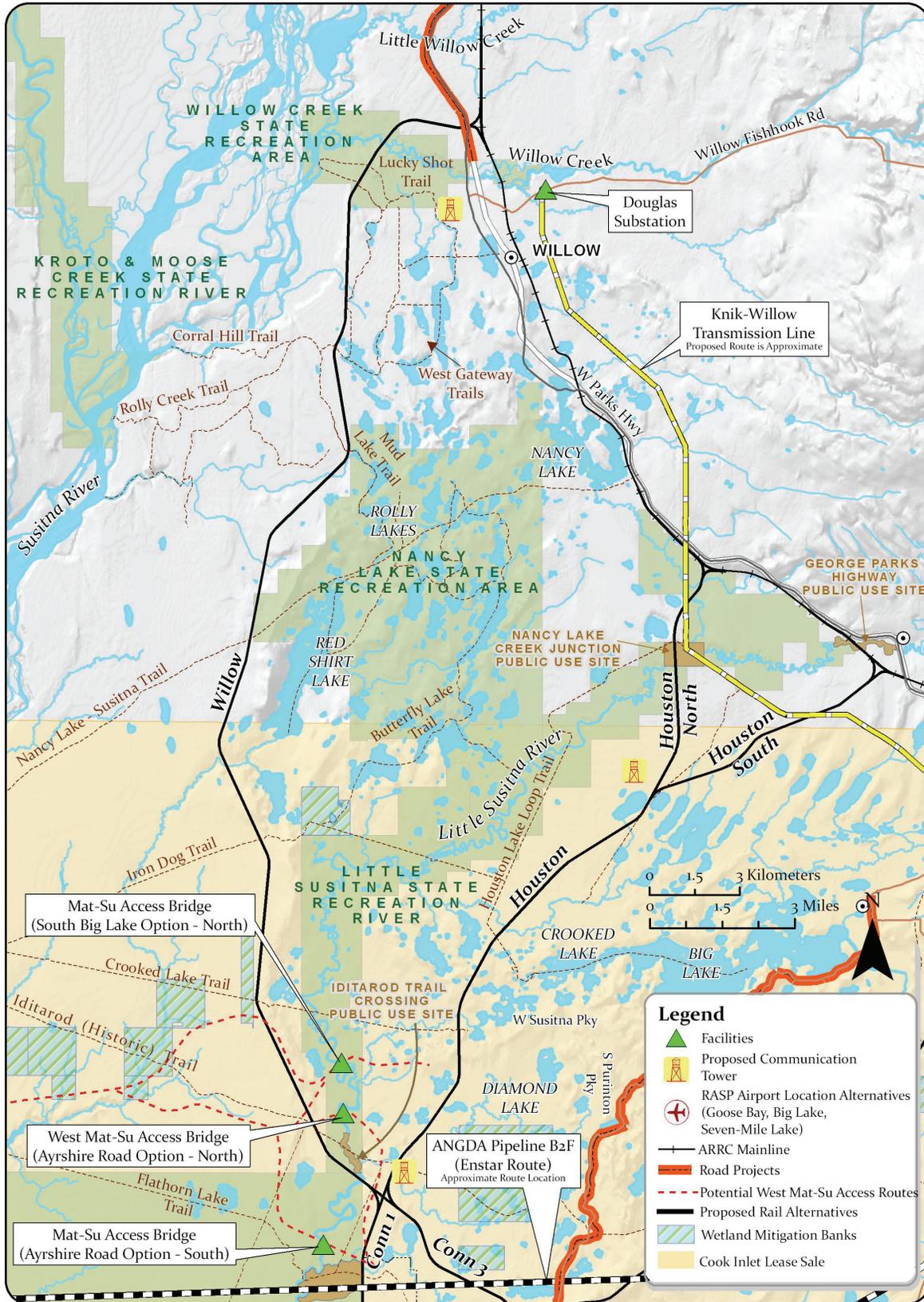


Figure 16-2 Other Projects Located Near the Willow and Houston Segments

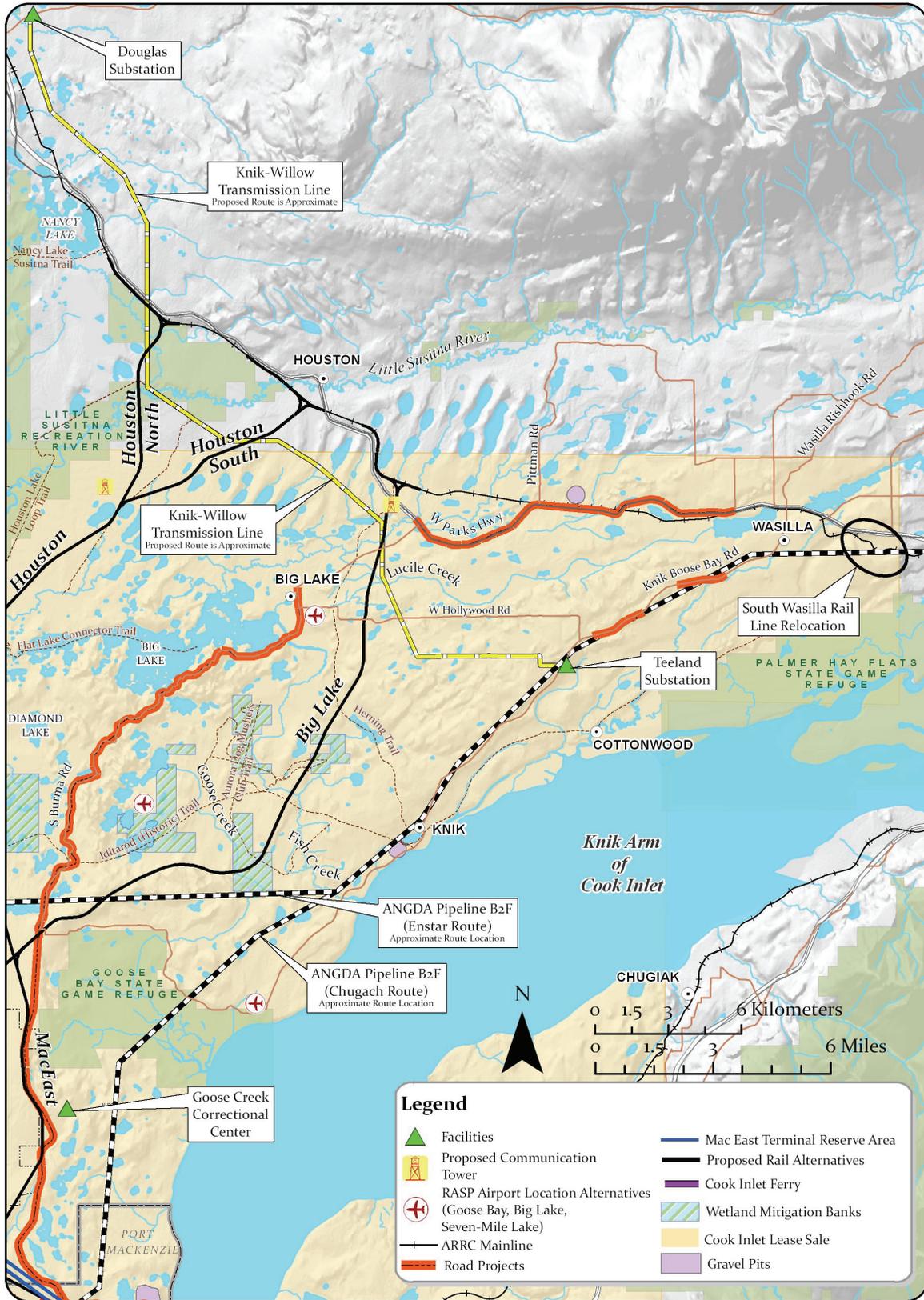


Figure 16-3 Other Projects Located Near the Big Lake Segment

impact analyses was not always available for the relevant projects and actions identified in this cumulative impacts analysis. Where quantitative project data was absent, SEA based the cumulative impacts analysis on the best available qualitative data and information. Section 16.4 summarizes potential cumulative impacts by resource area, and Appendix O provides a more detailed discussion. Chapter 20 includes references for both quantitative and qualitative data and additional information sources relied upon.

16.4 Other Relevant Projects and Actions

This section describes the projects SEA included in the cumulative impacts analysis. Appendix O identifies all projects and actions SEA considered for inclusion and provides a rationale for each project or action not included in the cumulative impacts analysis.

16.4.1 Brief History of the Project Area

When European contact began in the late 1700s, the Athabascan-speaking Dena'ina people were the inhabitants in the Upper Cook Inlet area, including the study area (Townsend, 1981). Early interaction between the Dena'ina, the Russians, and other European groups were limited but grew when Russians shifted their trading efforts from sea otter pelts to land furs which were traded within Alaska, with Russians serving as go-betweens for trade between Indians and Eskimos, and with China and Britain. The Dena'ina used their central geographic position and network of trails to serve as middlemen traders between the Russians and the groups farther in the interior, gathering relatively great wealth in a short time (DeLaguna, 1975; Osgood, 1965; Townsend, 1981; Stafeev, 1985).

From 1741 to 1838, Europeans inadvertently introduced the first of many epidemic diseases that devastated Native populations throughout the Arctic (Fortuine, 1992). In 1867, the United States purchased Alaska from Russia and performed a territory Census and summarized resources in 1879 (Bancroft, 1886; Petroff, 1881, 1884). Gold prospecting created the next great influx of Euro-Americans into Upper Cook Inlet, beginning with discoveries on the Kenai Peninsula and Turnagain areas in 1891 (Buzzell, 1986) and communities began to spring up and towns such as Knik and Susitna Station grew up along Cook Inlet. The community of Knik was the largest settlement in the Matanuska-Susitna Valley in the 1890s and it served as a transfer point for passengers and freight from ocean-going steamers to smaller vessels or for overland travel. However, the establishment of Anchorage in 1915 as the Alaska Railroad construction headquarters and ship anchorage spelled the end of Knik's prosperity.

After the 1918 Spanish influenza devastated the remaining Native population of Upper Cook Inlet, the survivors resettled at what is today Tyonek. Increasing populations of European Americans in the Upper Cook Inlet area made it correspondingly difficult for Dena'ina people to maintain their traditional land use patterns as promising lands of the Susitna and Matanuska Valleys became colonized. After realizing the strategic importance of the Alaska Territory during World War II, the Federal Government spent billions of dollars on civilian and military projects (Bush, 1984). Urbanization in Anchorage progressed slowly, with Dena'ina people being pushed away from their former home sites by development pressure, lack of property rights, and race-based discrimination. Among the last Dena'ina people to live a mixed traditional life on the land was Shem Pete, who lived in a cabin on Nancy Lake but eventually

Shem Pete and his son were forced off their land by land speculators who tricked them out of their rights to the land; they settled in Tyonek (Kari and Fall, 2003). The 1971 Alaska Native Claims Settlement Act was designed to transfer rights to lands taken by the Federal Government to Native peoples and to organize Alaska Natives into a suite of corporate entities.

Alaska officially became the 49th State on January 3, 1959 and voters created the Matanuska-Susitna Borough in 1964. With major improvements in transportation (the new Knik River Bridge completed in 1965, Houston was incorporated as a Third Class City in 1966 and the Anchorage to Fairbanks road (now named Parks Highway) was completed in 1971), and because of the large tracts of land available for subdivision, the Matanuska-Susitna Valley began to grow into a major population center, increasing from 6,509 people in 1970 to 59,322 in 2000 (ADOLWD, undated). The MSB continues to be the fastest growing area in the state with an average annual growth rate of 4.1 percent (ADOLWD, 2008).

Existing conditions reflect past and present projects and actions. The area around the proposed Port MacKenzie Rail Extension project has been developed increasingly over the past decades. Activities such as resource extraction, transportation improvements and growth, population growth, supporting infrastructure development, and major recreational development such as state recreation areas and wildlife refuges have all contributed to the current environmental conditions.

16.4.2 Projects and Actions Analyzed in this EIS

The projects described below and presented in Figures 16-1 through 16-3 could have potential impacts occurring within or near the Port MacKenzie Rail Extension project area. Many of the projects that have potential to contribute to cumulative impacts are concentrated towards the southern end of the project area near the Mac East, Mac West, and Connector segments.

Beluga to Fairbanks Natural Gas Pipeline. The Alaska Natural Gas Development Authority has proposed a 20-to 24-inch high-pressure bi-directional pipeline from Beluga to Fairbanks that would comprise four segments, one of which is the Beluga Fields to Palmer segment (ANGDA, 2008). This segment would follow one of two routes: both are located in the southern half of the Port MacKenzie Rail Extension project area. The Enstar Route would cross the Connector 1 Segment, Connector 3 Segment, and the Big Lake Segment, while the Chugach Route would cross the Mac East and Mac West segments.

Cook Inlet Areawide Oil and Gas Lease Sale. The Alaska Department of Natural Resources (ADNR) made a final best interest finding for the Cook Inlet areawide oil and gas lease sale (applicable to sales from 2009 through 2018) and sold four tracts (totaling 7,685 acres) at the May 20, 2009 sale. Three of the tracts and most of the total acreage leased are offshore with one onshore tract located near the Cook Inlet, west of the Susitna River (ADNR, 2009). Though impacts from the May 2009 sale would be focused in the Cook Inlet, most of the Port MacKenzie Rail Extension project area could be included in future lease sales.

Cook Inlet Ferry. The MSB anticipates construction of a dock at Port MacKenzie in summer 2010 (ADN, 2009) as part of the Borough's proposed year-round commuter ferry system that would provide transportation across the 2 miles of Knik Arm that separates MSB and

Anchorage. The project would also include parking and terminal structures (already constructed) and could lead to increased road development in the Point MacKenzie area.

Cook Inlet OCGen™ Power Project. Ocean Renewable Power Company Alaska plans to install its proprietary ocean current electrical generation technology, OCGen™, to generate renewable electricity from open-ocean and tidal currents in mid-2010 and operate it until at least mid-2011. The impacts of the project would be focused on the location where the project is sited in the Cook Inlet, and to-be-determined onshore locations where transmission lines would be constructed.

Knik Arm Crossing. Knik Arm Bridge and Toll Authority has proposed to construct the Knik Arm Crossing, a bridge that would cross the Knik Arm of Upper Cook Inlet. The bridge would be approximately 2.5 miles long and would connect the Municipality of Anchorage to MSB via Point MacKenzie Road. The crossing landfall would be approximately 1 mile from the Mac West Terminal Reserve and approximately 3 miles from the Mac East Terminal Reserve. Impacts resulting from the crossing would be focused at the southern end of the Port MacKenzie Rail Extension project area.

Knik-Willow Transmission Line Upgrade. The Alaska Energy Authority's (AEA) Knik-Willow (Teeland-Douglas) transmission line upgrade project would replace an older segment of the Anchorage-Fairbanks Intertie with a new 25-mile, 230 kilovolt transmission line between the Teeland (Knik) and Willow (Douglas) substations in Alaska. The transmission line route would be located in the northern part of the Port MacKenzie Rail Extension project area and would be likely to cross the Houston North, Houston South, and Big Lake segments. The AEA published a Draft Alaska Railbelt Regional Integrated Resource Plan (RIRP) Study in December 2009. That Draft RIRP includes a Lake Lorraine to Douglas route for a possible new transmission line. SEA did not include the possible Lake Lorraine to Douglas route area in this analysis as there are no specific routes or alternative routes defined. The Draft RIRP indicates that detailed engineering and permitting activity plans are not finalized or funded, and, if finalized and funded would begin in the 2011 through 2016 timeframe (Black & Veatch, 2009)

Goose Greek Correctional Center. The 450,000 square foot medium-security Goose Greek Correctional Center is an MSB and State of Alaska joint project under construction at the corner of Alsop Road and Point MacKenzie Road (DOWL Engineers, 2008). Impacts from the correctional center would be focused in the area of the Mac East Segment of the Port MacKenzie Rail Extension.

MSB Regional Aviation System Plan. The Regional Aviation System Plan (RASP) addresses aviation issues, needs, and growth with a geographic focus on the airports connected to the road system in the MSB. The RASP includes: a basic inventory of airports and improvements needed at public airports; a forecast of aviation growth; locations for new public airports and/or floatplane bases; preliminary plans for the layout of the highest priority new airports and floatplane bases; operations to improve aviation safety; and MSB roles in airport development and management. New or upgraded airport facilities identified in the RASP include locations at Big Lake, Goose Bay, and Seven-Mile Lake. The closest Port MacKenzie Rail Extension alternative would be the Big Lake Segment.

Port MacKenzie Development Projects: Bulk Materials Facility; Gravel Mining, Deep Draft Dock Expansion, Barge Dock Expansion. The following four projects at Port MacKenzie are planned or already operating. Impacts from the projects would be focused at the southern end of the Port MacKenzie Rail Extension project area and would be located closest to the Mac East and Mac West Terminal Reserves.

- The MSB plans to upgrade roads, storage and storage areas to develop a bi-modal bulk materials facility at Port MacKenzie to handle bulk materials cargo.
- The MSB and Quality Asphalt and Paving are moving gravel from an excavation site in Port MacKenzie to the Port of Anchorage to provide the foundation for the marine terminal development north expansion (White, 2008).
- The U.S. Army Corps of Engineers has permitted expansion plans for the 2004 Deep Draft Dock at Port MacKenzie and preliminary designs are complete; however, project funding is not yet in place (Zartman, 2008).
- In January 2007, Port MacKenzie received a permit to expand an existing barge dock by nearly 8 acres; funding was received in 2009 and construction is anticipated to begin in winter 2009-2010 (Zartman 2009).

Port of Anchorage Marine Terminal Redevelopment Project. The Port of Anchorage Marine Terminal Redevelopment Project began in 2005 and will expand, reorganize, and improve the Port of Anchorage by adding an additional 135 acres of land and providing approximately 8,880 linear feet of waterfront structures under a phased construction schedule through 2014. The project is located across the Cook Inlet from the southern end of the Port MacKenzie Rail Extension project area.

Road Projects. Road projects include Parks Highway: Lucas Road (Wasilla) to Big Lake Cutoff Improvements (State Transportation Improvement Program [STIP] #11961); Parks Highway: Willow Creek Bridge to Kashwitna River Bridge Rehabilitation, Mile Post 72-83; Point MacKenzie Road Upgrades and Paving (STIP #20254) from the intersection of South Burma Road to a point 0.5 mile before the intersection with Lu Young Lane (Koski, 2009); Point MacKenzie Road Improvements: Don Young Road Upgrades, South Big Lake/Burma Road Upgrades (previously STIP #21355), and Knik Goose Bay Road Improvements. These road projects would be located throughout the Port MacKenzie Rail Extension project area, including areas near the Big Lake, Willow, Mac East, and Mac West segments.

South Wasilla Rail Line Relocation. The Alaska Railroad Corporation (ARRC) plans to straighten curves along main line track in South Wasilla between ARRC Mile Posts 154 and 158. The relocation would take place in the far eastern end of the Port MacKenzie Rail Extension project area and would be closest to the Big Lake Segment.

Su-Knik Wetland Bank – Umbrella Mitigation Bank Instrument – Big Lake South Individual Bank Plan. The MSB and Sustainable Environments, LLC, propose to establish an umbrella preservation mitigation bank. The Big Lake South Bank in the MSB just south of the Houston, Wasilla, and Palmer growth corridor would be a part of this umbrella, and Fish Creek,

Threemile Creek, and Goose Creek would flow through the project area and connect an extensive complex of existing wetlands. The mitigation banks would be located near the area of the Connector 1 Segment and the Houston Segment, and would be crossed by the Big Lake Segment of the Port MacKenzie Rail Extension.

West Mat-Su Access Project. MSB has proposed to build a bridge across the Little Susitna River into the southern part of the Fish Creek Management Area and is studying four access road options including three locations for the bridge – the extension of Susitna Parkway in the Big Lake area; a location approximately 0.8 miles north of where the Iditarod National Historic Trail crosses the river; and near the existing Little Susitna River access at the end of Ayrshire Road. Potential road options associated with the access project could intersect Connector 1 Segment and Big Lake Segment of the Point MacKenzie Rail Extension.

16.5 Environmental Consequences

This section summarizes the results of resource-specific cumulative impacts analyses detailed in Appendix O. It is a compilation of potential impacts; that is, the cumulative result of impacts of the proposed action and alternatives when added to the potential impacts of other actions. SEA analyzed cumulative impacts for situations in which planned or reasonably foreseeable projects and actions would overlap the proposed Port MacKenzie Rail Extension in relation to geographic area and project timeframe.

SEA identified the combined interaction of the proposed Port MacKenzie Rail Extension and other planned or reasonably foreseeable future projects and identified potential cumulative impacts for all of the environmental resource areas described in Chapters 3 through 15 of this EIS. Sections 16.5.1 through 16.5.13 summarize potential impacts of the proposed rail line and focus on how those impacts could contribute to cumulative impacts when combined with potential impacts of relevant other projects.

16.5.1 Geology and Soils

Potential impacts to geology and soils from the proposed Port MacKenzie Rail Extension include modifications of topography through excavation and fill associated with construction of the rail line and associated facilities; removal and replacement of soils classified as unsuitable for construction of railroad embankments and service roads; exposure of highly erodible soils to the erosive forces of wind and water; conversion of land in the Port MacKenzie Rail Extension right-of-way (ROW) that contain soils MSB considers to be of local importance for agricultural purposes; and potential damage to infrastructure from seismic events.

Construction and operations activities associated with the oil and gas lease sale, the bridge crossing of Cook Inlet, the transmission line and pipeline, and certain road projects would overlap with certain segments of the proposed rail line extension and minor cumulative impacts would result. Most notably, these activities could, to some extent, result in minor impacts in relation to topographic modification through removal and replacement of the existing soil profile. In some cases, these activities could also lead to the exposure of highly erodible soils or conversion of agricultural lands. Furthermore, infrastructure related to these projects would have some degree of vulnerability to damage resulting from seismic events. Potential impacts from

the proposed Port MacKenzie Rail Extension, when added to potential impacts of the relevant projects, could result in minor cumulative impacts to geology and soils in the Matanuska-Susitna area.

16.5.2 Water Resources

There could be potential impacts to certain water resources from proposed rail line construction and operations, including impacts from clearing and grading; construction of unpaved access roads, bridges, staging areas, and culverts; water-supply withdrawals; and rail line operations. Impacts could include changes to natural drainage and altered flood hydraulics; increased potential for overbank flooding and debris jams; reduced floodplain area; increased scour and bank erosion; increased turbidity, sediment loads, and concentrations of pollutants; changes to recharge potential and aquifer dewatering, impacts to wetland mitigation areas, and impacts to the Goose Creek Fen. SEA analyzed impacts to surface waters and wetlands; cumulative impacts to groundwater and floodplains were not analyzed as there are not likely to be adverse impacts to groundwater or floodplains resulting from the proposed rail line extension.

The proposed rail line could add to existing impacts to surface water and wetlands resources in the project area from urban, recreation, transportation, agriculture, and resource-development activities.

Potential impacts to surface water and wetlands resources from the proposed rail line could overlap with impacts from several of the projects identified in Section 16.4, including the oil and gas lease sale, the transmission line, the correctional center, the aviation plan, the natural gas pipeline, development projects at Port MacKenzie, road projects, and the wetland mitigation bank. There would be no overlap of impacts to the Goose Creek Fen. Therefore, impacts to surface water and wetlands resources from the proposed Port MacKenzie Rail Extension, when added to the impacts of other relevant projects could result in cumulative impacts to surface water and wetlands resources in the Matanuska-Susitna area.

16.5.3 Biological Resources

The primary impacts of proposed rail line construction and operations would be habitat loss and altered suitability; fish, wildlife, and vegetation mortality; and reduced survival and reproductive success of native species. Linear projects that involve significant land clearing across long distances could interrupt natural fire ecology by leading to the creation of fire breaks along the project right-of-way. These fire breaks could lead to an increase in fuel accumulation along one side of the project right-of-way, thereby increasing the risk of more intense wildland fires. As a result of this disruption of the natural fire cycle, separated vegetation communities might experience different rates of ecological succession leading to a decrease in biodiversity in the project area.

All Port MacKenzie Rail Extension alternatives have the potential to impact biological resources already affected by urban, recreation, transportation, agriculture, and resource-development activities in the rail line project area.

Construction and operations activities associated with the oil and gas lease sale, the OCGen™ Power Project, the bridge and ferry crossing of Cook Inlet, the transmission line, the correctional center, the aviation plan, the natural gas pipeline, development projects at Port MacKenzie and the Port of Anchorage, road projects, and the wetland mitigation bank could affect wildlife habitat through habitat destruction and altered suitability (including increases in invasive plant populations and interruption of natural fire ecology), increased public access, noise, and potential direct and indirect wildlife mortality. The potential impacts of the proposed Port MacKenzie Rail Extension project, when added to the impacts of the noted projects, could result in cumulative impacts to the biological environment in the Matanuska-Susitna area.

16.5.4 Cultural and Historic Resources

Archaeological sites in the Port MacKenzie Rail Extension ROW that cannot be avoided could possibly be damaged during proposed rail line construction. The dog sledding cultural landscape could be adversely affected to varying degrees through loss of visual integrity, cultural privacy, potential loss of or changes to access, and changes to traditional or culturally notable use of and connection to the property. Officially recognized trails would be grade-separated or relocated, facilitating free passage; however, the integrity of any historic trails would still be adversely affected through the introduction of auditory and visual effects, and access across the study area by dog sledders who travel across unofficial trails would be impeded. In order for any potential effects to be considered adverse, the introduction of visual, atmospheric or audible elements would have to diminish the integrity of the property's major historic features (36 CFR 800.5(2)(v)). The NHPA Section 106 Programmatic Agreement being developed for this project would provide a mechanism to fully evaluate which properties are listed in or eligible for listing in the National Register of Historic Places, what their major historic features are, and whether those properties would be adversely affected by the proposed project.

Historic and potentially historic trails could be blocked, rerouted, or diverted. Depending on the timing of construction activities and/or locations of installed crossings, some trail routes, such as the Iditarod Dog Sled Race route, could be altered. Trail crossings would diminish the integrity of historic and potentially historic trails. Historic properties within the project area could be adversely affected and lose their context and integrity through visual, and audible effects. All alternatives would cross the Iditarod National Historic Trail thereby affecting the historic integrity of the trail and its ancillary network, and potentially affecting the eligibility of the ancillary network as NHPA trails or NHPA historic trail segments.

Noise and vibration impacts during construction and operations are not anticipated to be adverse as the estimated construction noise and general vibration levels would be below the FTA criteria for an adverse impact. Since there would be no buildings within the contour for the FTA fragile building damage criterion which was determined to be five feet on each side of the centerline and no receptors within the vibration annoyance contour which was determined to be 80 feet from the track centerline, there would be no damage to buildings or vibration impacts from proposed rail line operations.

There could be increases in residential development and recreation activity in the project area associated with the Knik Arm Crossing, Cook Inlet Ferry, the regional aviation plan, and the West Mat-Su Access Project. There would be construction activities associated with these

projects and the correctional center, the transmission line, and the natural gas pipeline, which could result in adverse impacts to cultural and historic resources.

The Knik Arm Crossing in the study area could have a substantial impact on existing cultural resources particularly for those closest to Point MacKenzie and Knik areas, including the Iditarod National Historic Trail due to the increase in residential development from people taking advantage of the shortened commute between Point MacKenzie and Anchorage via the bridge. The construction of a segment of the Beluga to Fairbanks Natural Gas Pipeline project would cross a number of trails diminishing their integrity as several of them could have historical importance or be part of a dog sledding cultural landscape. Proposed rail line construction activities, when combined with these other projects, could result in cumulative impacts to cultural and historic resources.

16.5.5 Subsistence

All Port MacKenzie Rail Extension alternatives are in the state nonsubsistence area and are a considerable distance from areas where state-regulated subsistence activities occur. Therefore, impacts to subsistence uses outside the nonsubsistence area would be similar for all alternatives. Impacts to wildlife from the rail line alternatives could vary. Impacts to subsistence could include adverse impacts to resource availability as a result of train-resource collisions, especially for species that migrate through the project area; changes in resource availability if disruption from rail line operations affects species distribution and/or survival rates; and adverse impacts to user access due to ARRC regulations prohibiting access across the rail line except at designated crossing points.

The most substantial past impact on subsistence activities in the study area resulted from the creation of the Anchorage-Matsu-Kenai nonsubsistence area in 1992 under 5 Alaska Administrative Code 99.015. This action removed subsistence hunting and fishing regulations and the subsistence priority from a large continuous area of the Matanuska-Susitna, Anchorage, and Kenai Peninsula areas.

Cumulative impacts to subsistence uses would be minimal because planned or reasonably foreseeable future projects are within the Anchorage-Matsu-Kenai nonsubsistence area. Several of these projects would have a small footprint within the nonsubsistence area and, except for small habitat disturbances in the immediate area, would not be likely to contribute to larger cumulative impacts to subsistence. There are two foreseeable projects that could add to cumulative effects to subsistence uses outside the Anchorage-Matsu-Kenai nonsubsistence area – the Knik Arm Crossing and natural gas pipeline projects. The Knik Arm Crossing could draw more residents to the study area, thereby increasing the number of people who might travel to the closest subsistence managed lands. Depending on the proponents' policy regarding access along the natural gas pipeline ROW, the pipeline could restrict or improve subsistence-user access to subsistence managed lands. An overall increase in the number of development projects in the study area could lead to cumulative impacts to Knik and Eklutna tribal members' traditional use areas. While these traditional use areas are now within a nonsubsistence area, Eklutna and Knik tribal members could still have a traditional connection to the lands, and construction and operation of future projects could add to a sense of loss and intrusion by outsiders into their traditional harvest areas. To the extent that any project affects populations of beluga whales,

there could be impacts to Cook Inlet Dena'ina villages (such as Tyonek, Eklutna, and Knik) subsistence use of beluga whales.

16.5.6 Climate and Air Quality

SEA has concluded that increases in emissions from construction and operation of the proposed Port MacKenzie Rail Extension project would be minimal in the context of existing conditions. Using a conservative approach SEA determined that construction emissions for the proposed project would be expected to be a small fraction of the Borough's total annual emissions during the assumed construction period of 2 years. Estimated nitrogen oxides (NO_x), PM₁₀¹, and PM_{2.5}² construction-related emissions would be well below the *de minimis* conformity thresholds of 100 tons per year for each pollutant. The estimated operations-related emissions would also be a small fraction of MSB annual off-highway vehicle emissions and the emission totals for each of the pollutants would be well below the *de minimis* conformity thresholds of 100 tons per year for each pollutant. SEA has also determined that emissions from the proposed terminal reserve at the end of the line in the Port MacKenzie District would be a fraction of the rail line operations-related emissions and well below the *de minimis* conformity thresholds of 100 tons per year for each pollutant.

Globally, sources of human-induced emissions of greenhouse gases include mainly burning of fossil fuels, with important contributions from clearing of forests, agricultural practices and other similar activities. Greenhouse gas emissions associated with the proposed project would be mostly carbon-dioxide (CO₂) emissions. Estimated annual average construction-related CO₂ emissions would be 3,073 metric tons per year and operations-related emissions would be 2,539 metric tons per year. Operations-related CO₂ emissions would represent a 2 percent increase in Alaska rail CO₂ emissions and would be less than 0.01 percent for Alaska as a whole (ADEC, 2008). Also, CO₂ emissions from existing highway activity would likely decrease as a result of the proposed rail line to the extent that transportation activity by truck would be shifted to rail. Similarly, CO₂ emissions would likely decrease if commodities from Interior Alaska were transported over the proposed rail line to Port MacKenzie rather than to the Port of Anchorage or Seward because of the shorter distance.

Although the emissions generated from the construction and operation of the Port MacKenzie Rail Extension project would be very small in comparison to annual global CO₂ emissions, they could contribute to global greenhouse gas emissions and when added to emissions from the reasonably foreseeable future projects and actions described in this Chapter (see also Appendix O) and similar projects and actions across the globe, they could lead to an adverse cumulative impact. The following paragraphs provide a discussion of the general impacts of climate change with a focus on Alaska and their effects on the proposed project.

The Intergovernmental Panel on Climate Change (IPCC) and the U.S. Global Change Research Program (USGCRP) have assessed the potential consequences of global climate change (IPCC, 2007 and USGCRP, 2009). The global average temperature since 1990 has risen by about 1.5

¹ All particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers.

² All particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.

degrees Fahrenheit (°F) and it is projected to rise another 2 to 11.5°F by 2100 with the greatest increases expected to occur in the Arctic and in the middle of continents. The U.S. average temperature has risen by a comparable amount and is very likely to rise more than the global average over this century, with some variation from place to place (USGCRP, 2009). Over the past 50 years, Alaska has warmed at more than twice the rate of the rest of the U.S. average leading to more pronounced climate change impacts in the state than in the rest of the U.S. Alaska's annual average temperature has increased 3.4°F and the winters have warmed by 6.3°F (Fitzpatrick *et al.*, 2008 in USGCRP, 2009). Average annual temperatures in Alaska are predicted to rise about 3.5°F to 7°F by the middle of the century (USGCRP, 2009).

Precipitation patterns are also changing with increases and decreases observed across the globe and in some regions there have been increases in both droughts and floods (Trenberth *et al.*, 2007 in USGCRP, 2009). Precipitation is projected to increase overall but substantial shifts are expected in where and how precipitation occurs and simultaneous increases in air temperature are expected to lead to drier conditions overall (Meehl *et al.*, 2007 in USGCRP, 2009). Sea levels are rising at roughly double the rate observed over the past century as recorded by satellite data over the last 15 years (Bindoff *et al.*, 2007 in USGCRP, 2009).

In Alaska, higher temperatures are already contributing to earlier spring snowmelt, reduced sea ice, widespread glacier retreat, and permafrost warming (ACIA, 2004; Fitzpatrick *et al.*, 2008 in USGCRP, 2009). Reduced sea ice provides opportunities for increased shipping and resource extraction, however, at the same time increases coastal erosion (Jones *et al.*, 2009 in USGCRP, 2009) and flooding associated with coastal storms. Climate models project the Bering Sea to experience the largest decreases in atmospheric pressure in the Northern Hemisphere, suggesting an increase in storm activity in the region (Meehl *et al.*, 2007 in USGCRP, 2009). Reduced sea ice also alters the timing and location of plankton blooms which is expected to drive major shifts of marine species such as Pollock and other commercial fish stocks (Grebmeier *et al.*, 2006 in USGCRP, 2009). The Bering Sea Pollock fishery off Alaska's west coast is the world's largest single fishery and has undergone major declines in recent years (USGCRP, 2009).

Insect outbreaks and wildfires are increasing with warming temperatures and Southcentral Alaska experienced the largest outbreak of spruce beetles in the world in the 1990s destroying over 5 million acres of Alaska spruce forest (Ryan *et al.*, 2008 in USGCRP, 2009; Juday *et al.*, 2005 in USGCRP, 2009). The average area burned per year in wildfires in Alaska is projected to double by the middle of this century (Balshi *et al.*, 2008 in USGCRP, 2009). Permafrost temperatures have increased throughout Alaska since the 1970s (Lettenmaier *et al.*, 2008, in USGCRP, 2009) with the largest increases measured in the northern part of the state (Osterkamp, 2007 in USGCRP, 2009). Greater evaporation and permafrost thawing due to warming temperatures is the likely cause for reduction in the area of closed basin lakes in Alaska over the last 50 years and threatens wetlands and the traditional lifestyle of Native peoples that depend on them. Degradation of permafrost could connect surface waters to groundwater, which has the potential to dry out shallow streams, ponds, and wetlands if re-supply by snowmelt and precipitation are less than losses from evaporation and percolation (ACIA, 2004). In areas with heavy concentrations of ground ice, permafrost thawing and associated ground surface collapsing could increase the formation of wetlands, ponds, and drainage networks (ACIA, 2004). Because water extraction would only occur during construction, long-term, climate-change induced changes in water availability would not be expected to affect the project.

Climate change-induced permafrost thaw could lead to embankment deformation through the process of thaw settlement which occurs when ice-rich permafrost thaws and causes the ground surface to subside (Lemke *et al.*, 2007). Ground subsidence could damage public infrastructure including roads, runways, water and sewer systems and rail embankments. It has been estimated that thawing permafrost could add \$3.6 billion and \$6.1 billion to future costs for publicly owned infrastructure in Alaska by 2030 (Larsen *et al.*, 2008 in USGCRP, 2009).

16.5.7 Noise and Vibration

Proposed Port MacKenzie construction activities, such as the use of heavy equipment and piledriving for bridges along certain segments, would generate noise. Rail line operations would generate wayside noise and noise from sounding locomotive warning horns at at-grade rail-highway crossings. There are no receptors near any of the alternatives that would experience adverse noise impacts during rail line operations. Because of the relatively low ambient noise level and proximity of receptors, the 3 dBA [A-weighted decibel] noise increase contour associated with the Big Lake Segment would include 16 receptors, the Houston South Segment contour would include 8 receptors, and the Mac West Segment contour would include 2 receptors. Because of relatively low ambient noise levels in these areas, train noise would be more noticeable than in other areas with higher ambient noise levels. However, because noise levels would be below the 65 decibel DNL [day-night average noise level] for all potential receptors, there would be no adverse noise impacts associated with any of the Port MacKenzie Rail Extension alternatives. Although some of the other projects and actions could increase noise levels, there is no overlap of the areas of noise impact from these projects and actions with the areas of potential noise impact from the proposed rail line. Because there are no adverse noise impacts from the proposed rail line extension, no cumulative impacts would result.

16.5.8 Energy

All segments of the Port MacKenzie Rail Extension would cross a 230 kilovolt transmission line that links the Beluga Power Plant near Tyonek to a bulk substation just south of the Port MacKenzie District. The Big Lake, Houston South, and Houston North segments would also cross a 138 kilovolt transmission line parallel to the ARRC main line between Knik-Fairview and Willow. Connector 1 Segment, Connector 3 Segment, and the Big Lake Segment would cross the Beluga-Wasilla natural gas pipeline that runs along Ayrshire Road and just north of Port MacKenzie Road. ARRC would have to ensure appropriate grade separations and employee-appropriate construction industry standards to minimize any potential to disrupt the provision of energy resources. Increases in energy consumption during proposed rail line construction would be negligible. Train operations would consume less than 0.5 percent of the annual statewide consumption of distillate fuel.

Cumulative impacts to energy resources would be limited to Port MacKenzie Rail Extension crossings of proposed transmission lines and pipelines. This would require coordination between ARRC and the proponents responsible for the other proposed projects to ensure appropriate planning for location of transmission pylons (for the Knik-Willow transmission line) and for grade separation between the Port MacKenzie Rail Extension and the Beluga-Fairbanks natural gas pipeline.

16.5.9 Transportation Safety and Delay

The proposed Port MacKenzie Rail Extension would have the potential to impact traffic safety and delay on the network of local, arterial, and collector roads that comprise much of the existing transportation system in the project area. Where new crossings along the proposed Port MacKenzie Rail Extension would be grade-separated, there would be no increase in the number of potential future train-vehicle accidents and no change in vehicle delay. Where crossings would not be grade-separated (at-grade crossings), there could be some accidents and an increase in vehicle delay.

There could be temporary vehicle delays during rail line construction at new at-grade crossings and where roads would be improved or relocated. Although rail line operations could affect delay at at-grade crossings, this impact would be minimal.

The proposed Port MacKenzie Rail Extension is expected to result in a small increase in future accident frequencies as a result of at-grade crossings. The proposed project should not result in a considerable increase in vehicle delay. There could be an increase in future accident frequency and vehicle delay from the proposed rail line when added to the Port MacKenzie development projects, the Knik Arm Crossing, the Cook Inlet Ferry, the West Mat-Su Access Project, and other road improvements.

16.5.10 Navigation

The proposed Port MacKenzie Rail Extension includes bridges and structures that would cross inland rivers and streams in the project area, which could have a negligible impact on navigation. Of the reasonably foreseeable future projects analyzed for cumulative impacts, only the West Mat-Su Access Project, which would include a new bridge across the Little Susitna River, could create the potential for cumulative impacts to navigation along this waterbody. Alternative access routes, including three potential bridge locations, are under consideration for the West Mat-Su Access project. The Willow, Houston North, and Houston South segments also include a bridge crossing of the Little Susitna River. Construction of any of these segments, combined with the West Mat-Su Access project, could result in cumulative impacts to navigation along the Little Susitna River due to the construction of bridges over this waterbody. However, the cumulative impacts to navigation would be negligible if the bridges are constructed with vertical and horizontal clearances equal or greater than those found in existing bridges on the waterway.

16.5.11 Land Use

The MSB, the State of Alaska, and private entities own most of the land the proposed rail line would directly affect. Impacts to land use from the proposed Port MacKenzie Rail Extension construction and operations would vary depending on alternative. Existing land uses within the ROW would be permanently changed, and any activities within the ROW not associated with the rail line would require an ARRC entry permit. In the area of the Big Lake Segment, the proposed rail line extension would require taking 17 residences and three structures. Two structures in the Connector 3 Segment ROW would be taken, and one structure in the Mac East Segment ROW would be taken.

Public lands in the project area are used primarily for recreation, hunting, and fishing. Figures 16-1 through 16-3 show the recreational resources associated with the Port MacKenzie Rail Extension segments. Construction activities could temporarily impede access to trails and waterways, including the Iditarod National Historic Trail. Operations activities could impact the experience of users engaged in activities such as recreation, hunting, fishing and wildlife viewing. Officially recognized trails would be grade-separated or relocated, but ARRC does not propose to provide crossings for unofficial trails. Unofficial trails would be blocked, and ARRC's trespassing regulations would prohibit the public from crossing of the ROW without first obtaining approval from ARRC.

Mining and timber harvesting are also allowed by permit. Private lands in the project area are primarily in agricultural and residential use. Lands outside the ROW would maintain their existing ownership and uses, but landowners could change the way they use the land as allowed by MSB building or zoning rules. The proposed rail line includes two freight-only trains per day, with no passenger service or whistle stops. Except for the rail line and associated facilities within the ROW, the presence and operation of the rail line would not be likely to result in substantial changes in land use patterns in the project area.

Impacts of the proposed rail line could combine with the impacts of the Cook Inlet areawide oil and gas lease sale and the Knik Arm Crossing to produce potentially significant land-use changes; the rail line contribution to those cumulative impacts would be minimal. The Beluga to Fairbanks natural gas pipeline project could combine with the Port MacKenzie Rail Extension project resulting in cumulative impacts in the area of the Connector 1 Segment, Connector 3 Segment, and Mac West Segment, depending on pipeline and rail line route alternatives.

16.5.12 Socioeconomics

Potential socioeconomic impacts from the proposed Port MacKenzie Rail Extension could include a temporary increase in direct employment during construction. This temporary increase in direct employment could be complemented by additional indirect employment generated through suppliers and service providers and induced employment through multiple rounds of expenditures and consumption along production and consumption chains. The local labor force would partly meet the increased labor demand, and any increased pressures on housing and public services from the migration of laborers to the project area would be minor.

Cumulative impacts to socioeconomic resources would include increased demand for labor, which would likely lead to increased demand for local housing and public services to the extent that labor migrates to the MSB from outside the area. Labor for some of the construction projects might come from the Municipality of Anchorage and reside in that area, which would reduce pressure on the MSB housing market and public services from migration to the area. To the extent that some of the foreseeable projects would shorten the commute time between the MSB and Anchorage, there could be incentives for workers to permanently relocate to the MSB. However, because this permanent stimulus for relocation would occur only after construction works were completed, the MSB housing market and its public services would have time to adjust to expected increases in demand.

There could be long-term negative impacts to recreational activities because the proposed rail line would cross land used for recreational purposes. Crossings of officially recognized trails would be grade-separated or relocated. Recreation and tourism activities that use unofficial trails would be blocked by the rail line, but could possibly be diverted to nearby officially recognized trails. This could have a potentially adverse effect on economic activities directly or indirectly related to the use of such trails. Cumulative impacts to recreation activities are expected to be minor.

16.5.13 Environmental Justice

Because proposed Port MacKenzie Rail Extension construction and operations would not result in high and adverse impacts to human health or the environment, minority and low-income populations would not experience disproportionately high and adverse impacts.

Based on the analysis of cumulative impacts reported in Sections 16.4.1 through 16.4.12, impacts of the proposed Port MacKenzie Rail Extension, when added to the impacts of other past, present, or reasonably foreseeable future projects and actions, would not result in high and adverse cumulative impacts to human health or the environment. In the absence of high and adverse human health and environmental effects, even considering the impacts of other relevant projects, there would be no disproportionately high and adverse cumulative impacts to minority and low-income populations.