17. CUMULATIVE IMPACTS

This chapter describes potential cumulative effects of the Northern Rail Extension (NRE) project. This cumulative effects analysis was based on findings from the environmental and community resources analyzed in the Environmental Impact Statement (EIS).

The Surface Transportation Board (STB or the Board) Section of Environmental Analysis (SEA) collected and reviewed information on relevant past, present, and reasonably foreseeable future projects and actions that could result in impacts in the same area as the proposed rail extension. For those identified relevant projects, SEA identified where there could be cumulative impacts.

17.1 Applicable Regulations

The Council on Environmental Quality (CEQ) regulations that implement the National Environmental Policy Act (NEPA) define cumulative effects 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 CFR 1508.7). To assist Federal agencies in assessing 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 in the area of the proposed action would, when combined with the potential impacts of the construction and operation of the proposed rail line, cumulatively result in environmental impacts.

17.2 Affected Environment

The project area is in the Fairbanks North Star Borough (FNSB) of Alaska and the adjacent Southeast Fairbanks Census Area. The proposed rail line would extend between the towns of North Pole and Delta Junction. The area is relatively rural, with several large military facilities nearby. Much of the proposed rail line would parallel the Tanana River, a large tributary of the Yukon River, and would also roughly parallel Richardson Highway, one of the major highways in Interior Alaska. Eielson Air Force Base (AFB) is in the northern portion of the project area and Fort Greely is adjacent to Delta Junction at the southern end of the project area. On the western side of the Tanana and Delta Rivers are two military training areas, the Tanana Flats and the Donnelly West training areas (TAs). The Tanana River Basin is composed of generally flat bottomlands and a prevalence of spruce and hardwood forests, with riparian features such as meandering rivers, side sloughs, and oxbow lakes. There is recreational boating on the river in the summer, snowmachining and dog-sledding along certain sections in the winter, and there are state recreation areas nearby.

Existing conditions reflect past and present projects. The area around the proposed NRE has been experiencing gradual incremental development. Activities such as military activity, resource extraction and transportation, population growth and supporting infrastructure development have all contributed to the current environmental conditions.

17.3 Methodology

The cumulative effects of an action might be undetectable when viewed in the individual context of general impacts, but they can add to other disturbances and eventually lead to a measurable

environmental change. Cumulative effects should be evaluated along with the overall impacts analysis of each alternative. The range of alternatives considered should include the No-Action Alternative as a baseline against which to evaluate cumulative effects. CEQ recommends that an agency's analysis accomplish the following:

- Focus on the effects and resources within the context of the proposed action.
- Present a concise list of issues that have relevance 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 on reasonably foreseeable projects or activities that are beyond the scope of the analyzing agencies purview.
- Relate to the geographic scope of the proposed project.
- Relate to the temporal period of the proposed project.

In general, a cumulative effects analysis involves assumptions and uncertainties.

17.3.1 Collect and Screen Project Data

SEA researched and collected information on other future projects/actions that could have effects that coincide in time and space with the potential effects from the proposed NRE. SEA conducted interviews of appropriate personnel (key personnel from project proponent offices and/or agencies) to identify various past, present and reasonably foreseeable future projects. SEA then reviewed analyses and information about those projects to identify which projects should be included in the cumulative impacts analysis and/or as part of each resource analysis. SEA then applied a screening process to determine if projects were reasonable, foreseeable, and could be associated with potential cumulative impacts. Section 17.4 identifies those projects.

17.3.2 Evaluate Potential Cumulative Impacts

SEA evaluated the cumulative impacts for situations where planned or reasonably foreseeable future projects would overlap with the proposed NRE in terms of geographic area and/or timeframe. A discussion of potential cumulative impacts, by resource, is included later in this chapter.

17.4 Potential and Relevant Projects

The following section describes projects SEA reviewed for potential inclusion in this cumulative effects analysis. Projects are categorized into two groups—projects that are relevant and should be included in this analysis, and projects that were reviewed but were deemed inappropriate for this cumulative effects analysis. Brief explanations of those projects and/or actions are included below, including the rationale for why some projects were excluded from analysis.

17.4.1 Projects Considered in this Analysis

The projects listed below could have common potential actions and impacts and would occur within or near the proposed NRE project area and during a similar period. Also included are references to identified environmental analyses for those projects.

Military Activities

The proposed NRE would run from near North Pole and Eielson AFB to Delta Junction and would go through the Tanana Flats and the Donnelly West TAs.

At present, access to the Donnelly West TA and Tanana Flats TA is restricted by the Tanana River and Delta River. There are no permanent bridges across these rivers in the area of the proposed rail extension. In the winter, the U.S. Army and U.S. Air Force construct ice bridges to transport vehicles, troops, and supplies to the training areas. The U.S. Army and U.S. Air Force also access these training areas by helicopters, planes, or boats when ice bridges are not available (USARAK, 2004).

U.S. Army Alaska (USARAK) has experienced more than 120-percent growth in assigned troop strength since fiscal year 2003 and is projected to continue to expand through fiscal year 2013 (Shutt, 2007). As USARAK grows the force in both numbers and capabilities, increases in collective training requirements are anticipated to result in additional training area usage. Gaining year-round ground access to the more than 1 million acres of training land in the Tanana Flats and Donnelly West TAs could contribute to providing safe and multi-spectrum training for forces training in Alaska.

The Tanana Flats and Donnelly West TAs are notable components of the ongoing growth in training infrastructure in the Pacific Alaska Range Complex. A combined vehicle and rail bridge providing access across the Tanana River could facilitate continuing range, trail, and training area infrastructure and maintenance improvements. The U.S. Department of Defense (DoD) Alaska Command (ALCOM) (Joint Headquarters) supports this requirement as a Joint Initiative (Shutt, 2007). As changes in force structure necessitate planning for increased training in the Tanana Flats and Donnelly West TAs, ALCOM will ensure that an assessment is prepared of the potential environmental impacts of future expansion of DoD training requirements.

Other military-related projects that could have an effect on the environment in the area of the proposed NRE include:

- Construction of new range complexes[1] at Donnelly East TA to enhance training capabilities: The U.S. Army's Record of Decision (ROD) documents selection of the Eddy Drop Zone alternative, located approximately 1.8 miles southeast of the terminus of the proposed NRE. The ROD identified significant environmental impacts for fire management/fire risk hazard; cultural resources, and public access and recreation. Positive impacts to socioeconomics were also identified.
- Construction of new facilities at Donnelly West TA; and
- Replacement and upgrade and upgrade of a rail loading facility at Fort Wainwright. The U.S. Army Garrison Alaska (USAG Alaska) published an Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) in August 2007, concluding that there would be minor impacts to air quality, soils, water resources, biological resources and transportation and minor cumulative impacts to those resources as well as hazardous materials, waste and socioeconomics. With mitigation, a FONSI was issued.

[1] The new range facilities are a Battle Area Complex (BAX) and a Combined Arms Collective Training Facility (CACTF). These facilities will enable the U.S. Army units to be trained to higher skill levels than can be attained with current facilities. Environmental impacts caused by the construction and use of these facilities are described and analyzed in a Supplemental EIS prepared by the Army in April 2006.

Alaska Natural Gas Pipeline

Federal Energy Regulatory Commission (FERC), the regulatory and licensing agency for a natural gas pipeline in Alaska, cited substantial progress in its Sixth Report to Congress on development of that pipeline. As of August 2008, two groups are moving forward through development stages.

- In August 2008, TransCanada Alaska was issued a license by the state under the Alaska Gasline Inducement Act (AGIA).
- In June 2008, the Alaska Gas Pipeline, LLC, pre-application filing with FERC was accepted. Alaska Gas Pipeline, LLC, a British Petroleum/ConocoPhillips consortium, expects to file a completed application in August 2011.

If completed, this natural gas pipeline could follow a portion of the TransAlaska petroleum pipeline and run nearly 3,500 miles to Tok and possibly to Calgary. The exact route is under consideration, but may run through North Pole to Delta Junction (ConocoPhillips, 2007). In its AGIA license application, TransCanada indicated that the gas pipeline route could generally follow the TransAlaska Pipeline System (TAPS). While all parties currently involved in competing for this project indicate that a natural gas pipeline could run through the area of the proposed NRE within or near the existing TAPS right-of-way at this time, the exact location is not known. In their November 2002 Final EIS on *Renewal of the Federal Grant for the Trans-Alaska Pipeline System Right-of-Way*, the BLM concluded that no major synergistic effects were identified in their cumulative impacts analysis (BLM, 2002).

Richardson Highway Upgrades

The Alaska Department of Transportation and Public Facilities (ADOT&PF) continually performs upgrades to segments of Richardson Highway, including roadway resurfacing and projects to add access and passing lanes. Substantial upgrades are likely to continue along the length of Richardson Highway to accommodate development and substantial infrastructure projects such as the Alaska Natural Gas Pipeline (ADOT&PF, 2008b). In addition, under the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), the Fairbanks-Yukon International Corridor, consisting of portions of the Alaska Highway and Richardson Highway from the international border with Canada to Fairbanks, was designated a High Priority Corridor (Corridor 67) (FHWA, 2006). This designation is likely to be associated with investments in improving the Richardson Highway over the long-term.

Specific projects in the 2006- 2009 Statewide Transportation Improvement Program (ADOT&PF, 2008d), and their environmental review status if known, include:

- MP 357 Fairbanks New Weigh Station (environmental review in progress);
- MP 350 Badger Interchange ramps and improvements (categorically excluded from detailed environmental analysis);
- MP 348 North Pole Interchange improvements (environmental assessment completed with resulting Finding of No Significant Impact); and
- Northern Region Pavement and Bridge Rehabilitation program.

For construction beyond 2009, ADOT&PF has four projects with an estimated cost of $30 million under design for the portion of the Richardson Highway between Delta Junction and

Fairbanks. These projects involve bridge replacements at Jarvis and Shaw creeks and roadway reconstruction and improvements at other locations (ADOT&PF, 2008a).

Typically, Richardson Highway upgrade projects occur within the footprint of the existing highway and are categorically excluded from detailed environmental impacts analysis because of limited environmental impacts (AKDOT&PF, 2008).

17.4.2 Projects Considered but not Analyzed in Detail

The following projects and activities were considered for their potential for cumulative impacts; however, the relationship and synergy among them and the proposed NRE and any resultant cumulative impacts are so limited or are non-existent at this time that no further analysis was considered useful or necessary. SEA believes that the projects listed could happen in the future and should be noted, but that these projects are not considered reasonably foreseeable at this time and are considered speculative due to uncertain or lack of funding, or are supported only by non-specific or conceptual plans.

Alaska-Canada Rail Link

This proposed rail link would involve approximately 1,600 miles of new rail line to connect ARRC's rail network to the existing Canadian railroad system to facilitate increased mining development, visitor and resident travel, and open a new trade route to Asia (Government of Canada and Anchorage Consulate, 2008). An initial feasibility study was completed in June of 2007 and it is likely that additional studies will be conducted (State of Alaska and Yukon Government, 2007). Although the State of Alaska and Yukon territorial governments continue to explore the concept of extending Alaska's railroad track (including from Delta Junction), this project has been discussed for decades, is in the early planning phases, and is currently unfunded. Therefore, near-term progress is not anticipated.

Closure of Agrium's Kenai Peninsula Nitrogen Operations

By September 2008, this fertilizer production facility south of Anchorage will be closed with only a small caretaker and security staff remaining. The closure was attributed to a shortage of local natural gas on the Kenai Peninsula. The fertilizer was previously trucked from Kenai to Fairbanks for use by farmers in Delta Junction. The alternatives for fertilizer transport include:

- Train to Fairbanks, truck to Delta Junction;
- Truck to Delta Junction from a port; and
- Future: Train to Delta Junction (an identified potential commercial use of the proposed NRE).

If a new source of natural gas is identified, the facility could be reopened. Potential alternatives under consideration include coal to natural gas technology.

Fairbanks Area Rail Line Relocation (FARLR)

This FARLR project would relocate portions of the existing rail line in and around Fairbanks and North Pole. The Fort Wainwright segment was separated from the FARLR into its own project in 2006 (ARRC, 2007d). In 2007, several smaller projects and studies were combined into the Fairbanks Area Rail Realignment project. Until funding is identified, this project will move forward with an alternatives analysis that incorporates the findings of previous studies (ARRC, 2008b). At this time, funding for preliminary engineering, environmental documentation, final

design and construction has not been identified. Therefore, SEA does not consider the FARLR project to be reasonably foreseeable.

Mining Operations

Various future mining operations could become economically viable with the long-haul option that the proposed NRE could provide, although there are no proposals to do so at this time. If any of these operations were to be carried forward in the future in the vicinity of the proposed NRE, they could contribute to the overall cumulative impacts.

Oil and Gas Exploration and Extraction

Future exploration and extraction projects could include the opening of the National Petroleum Reserve to exploration; the Shell Offshore Oil Development in the North Arctic Sea (although held up in litigation, this has the potential for an additional 2,000 people based in Fairbanks); and the opening of the Arctic National Wildlife Reserve to oil exploration. Fairbanks could experience a population increase with the resurgence of oil and gas exploration on the North Slope.

Potential Changes in Population and Development

Population and development patterns in Alaska and the Fairbanks area could continue to shift in the future and may have implications for cumulative impacts. Chapter 15, Socioeconomics, includes analysis of these and other related socioeconomic trends.

17.5 Environmental Consequences

This section builds on the results of resource-specific analyses. The environmental consequences discussion 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 the cumulative impacts for situations where planned or reasonably foreseeable projects overlapped with the proposed NRE in terms of geographic area and timeframe. Section 17.4 describes these projects.

SEA identified the combined interaction of the proposed NRE and other planned or reasonably foreseeable future projects. SEA then identified the potential cumulative impacts for all of the environmental resource categories described in Chapters 3 through 16 of the EIS. Each of the environmental resource categories is described below.

17.5.1 Topography, Geology and Soils

Impacts from the proposed NRE include elimination of the existing soil profile in areas subject to excavation or filling required to construct the railbed with the desired grade and elevation or with removal of soils unsuitable for railbed construction; thawing of permafrost, potentially leading to irregular subsidence of the surrounding soil; and potential mass wasting events such as landslides, rockslides, or slump. Because the proposed NRE would be in an area of seismic activity, there would be a potential for train derailment resulting from a seismic event.

Construction-related activities associated with various potential military expansion activities, roadway projects, and the proposed natural gas pipeline could cause minor adverse effects to topography, geology, and soils that would cumulatively contribute to the impacts caused by the proposed NRE. These activities could include actions such as removing and transporting dirt and fill and establishing and using construction staging areas. The proposed action, in addition

to past, present, and future actions, is predicted to result in minor cumulative impacts to topography, geology and soils.

17.5.2 Water Resources

Impacts to water resources from construction of the proposed NRE could result from the building of unpaved access roads, excavation of gravel, construction of bridges and culverts, use of ice roads and ice bridges, water supply extraction, transportation, and staging areas. Construction and operations-related activities associated with various potential military expansion activities, roadway projects, and the proposed natural gas pipeline could cause adverse effects to water resources and thus would cumulatively contribute to the impacts caused by the proposed NRE. These activities could include actions such as removing and transporting dirt and fill and establishing and using construction staging areas.

The cumulative impact of past, present, and future actions is predicted to have a minor to moderate cumulative impact on surface water, a minor impact on groundwater, and a minor to moderate impact on wetlands. A critical factor in the extent of cumulative impacts would be the exact location and extent of impacts of the proposed Alaska natural gas pipeline, which could be located in the existing TAPS right-of-way. The cumulative effect of these actions, in combination with the proposed action, is anticipated to have a moderate impact on surface water and floodplains from changes to hydrology, stormwater drainage, erosion and sedimentation resulting from construction as discussed. The cumulative impact of the proposed action on groundwater is predicted to be minor from changes to permafrost and ponding. The cumulative impact of the proposed action on wetlands is predicted to be minor to moderate (proposed action 1,000 to 1,500 acres in addition to other actions).

17.5.3 Biological Resources

Impacts to biological resources as a result of the proposed NRE would include habitat disturbance, loss, and fragmentation; degradation of water quality; loss and alteration of fish spawning and rearing habitat through direct modification and changes in surface and subsurface water flow; direct collision mortality from construction and operations; reduced winter survival and lowered breeding success from exposure to construction noise/human activity; and reduced survival or mortality from exposure to fuel or oil spills.

Construction and operations-related activities associated with various potential military expansion activities, roadway projects, and the proposed natural gas pipeline could cause moderate adverse effects to biological resources and, thus, would cumulatively contribute to the impacts caused by the proposed NRE. These activities could include actions that would affect wildlife habitat through ground disturbance or changes in wildland fire patterns, increased or decreased access, noise, and potential transportation-related collisions with wildlife. The severity of these impacts would vary depending on the potential location and impact of the Alaska liquefied natural gas pipeline on fish and mammal populations and habitat.

The proposed action, in addition to past, present, and future actions, is predicted to result in moderate cumulative impacts to biological resources.

17.5.4 Cultural Resources

The proposed NRE could result in destruction, contamination of organic residues of a cultural resource site, exposure of archaeological resources, impacts to the aesthetics and visual site

setting (depending on proximity), and changes to groundwater that affect soil pH level and harm preservation of buried artifacts. Indirect project effects could result from increased erosion and watershed changes. Potential impacts to historic properties in the project's area of potential effect would be further identified and evaluated under a Programmatic Agreement if the STB licensed construction and operation of the proposed NRE.

Construction-related activities associated with various potential military expansion activities, roadway projects, and the proposed natural gas pipeline could cause moderate adverse effects to cultural resources and, thus, would cumulatively contribute to the impacts caused by the proposed NRE. These activities could include actions such as removing and transporting dirt and fill and establishing and using construction staging areas. The proposed action, in addition to past, present, and future actions, is predicted to result in moderate cumulative impacts.

17.5.5 Subsistence

Subsistence use impacts associated with the proposed NRE would result from restrictions on user access to use areas and resource availability in those areas. The cleared right-of-way (ROW) could result in more train-moose collisions and potentially affect overall moose resource availability in the area. Competition due to changes in the accessibility of the area could cause harvesters to utilize other communities' use areas, increasing the number of harvesters competing for resources in those places.

Construction and operations-related activities associated with various potential military expansion activities, roadway projects, and the proposed natural gas pipeline could cause moderate adverse effects to subsistence resources and, thus, would cumulatively contribute to the impacts caused by the proposed NRE. The proposed action, in addition to past, present, and future actions, is predicted to result in moderate cumulative impacts.

17.5.6 Climate and Air Quality

SEA has concluded that the increases in emissions from construction and operation of the proposed NRE would be minimal in the context of existing conditions. Greenhouse gas emissions associated with the proposed NRE would be comprised mostly of carbon dioxide (CO_2), and the increase in CO_2 emissions from the current CO_2 level would be less than 0.02 percent for the state as a whole (ADEC, 2008b). While any of the other projects have the potential to generate some impacts to climate and air quality, factors affecting air emissions and air quality, such as possible influx of persons, vehicle and construction equipment for a possible Alaska natural gas pipeline, vary widely.

Although the emissions generated from the proposed project would be small, they would contribute to a cumulatively significant adverse impact. The Intergovernmental Panel on Climate Change (IPCC) has assessed the potential consequences of global climate change (IPCC, 2007). Specific to Alaska and the project study area, trends have shown that the average annual surface temperature in Alaska has been rising at the rate of about 1.5 degrees Fahrenheit (ºF) (1 degree Celsius [ºC]) per decade over the last 3 decades, with the largest warming occurring in the interior and arctic regions (Alaska Regional Assessment Group, 1999). The temperature increases are larger in winter. Precipitation has increased by about 30 percent overall, but there is more spatial variability. The two general circulation models used in a National Assessment (NAST, 2000) predict an increase in the mean temperature in Alaska of 3 to 6 ºF (1.5 to 3.5 ºC) by the year 2030. Annual snowfall has increased by about 11 percent over Alaska, but annual snow cover has decreased due to more rapid melting in spring and summer (Alaska Regional

Assessment Group, 1999). Along a transect following the Trans-Alaska Pipeline route, permafrost temperatures at 49.2- to 65.6-foot (15- to 20-meter) depths have increased between 33.1 and 34.7 °F (0.6 and 1.5 °C) over the past 20 years. Borehole measurements have shown an increase of the mean annual ground surface temperatures of 36.5 ºF (2.5 °C) since the 1960s, while discontinuous permafrost has begun thawing downward at a rate of 0.3 foot (0.1 meter) per year at some locations (ACIA, 2005). Current scientific literature predicts that these trends will continue in particularly vulnerable areas, including Alaska, because warming is more pronounced closer to the poles (U.S. Climate Change Science Program, 2008).

17.5.7 Noise

SEA has concluded that there would be an increase in the number of sensitive receptors exposed to adverse noise levels resulting from operation of the proposed NRE. Assuming daytime construction only, there would be no adverse noise impacts from construction. Four receptors along one alternative segment would experience vibration impacts during construction. Vehicle traffic on Richardson Highway related to possible roadway improvement projects and natural gas pipeline activities, including construction-related traffic, could result in noise impacts in some areas that also would be affected by operation of the proposed NRE. Similarly, an increase in military use of Richardson Highway as a result of either construction-or operations-related activities could also result in minor additive noise effects and, thus, would cumulatively contribute to the impacts caused by the proposed NRE.

17.5.8 Energy Resources

SEA has concluded that the proposed NRE would result in no change or a slight decrease in fuel usage; rail operations would not decrease overall energy efficiency; there would be no effect on the transportation of energy resources or recyclable commodities; and there would be negligible effects on electrical transmission lines and pipelines in the project area. Construction and operations-related activities associated with various potential military expansion activities, roadway projects, and the proposed natural gas pipeline could cause increased use (and for the pipeline, increased supply) of these resources and, thus, would cumulatively contribute to the very minor impacts caused by the proposed NRE.

17.5.9 Navigation

SEA has concluded that small temporary effects to navigability of designated waterways could result during construction of the proposed NRE; no long-term adverse impacts are expected during operations. As currently proposed, it is unlikely that the potential military expansion activities, roadway projects, and the proposed natural gas pipeline would cause adverse impacts to these resources other than potential temporary effects during construction. Thus, no long-term cumulative adverse impacts are expected on navigation resources.

17.5.10 Transportation Safety and Delay

Where new crossings on the proposed NRE would be grade separated, there would be no increase in the number of accidents and no change in vehicle delay. Where crossings would not be grade separated (at-grade crossings), SEA's analysis indicates that some accidents could occur and an increase in some vehicle delay would occur. SEA's analysis indicates that no change in level of service is anticipated at any grade crossing as a result of proposed NRE operations. Similarly, SEA anticipates minimal change in rail delay or safety as a result of

proposed NRE rail traffic. SEA anticipates that temporary delay for vehicles would occur during construction of the proposed NRE at new grade crossings and where roads would be improved or relocated.

Vehicle traffic on Richardson Highway related to possible natural gas pipeline activities, including construction-related traffic, could result in increased vehicle delay or accidents on area roadways and at some at-grade crossings that would be used by rail traffic associated with the proposed NRE. An increase in military use of Richardson Highway could also result in additive delay and in increased numbers of accidents. Moderate increases in vehicle traffic could occur on roads in the project area and at some of the grade crossings that would be crossed by the proposed NRE. However, roadway improvements along Richardson Highway could offset some of the potential cumulative impacts associated with the proposed NRE and natural gas pipeline construction activities.

17.5.11 Land Use

Impacts to land use as a result of the proposed NRE include permanently changing land use within the ROW and requiring a permit for any non-rail activities conducted within the ROW. Military training activities that occur in the ROW would be limited to transit over the access road. Permanent ancillary facilities for the proposed NRE would be constructed beyond a 200-foot ROW. Lands affected by the project are generally undeveloped, away from residences and businesses, and predominantly in public ownership. These lands are used for military training, recreation (such as hunting and fishing), and mining and timber harvest. Privately owned lands are primarily in agricultural and residential use or in a natural state.

The Federal Railroad Administration and Federal Transit Administration are cooperating agencies in the preparation of the EIS and are required to conduct a Section 4(f) evaluation under the U. S. Department of Transportation Act of 1966. SEA identified potential 4(f) resources that would be affected by the proposed NRE. Most of these properties are recreational trails used for dog-sledding, snowmachining, and skiing; two are cultural resources. Ten alternative segments would require use of Section 4(f) resources.

Construction and operations-related activities associated with various potential military expansion activities and the proposed natural gas pipeline could cause moderate adverse effects to Section 4(f) resources and, thus, would cumulatively contribute to the moderate potential impacts caused by the proposed NRE.

17.5.12 Visual Resources

SEA's analysis indicated that six alternative segments would not meet the Bureau of Land Management's visual resource management (VRM) objectives. The visual contrast of structures over dominant waterways is the primary reason the project would fail to meet the VRM objectives at sites along these segments. Temporary facilities could have an adverse visual impact during construction where they are visible. Temporary facilities would be removed after construction and the sites would be restored and meet VRM objectives in the long term. Depending on their location, some of the permanent communications towers could have a moderate to strong contrast with the surrounding landscape. If possible future actions such as the military activities, roadway projects, or the proposed natural gas pipeline construction and operation occur in the same viewsheds as those affected by the proposed NRE, they could cumulatively contribute to the adverse impacts caused by the proposed NRE. Based on review

of existing environmental analyses for projects included in this cumulative impacts analysis, minor cumulative impacts are expected.

17.5.13 Socioeconomics

SEA estimates that any of the alternatives would generate 2,600 to 3,200 direct full-time and part-time jobs during construction, and direct in-state project expenditures on labor, goods and services would initiate subsequent rounds of income creation, spending and re-spending, producing a multiplier effect on Alaska's economy, thereby creating 5,900 to 6,600 direct and secondary full-time and part-time jobs during construction. A small positive proportion of that output and employment would accrue to businesses in the project area. Effects of project construction on public services and housing in the project area would be minimal. One alternative segment would require the relocation of Salcha Elementary School and a section of Richardson Highway. The effects of all alternatives on community cohesion would be minimal.

During rail line operations, smaller annual expenditures would be made, and between 11 and 19 direct and secondary jobs could result and the effects on demands for housing and public facilities and services would be negligible. Use of the proposed NRE would not likely be a determining factor in economic growth of the regional economy, though the improved accessibility provided by the rail extension could in some measure facilitate additional industrial and commercial activity in the Tanana River Basin, including Delta Junction.

Construction and operation of the various potential military expansion activities and the proposed natural gas pipeline could lead to additional job creation, an economic multiplier effect, and demands for housing and public services could result. Nearly all projects included in this cumulative impacts analysis could result in additional jobs. Thus, moderate beneficial cumulative socioeconomic impacts could occur.

17.5.14 Environmental Justice

With the selection of the proposed action or any of the alternatives, there would be no high and adverse impacts to human populations in the project area. Therefore, there would be no high and adverse impacts to environmental justice populations as a result of the proposed NRE. The other projects included in this cumulative impacts analysis reported no or insignificant impacts to environmental justice populations. Thus, there would be no cumulative environmental justice impacts.