PORT MACKENZIE RAIL EXTENSION
BIOLOGICAL ASSESSMENT

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Executive Summary

This Biological Assessment addresses potential effects of the Alaska Railroad Corporation's (ARRC or Applicant) proposed Port MacKenzie Rail Extension (the proposed project) on federally listed threatened and endangered species that are protected under the Endangered Species Act. After consulting the U.S. Fish and Wildlife Service and the National Marine Fisheries Service on potential threatened or endangered species that could be affected by the proposed project, the Surface Transportation Board (STB or the Board) Section of Environmental Analysis (SEA) determined that the proposed project could indirectly affect the endangered Cook Inlet beluga whale (*Delphinapterus leucas*). SEA identified and evaluated potential indirect effects on beluga whale that include: 1) beluga whale forage fish at freshwater stream crossings that support anadromous salmon and smelt throughout the proposed project area, and 2) induced noise and disturbance effects in the immediate vicinity of Port MacKenzie at the entrance of the Knik Arm, as a result of induced increases in vessel traffic to and from Port MacKenzie. SEA, in consultation with National Marine Fisheries Service, did not identify any direct impacts from the proposed project to the beluga whale or beluga whale habitats in the waters of Cook Inlet or within the lower reaches of the Susitna River or the Little Susitna River.

Depending on the alternative that could be chosen, the proposed 35- to 40-mile line rail extension would cross between 5 and 9 streams supporting anadromous salmon populations in the Willow Creek and Fish Creek-Susitna River drainages; the Little Susitna River drainage; Lucille Creek, Fish Creek, and Goose Creek-Knik Arm drainages; and several other small Cook Inlet drainages. These crossings could potentially result in habitat loss or reduced habitat quality for salmon populations, which are important forage resources for the Cook Inlet beluga whale. Implementation of avoidance, minimization, and mitigation measures at these anadromous crossings would likely eliminate or reduce any potentially significant effects to the anadromous fish stream habitats crossed by proposed project alternatives, such that changes in anadromous fish runs supporting beluga whales would not be expected to occur as a result of the proposed project.

Operation of the proposed rail line extension, including delivery of bulk materials and freight to and from Port MacKenzie, would potentially increase vessel traffic at Port MacKenzie from an average of 50 ships per year during 2005 to 2008, the vast majority of which were associated with barge traffic between Port MacKenzie and the Port of Anchorage, to as many as 55 to 63 ships per year if rail line operation would occur while Port of Anchorage expansion continues, potentially displacing beluga whales from the Port MacKenzie area due to noise and disturbance (see Section H.5). As many as 60 percent of beluga whales may seasonally use the Knik Arm, after passing through the Knik Arm Narrows and between the Port of Anchorage and Port MacKenzie. This area has experienced ongoing increases in industrial, shipping, and aircraft noise and disturbance, but continues to be used by beluga whales. Ships coming into Port MacKenzie would generally be moving slowly and injury to beluga whales from strikes by ships calling at Port MacKenzie would be highly unlikely. Ships used to transport materials delivered to and from Port MacKenzie by the rail extension would not produce noise in excess of the 180 dB re: 1 µPa, which is defined as Level A harassment for marine mammals. In addition, sound

from ship traffic is concentrated at low frequencies (less than 0.5 kHz for container ships and freighters) that are outside the range of beluga whale hearing and vocal communications, and sound pressure levels would attenuate within short distances from the source to levels well below the Level B harassment threshold.

SEA has determined that the Port MacKenzie Rail Extension, if authorized, ***may affect***, ***but is not likely to adversely affect*** the Cook Inlet beluga whale or access of beluga whales to Type 1 habitats (intensive use from spring through fall for foraging and nursing) in the Knik Arm.

Project Location and Description

The proposed Port MacKenzie Rail Extension would be within the Matanuska-Susitna Borough, northwest of Anchorage, on the west side of the Knik Arm (Figure 1). The proposed project is generally bounded by the Susitna River on the west, Knik Arm of Cook Inlet on the south and east, and Parks Highway and existing Alaska Railroad Corporation main line to the north.

The proposed Port MacKenzie Rail Extension would involve the construction and operation of a new rail line connecting the Matanuska-Susitna Borough's Port MacKenzie, in Southcentral Alaska, to a point on the ARRC's existing main line between Wasilla and north of Willow, Alaska (Figure 1). With the STB as the lead agency, eight alternatives and the No-Action Alternative are being evaluated for an environmental impact statement (EIS) of the proposed project. The Alternatives are composed of southern and northern segments, with possible connector segments in between. The southern segments—Mac West and Mac East—would run either east or west of the Point MacKenzie Agricultural Project. The three main northern sections, north of the Point MacKenzie Agricultural Project, are Willow, Houston, and Big Lake, with Houston having a north or south variant. Connector segments link the north and south segments to create eight possible routes for the proposed rail line.

According to the Applicant, the proposed rail line would provide freight services between Port Mackenzie and Interior Alaska and would support Port Mackenzie's continuing development as an intermodal and bulk material resources export and import facility. Major elements of the proposed rail extension would include between 30 and 45 miles of new railroad track within a 200-foot-wide right-of-way; crossings of local roads, streams, trails, and utility corridors; sidings; and associated facilities. The proposed project potentially crosses Willow Creek and Fish Creek -Susitna River drainages; the Little Susitna River drainage; Lucille Creek, Fish Creek, and Goose Creek-Knik Arm drainages; and several other small Cook Inlet drainages.

Rail bridges and culverts would be required for crossing anadromous fish-bearing waterbodies important to beluga whales. The current location, type, and size of all proposed bridges and culverts are considered approximate and preliminary, and the exact locations, types, and sizes would be determined during the final design and permitting process. Some crossings are currently identified as 'drainage structures,' which are crossing structures that would be determined by the Applicant during the final design process and could include culverts, pre-cast arches, and single or multiple short-span bridges. The Applicant has stated that all bridges and culverts would be designed to allow fish passage in accordance with an ADNR Title 41 fish habitat permit.

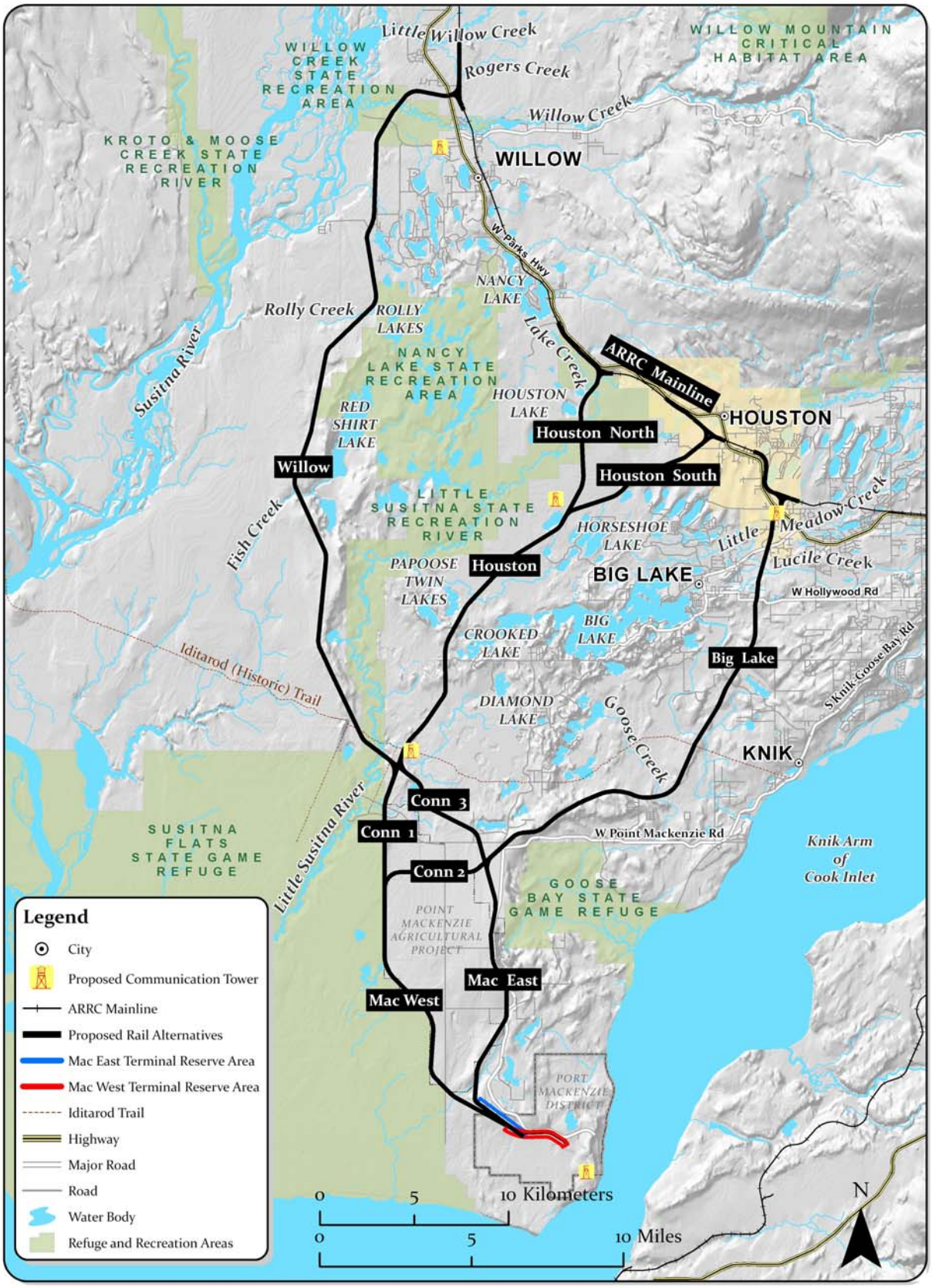

Figure 1. Proposed Port MacKenzie Rail Extension

A terminal reserve area would be established for the Port MacKenzie Rail Extension, which would provide for freight off-loading and rail line and equipment maintenance. No marine habitat would be directly affected by the Port MacKenzie Rail Extension.

Ship traffic (e.g., Panamax class vessels) at Port MacKenzie would likely increase as a result of operation of the rail line extension. Based on ARRC's petition for exemption for licensure for the construction and operation of the rail line on December 5, 2008, ARRC anticipated a maximum average of approximately two freight trains per day (one in each direction) with an average of 40 to 80 freight cars each, which would equate to approximately 13 Panamax class ships per year. This train and ship count was based upon market opportunities at the time of filing and the supply-based infrastructure and equipment limitations.

Based on current market opportunities, ARRC now estimates ship traffic for export of bulk commodities from the Port MacKenzie Rail Terminal would include 5 Panamax class ships per year at approximately 4-week intervals for an estimated 350,000 tons of bulk commodities per year over an approximately 20 week period (average 70,000 tons/ship ARRC, 2009).

The Applicant has proposed the following voluntary measures for avoidance, minimization or mitigation of potential adverse effects to anadromous fish streams that produce forage fish for the beluga whale.

- For all project-related crossings of fish-bearing waters that incorporate bridges or culverts, the Applicant shall design, construct, and maintain the conveyance structures in accordance with the National Marine Fisheries Service (NMFS) 2008 publication, "Anadromous Salmonid Passage Facility Design" [NMFS (National Marine Fisheries Service). 2008. Anadromous Salmonid Passage Facility Design. NMFS, Northwest Region, Portland, Oregon] or equivalent and reasonable requirements.
- The Applicant shall time project-related construction in anadromous streams to minimize adverse effects to salmon during critical life stages when practicable. The Applicant shall incorporate timing windows [i.e., those time periods when salmon are least vulnerable to disturbances], as specified by the Alaska Department of Fish and Game Division of Habitat, into construction contract specifications for instream work. The Applicant shall design and construct stream crossings so as not to impede fish passage or impair the hydrologic functioning of the waterbody.
- The Applicant shall implement Essential Fish Habitat (EFH) conservation measures as agreed upon with the National Marine Fisheries Service during the EFH consultation process for this project.
- The Applicant shall obtain Federal permits required by Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act, from the U.S. Army Corps of Engineers prior to initiation of project-related construction activities in wetlands and waterbodies. The Applicant also agrees to obtain necessary state permits and authorizations (e.g., Alaska Department of Fish and Game Fish Habitat Permit, Alaska Department of Natural Resources Land Use Permit, and an Alaska Department of Environmental Conservation Section 401 water quality certification). The Applicant shall incorporate stipulations into construction contract specifications.

- The Applicant shall be subject to U.S. Environmental Protection Agency and Alaska Department of Environmental Conservation jurisdiction under the National Pollutant Discharge Elimination System (NPDES) for stormwater discharges resulting from project-related construction activities. Requirements that are commonly part of a Stormwater Pollution Prevention Plan associated with a NPDES Stormwater Construction Permit include the following:
    - Ground disturbance shall be limited to only the areas necessary for project-related construction activities.
    - During earthmoving activities, topsoil shall be reused wherever practicable and stockpiled for later application during reclamation of disturbed areas.
    - Appropriate erosion control measures shall be employed to minimize the potential for erosion of soil stockpiles until they are removed and the area is restored.
    - Disturbed areas shall be restored as soon as practicable after construction ends along a particular stretch of rail line, and the goal of restoration shall be the rapid and permanent reestablishment of native ground cover on disturbed areas to prevent soil erosion.
    - The bottom and sides of drainage ditches shall be revegetated using natural recruitment from the native seed sources in the stockpiled topsoil or a seed mix free of invasive plant species.
    - If weather or season precludes the prompt reestablishment of vegetation, temporary erosion control measures shall be implemented.
- The Applicant shall avoid and minimize impacts to waters of the United States, including wetlands, to the extent practicable. The Applicant shall provide compensatory mitigation for unavoidable impacts to wetlands as part of the U.S. Army Corps of Engineers Section 404 permit, to the extent practicable in accordance with the reasonable requirements of the Clean Water Act.
- The Applicant shall minimize the number of temporary stream crossings constructed to provide access for contractors, work crews, and heavy equipment to the extent practicable. Where needed, temporary structures shall be placed to avoid overly constricting active channels and shall be removed as soon as practicable after the crossing is no longer needed.
- The Applicant shall disturb the smallest area practicable around any streams and, as soon as practicable following project-related construction activities, revegetate disturbed areas using native vegetation.
- When project-related construction activities, such as culvert and bridge construction, require work in streambeds, the Applicant shall conduct activities, to the extent practicable, during either summer or winter low-flow conditions.
- The Applicant shall design and construct the new rail line in such a way as to maintain natural water flow and drainage patterns to the extent practicable. This shall include installing bridges or placing equalization culverts through the embankment as necessary, preventing impoundment of water or excessive drainage, and maintaining the connectivity of floodplains and wetlands.

Action Area

The action area is defined as all areas to be affected directly or indirectly by the proposed action and not merely the area immediately adjacent to the action. SEA, in consultation with National Marine Fisheries Service, determined that the project could indirectly affect beluga whales, and identified areas where these indirect effects could occur. The areas include: 1) stream crossings that support anadromous salmon and smelt, and 2) the immediate vicinity of Port MacKenzie at the entrance of the Knik Arm that would experience an increase in vessel traffic to Port MacKenzie (Figure 2). These areas define the action area for the project. Stream crossing action areas account for any potential adverse affects to anadromous fish, and the Port MacKenzie action area accounts for disturbance effects to beluga whales that could result from increased vessel traffic.

Species Occurrence

The species addressed in this Biological Assessment were identified based on consultations with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service and the following correspondence:

- During initial consultations with the U.S. Fish and Wildlife Service, and scoping comments dated October 19, 2007, no listed species were identified as a concern. In a letter from SEA to the U.S. Fish and Wildlife Service, dated February 4, 2009, SEA requested information regarding the presence of threatened and endangered species and designated critical habitat in the proposed project area (see Appendix A, Agency Consultation). SEA noted that a review of the Endangered Species Act Consultation Guide Map for Alaska and project-related biological data indicated that no listed species or designated critical habitats are found in the proposed project area. SEA requested that the U.S. Fish and Wildlife Service confirm the lack of listed species and critical habitat within the action area for SEA's Section 7 consultation. The U.S. Fish and Wildlife Service responded on March 9, 2009 confirming that there are no federally listed or proposed species, and/or designated or proposed critical habitat within the action area of the project, and that the requirements of Section 7 of the Endangered Species Act have been satisfied for species under their jurisdiction.
- In a letter to SEA dated March 4, 2009, the National Marine Fisheries Service responded to a request for Endangered Species Act-listed threatened and endangered species that could be affected by the proposed project (Appendix A, Agency Consultation). The species identified were the Cook Inlet beluga whale and several Endangered Species Act-listed stocks of Pacific salmon from the Pacific Northwest that could occur in Alaskan waters. However, the National Marine Fisheries Service indicated that these salmon species are typically found in the North Pacific, south of the Bering Sea, and that the specific occurrence of these species in the proposed project area is highly unlikely.

Cook Inlet Beluga Whale

Beluga whales (*Delphinapterus leucas*) are small, white, toothed whales found in the Northern Hemisphere throughout arctic and subarctic waters, generally in shallow, coastal waters (National Marine Fisheries Service, 2008). The National Marine Fisheries Service designated

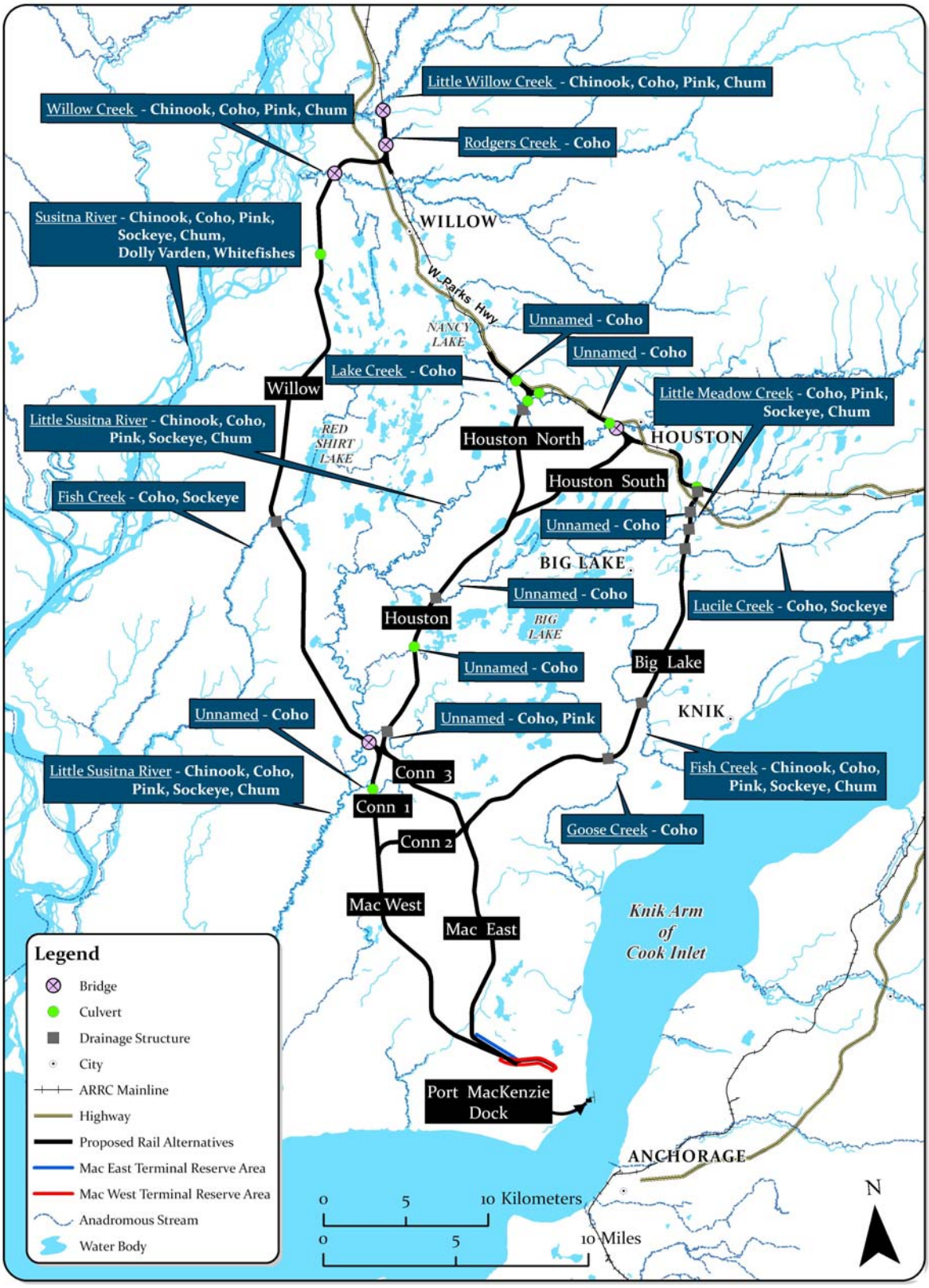

Figure 2. Action Area for Analysis of Potential Impacts of the Port MacKenzie Rail Extension

the Cook Inlet beluga whale stock as depleted under the Marine Mammal Protection Act on May 31, 2000 (65 FR 34590) and as endangered under the Endangered Species Act on October 22, 2008 (73 FR 62919). Belugas of Cook Inlet are a discrete isolated population that remains in Cook Inlet year round (Hobbs *et al.*, 2008; Hobbs & Sheldon, 2008).

Cook Inlet belugas are concentrated in the upper Inlet, generally near river deltas and bays in the summer and fall, and they disperse offshore and move to mid-Inlet waters in the winter (National Marine Fisheries Service, 2008). Beluga whales average 12 to 14 feet long with females averaging smaller and lighter than the average 3,300 pound males. Female belugas attain sexual maturity between 8 and 9 years of age, and males mature slightly later. In Cook Inlet, breeding is believed to occur between late winter and early spring, with most calving occurring from mid-May to mid-June, although calving has been observed from April through August (National Marine Fisheries Service, 2008). The gestation period is about 14 to 14.5 months, and females may produce a calf about every 3 years (National Marine Fisheries Service, 2008). Belugas are believed to live to about 60 years of age (National Marine Fisheries Service, 2008).

Beluga whales consume a wide range of prey, probably influenced by both seasonal abundance and preference. Cook Inlet belugas focus on specific species when they are seasonally abundant (e.g., eulachon [*Thaleichthys pacificus*] and gadids [of the family *Gadidae*] were preferred prey in spring). From late spring and throughout the summer, belugas prey on Pacific salmon (*Onchorhynchus* spp.), coincident with the timing of spawning runs in the area. Five Pacific salmon species—Chinook (*O. tshawytscha*), pink (*O. gorbuscha*), coho (*O. kisutch*), sockeye (*O. nerka*), and chum (*O. keta*)—spawn in rivers throughout Cook Inlet. Overall, salmon were the prey species found most frequently in the stomachs of Cook Inlet belugas (Hobbs *et al.*, 2008). In the fall, as salmon runs begin to decline, belugas return to consuming fish found in nearshore bays and estuaries, including cod (*Gadus* morhua) and other bottom-dwelling fish, including Pacific staghorn sculpin (*Leptocottus armatus*), flatfishes, such as starry flounder (*Platichthys stellatus*), and yellowfin sole (*Limanda aspera*) (Hobbs *et al.*, 2008). Dive data from tagged belugas indicate that belugas feed in deeper waters in winter, possibly on flatfish, cod, sculpin, and pollock (*Theragra Chalcormma*) (Hobbs *et al.*, 2008).

Abundance of belugas in Cook Inlet decreased from 1994 to 1998, most likely due to Native subsistence hunts (Figure 3; Hobbs *et al.*, 2008). Estimating abundance of Cook Inlet belugas is difficult because of several sources of variability during aerial surveys, including variability in surfacing intervals of belugas, correction factors to account for missed whales, and observer ability. In addition, counting whales is difficult because of the high densities of beluga aggregations and the differential visibility of older, white belugas and younger, blue-gray belugas (Hobbs *et al.*, 2000). Population estimates for 1994 to 2008 showed an average annual rate of decline of 2.91 percent per year (Standard Error [SE] = 0.010) and an annual rate of decline of 15.1 percent (SE = 0.047) during the years 1994 to 1998 when the harvest was unrestricted. The National Marine Fisheries Service predicted that the beluga population would begin to recover at a rate of 2 to 6 percent per year after harvest was limited. Between 1999 and 2008, the rate of decline was 1.45 percent (SE = 0.014) per year. While this rate of decline is not significantly less than no growth, it is significantly less than the minimum predicted growth rate of 2 percent per year ($P < 0.02$) (Hobbs & Sheldon, 2008).

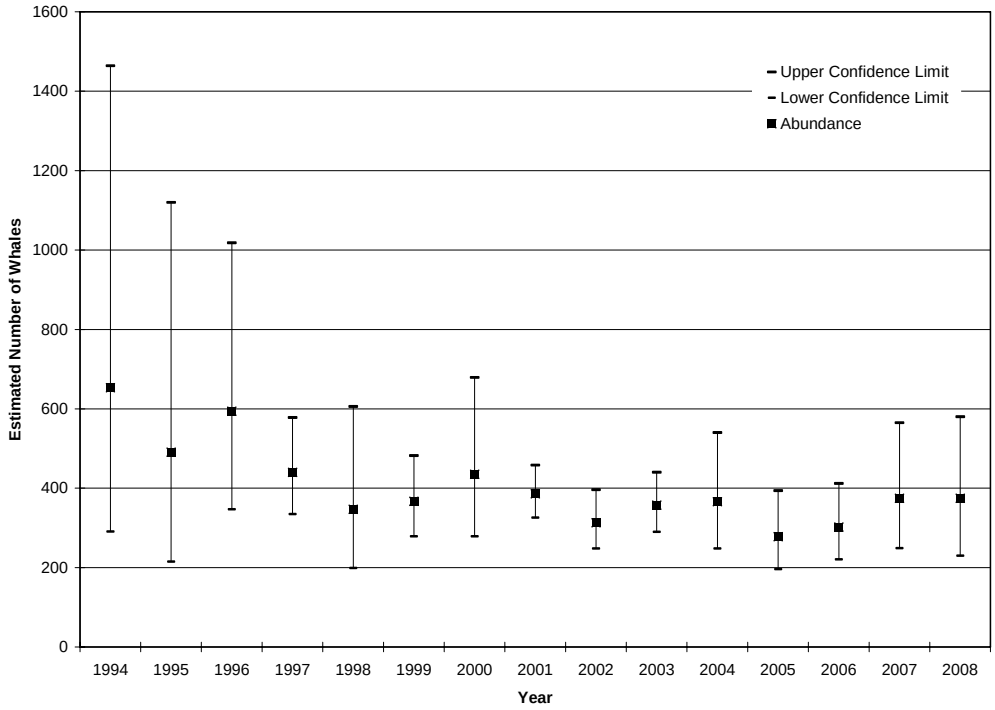

Figure 3. Estimated Abundance of Cook Inlet Beluga Whales from the National Marine Fisheries Service Annual Aerial Surveys 1994-2008, Showing Average Abundance and 95 Percent Confidence Intervals for Each Year (Hobbs *et al.*, 2008)

Beluga proximity to Anchorage has increased significantly since the late 1970s. However, the summer distribution of Cook Inlet beluga whales has contracted since the late 1970s when belugas were distributed throughout Cook Inlet, with 10 percent of groups occurring south of the Kenai River and Kalgin Island. During 1993 to 2007, most beluga sightings were concentrated north and east of the Beluga River and Point Possession (Hobbs *et al.*, 2008). Belugas have remained in the area that previously had the highest impact from hunting (e.g., the north end of Cook Inlet, near Anchorage), and they have disappeared from peripheral habitats (e.g., the southern end of the inlet). It is not known if the current contracted distribution is a result of changing habitat, predator avoidance, or a shift of a reduced population into preferred habitat areas (Hobbs *et al.*, 2008). In winter, belugas are more dispersed throughout the Cook Inlet (Moore *et al.*, 2000). During the June and July abundance estimate surveys, the proportion of belugas using the Knik Arm has fluctuated between 0 to a little over 60 percent of the observed individuals (Figure 4).

Cook Inlet has been stratified into three habitat regions characterized by beluga habitat use (Figure 5) (National Marine Fisheries Service, 2008). Type 1 habitat is considered the most valuable due to its intensive use by belugas for foraging and nursery habitat from spring through fall, and because it is in the upper Inlet, where there is the greatest potential for anthropogenic impacts. Type 2 habitat includes areas with high fall and winter use, and a few isolated spring feeding areas, and Type 3 habitat includes the remaining portions of the range of belugas within Cook Inlet.

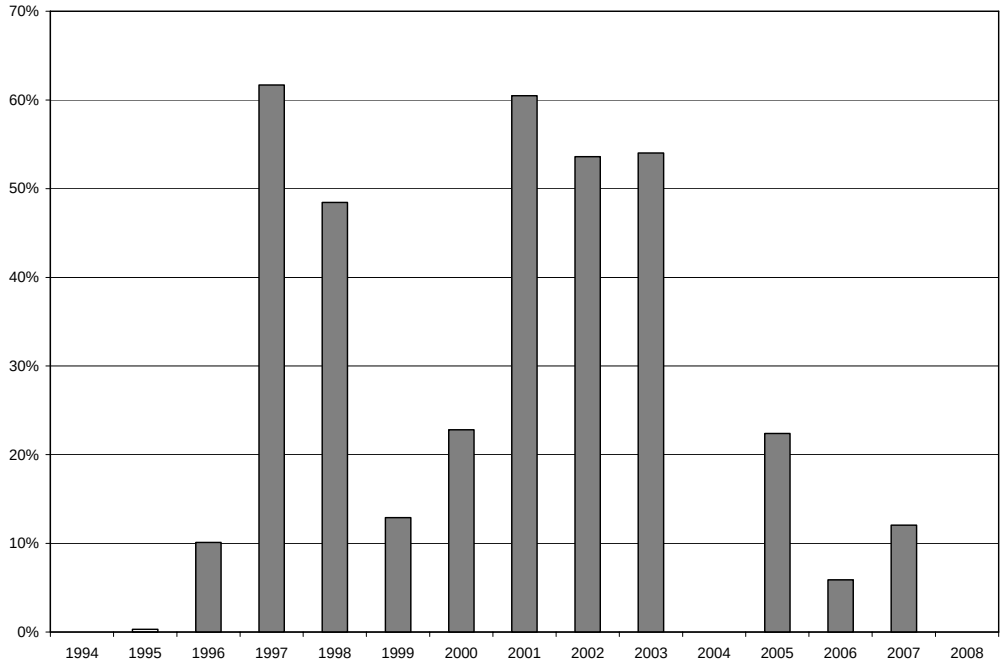

Figure 4. Proportion of Individual Beluga Whales Observed Within the Knik Arm During June and July Abundance Estimate Surveys of Cook Inlet Beluga Whales (Shelden *et al.*, 2008; Rugh *et al.*, 2007; Rugh *et al.*, 2006; Rugh *et al.*, 2005a; Rugh *et al.*, 2005b)

Critical Habitat

Critical Habitat for Cook Inlet beluga whales has not been designated by the National Marine Fisheries Service, but is currently being evaluated. It may include Type 1 and/or Type 2 habitats or a combination of portions of all three valuable habitat types as described above and illustrated in Figure 5. If Critical Habitat is designated prior to construction and operation of the proposed project, SEA would reinitiate consultation with the National Marine Fisheries Service.

Environmental Baseline

Beluga whales use Knik Arm as an important feeding area during much of the summer and fall, passing through the Knik Arm Narrows, past the Port of Anchorage and Port MacKenzie, to areas in the upper Knik Arm. Belugas ascend to upper Knik Arm on the flooding tide, feed on salmon returning to streams for spawning, and then fall back with the outgoing tide to waters off of and north of the Port of Anchorage and Port MacKenzie. The National Marine Fisheries Service has expressed concern for Cook Inlet belugas affected by developments that could restrict their passage along Knik Arm (National Marine Fisheries Service, 2008). Potential impacts that would be increased by aspects of Knik Arm development projects include:

- Encroachment into the lower Knik Arm from the west due to expansion of Port MacKenzie
- Increased dredging requirements with port expansions

- Increased ship traffic due to expansion of both ports in lower Knik Arms, new boat launches, and possible operation of a commercial ferry
- Increased in-water noise levels due to port construction, port operations, and the associated increased vessel traffic
- Increased need for vessel anchorage off both ports (National Marine Fisheries Service, 2008)

Port MacKenzie facilities include a deep draft dock that can be used on a year-round basis. In winter months with heavy ice, additional tie-down lines and a stand-by barge are used when ships are broken from their moorings by ice movements. In order to move with the flow of ice in winter, vessels schedule their arrivals on flood tides and departures on ebb tides. Vessel traffic was irregular at Port MacKenzie from 2005 through 2008, ranging from no ships to 187 vessels per year, with 185 of the vessels during 2008 associated with August gravel transportation for development at the Port of Anchorage (Van Dongen, 2009b). Construction at the Port of Anchorage is slated to continue through 2014. Because this work could overlap with operation of the proposed rail line, these 185 vessels were included in the calculation of average annual traffic at Port MacKenzie.

The current beluga whale use of the area around Port MacKenzie reflects the past and present effects of human activities at the Port and is the baseline condition used for the effects analysis that follows. The existing noise and disturbance levels near Port MacKenzie are described from studies completed for the Knik Arm Crossing, the Port MacKenzie Expansion, and the Port of Anchorage Expansion (Prevel Ramos *et al.*, 2006; Funk *et al.*, 2005; Blackwell, 2005; Blackwell & Greene, 2002). In general, beluga whales use the Knik Arm primarily between August and November, riding up the Knik Arm on the flood tide and down the Kink Arm on the ebb tide (Funk *et al.*, 2005). Belugas generally use the area near Port MacKenzie more frequently during lower tides and late in the day (Funk *et al.*, 2005). Beluga whales occur near Port MacKenzie in larger groups during summer (Funk *et al.*, 2005).

Movement and habitat use of belugas in Knik Arm is influenced by tidal fluctuations that result in changes in water depths of up to 39 feet (Funk *et al.*, 2005). Beluga whale use of Knik Arm was high during the fall (August through October), reduced and more sporadic in spring and late fall to winter (April through July and November through early December), with occasional occurrence at other times of year (mid-December through March) (Funk *et al.*, 2005). Beluga whale sightings near Port MacKenzie during the ice-free period (April through August) were concentrated in April (45 percent) and August (40 percent), with the largest number of whales per group occurring in July (30 whales per observation) (Funk *et al.*, 2005).

Beluga whales were sighted near the Port MacKenzie dock during spring (February through April) across all tide ranges (Figures 6 through 8; Funk *et al.*, 2005). Belugas were observed within the grid cells at and near the Port MacKenzie dock during all three tidal phases (Figures 6 through 8), with the greatest number of group sightings across the Knik Arm Narrows, between Cairn Point and the Point MacKenzie dock, during low- and mid-tidal phases (Figures 6 and 7). More beluga groups were observed within the grid cells near the Port MacKenzie dock during low- and mid-tide heights than at high tides during summer (May through July; Figures 9 through 11; Funk et al., 2005). Beluga whales were consistently observed within the Knik Arm narrows during the fall (late July through October) at all tide

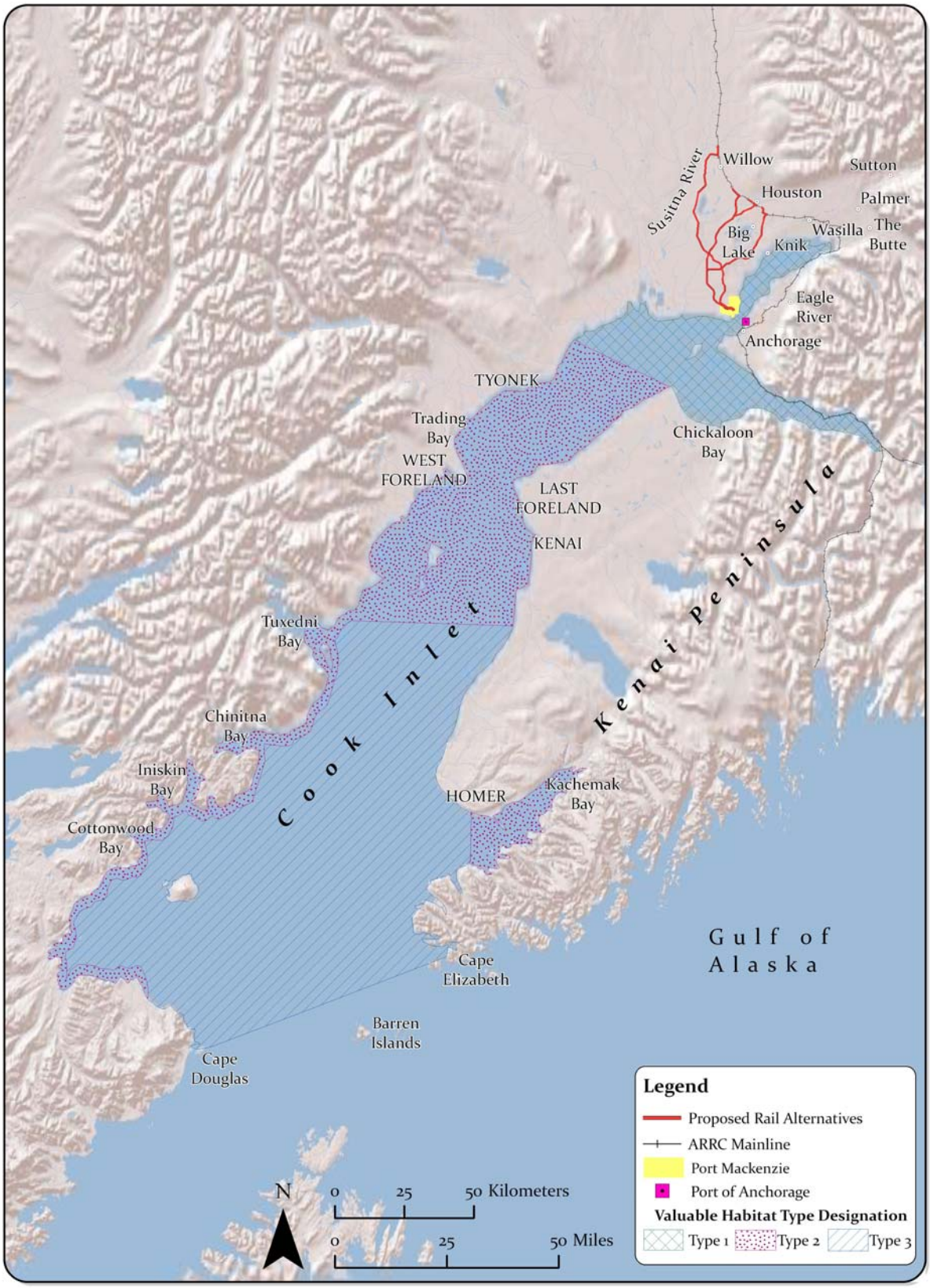

Figure 5. Valuable Habitat Areas (Types 1, 2, 3) Identified for Cook Inlet Beluga Whales (National Marine Fisheries Service, 2008)

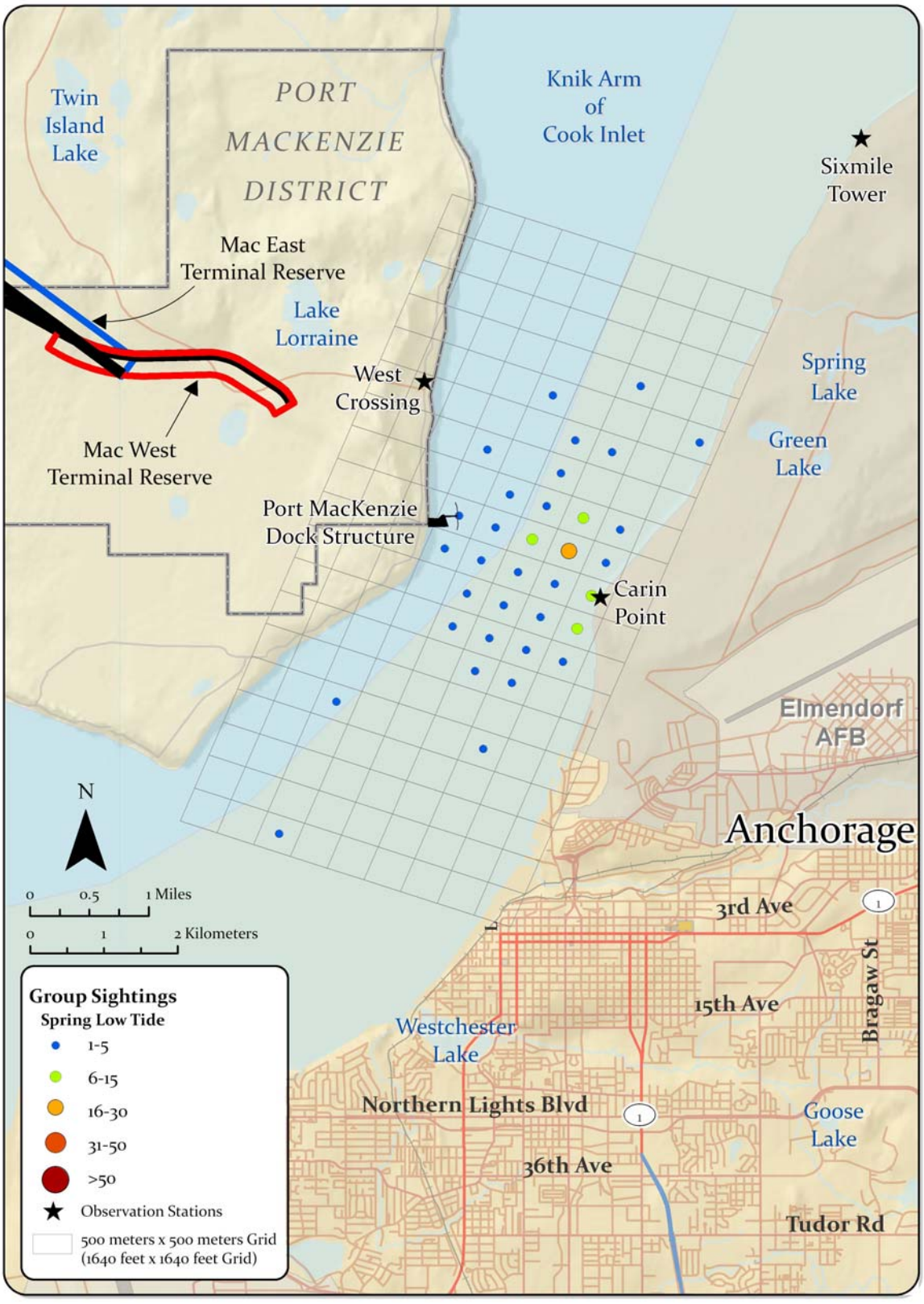

Figure 6. Beluga Whale Group Sightings During Spring (February through April) at Low Tide (< 12 Feet) Near Port Mackenzie; Interpreted from Funk *et al.* (2005)

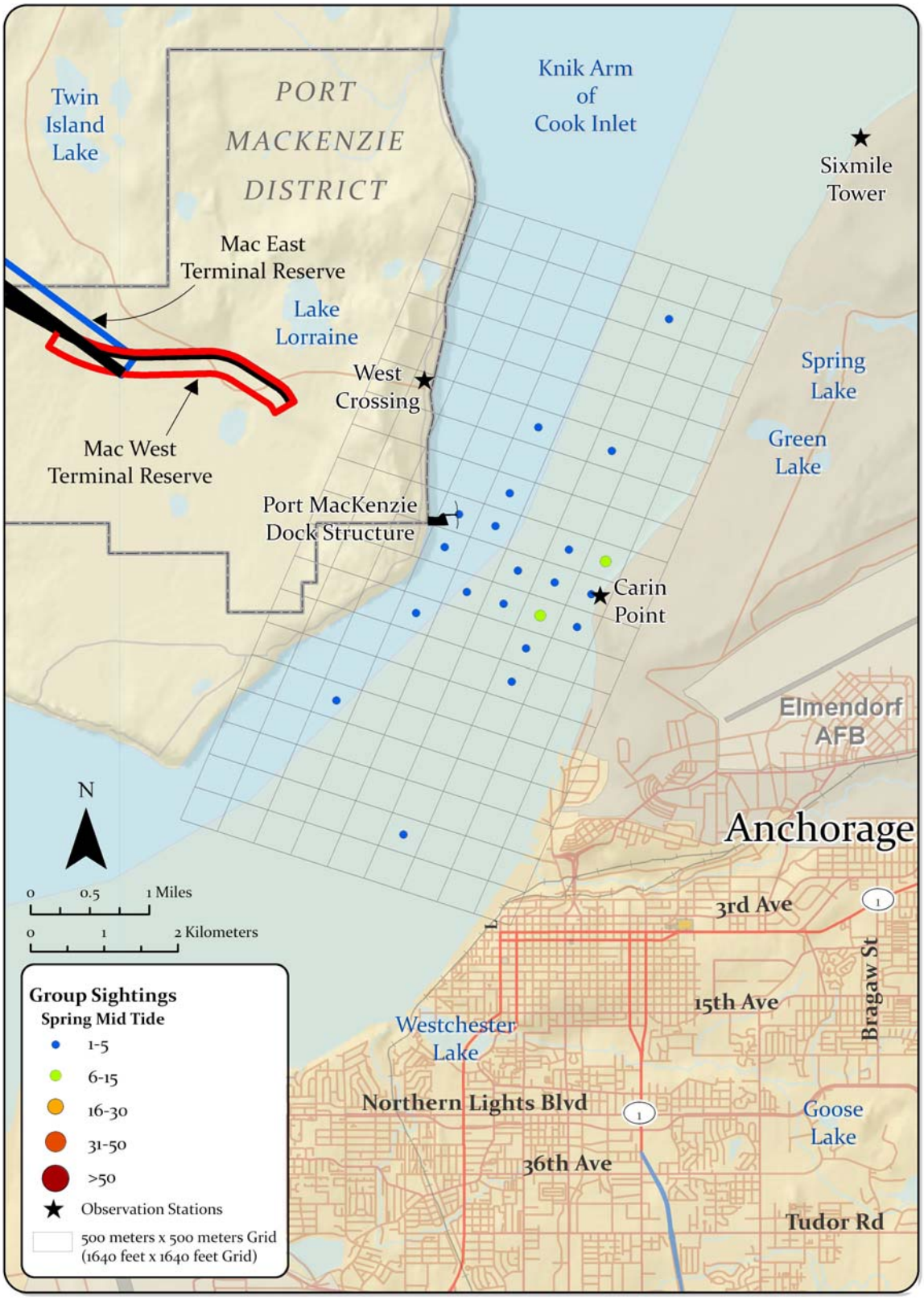

Figure 7. Beluga Whale Group Sightings During Spring (February through April) at Mid Tide (12 To 22 Feet) Near Port Mackenzie; Interpreted from Funk *et al.* (2005)

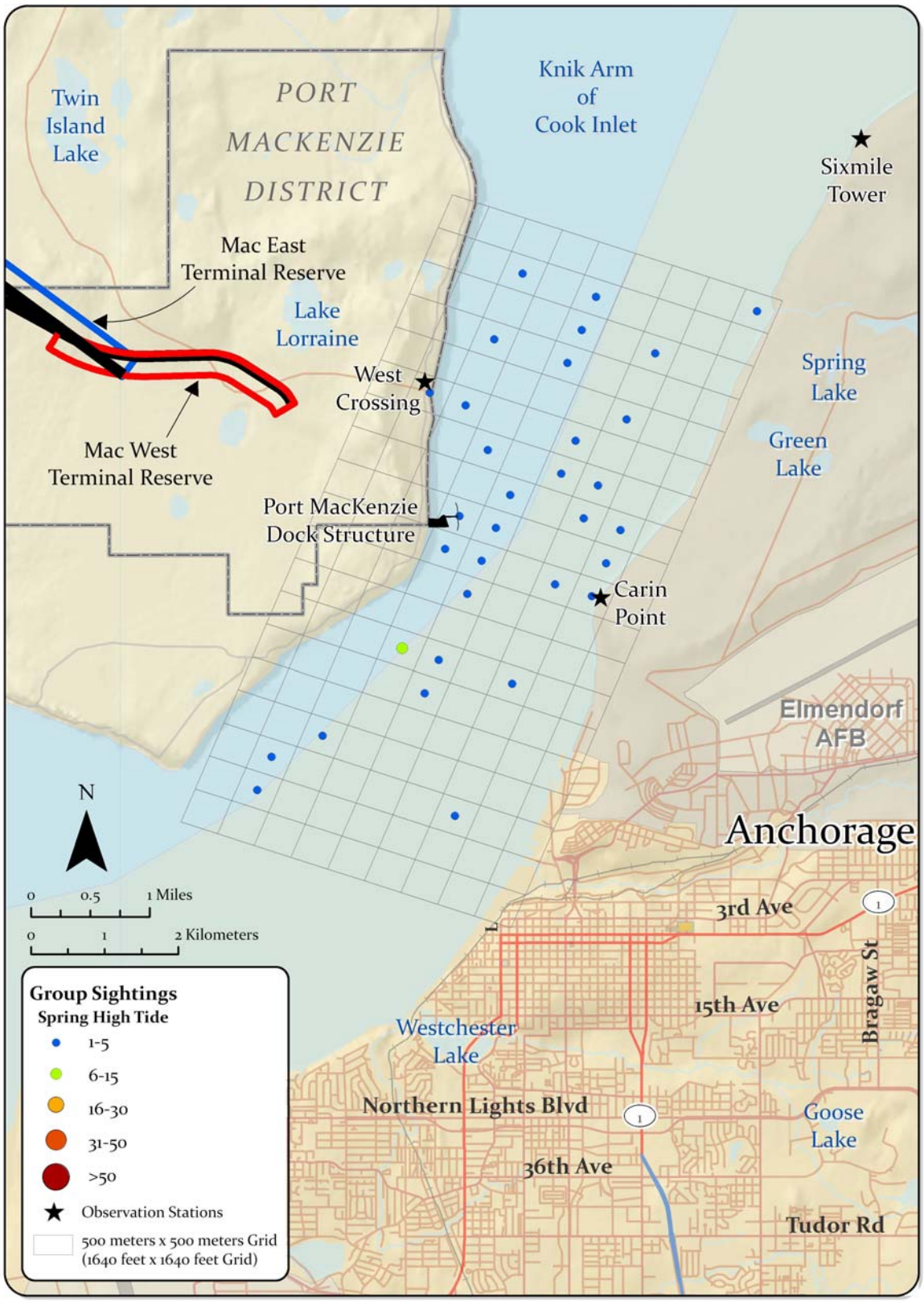

Figure 8. Beluga Whale Group Sightings During Spring (February through April) at High Tide (>22 Feet) Near Port Mackenzie; Interpreted from Funk *et al.* (2005)

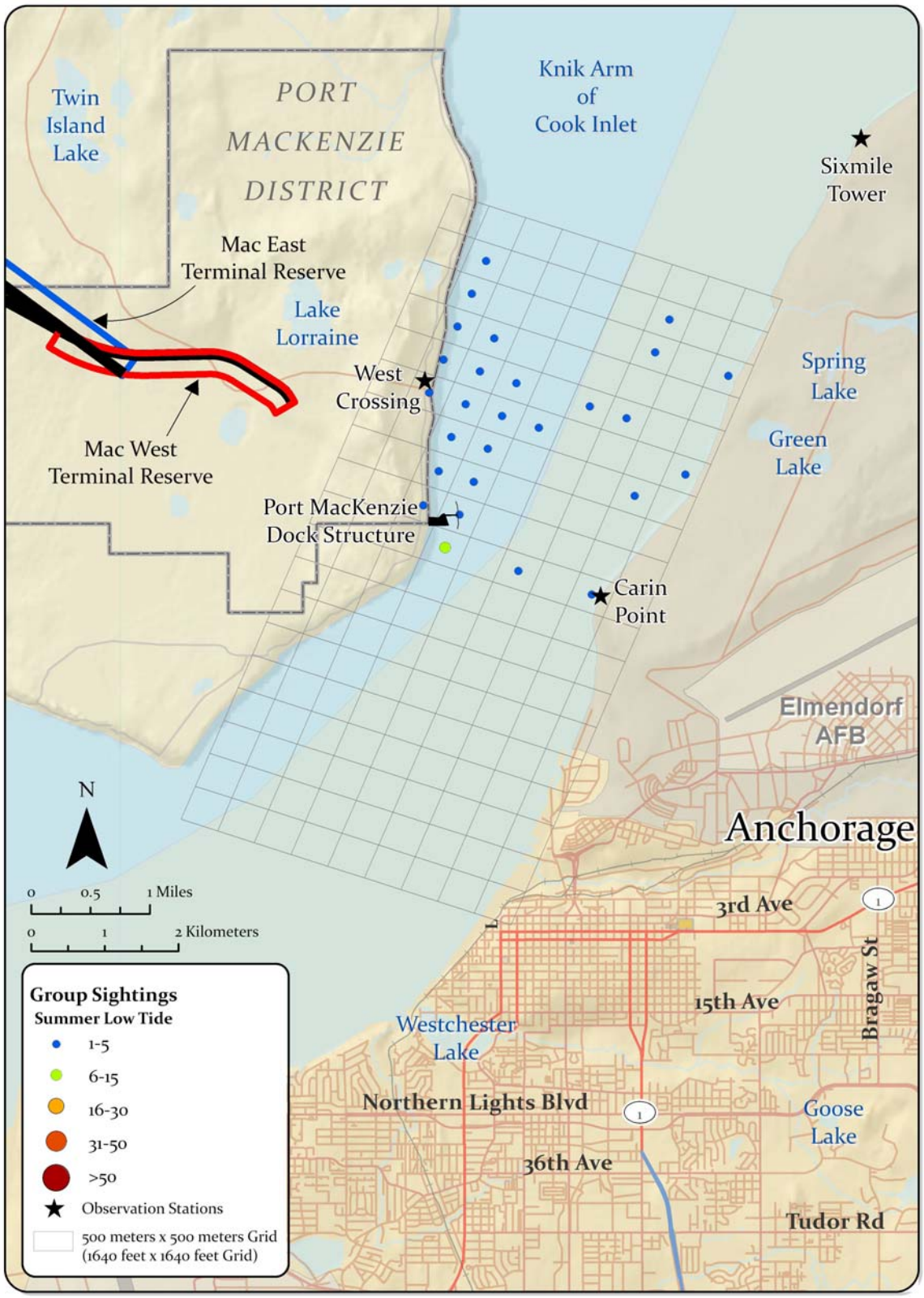

Figure 9. Beluga Whale Group Sightings During Summer (May through July) at Low Tide (< 12 Feet) Near Port Mackenzie; Interpreted from Funk *et al.* (2005)

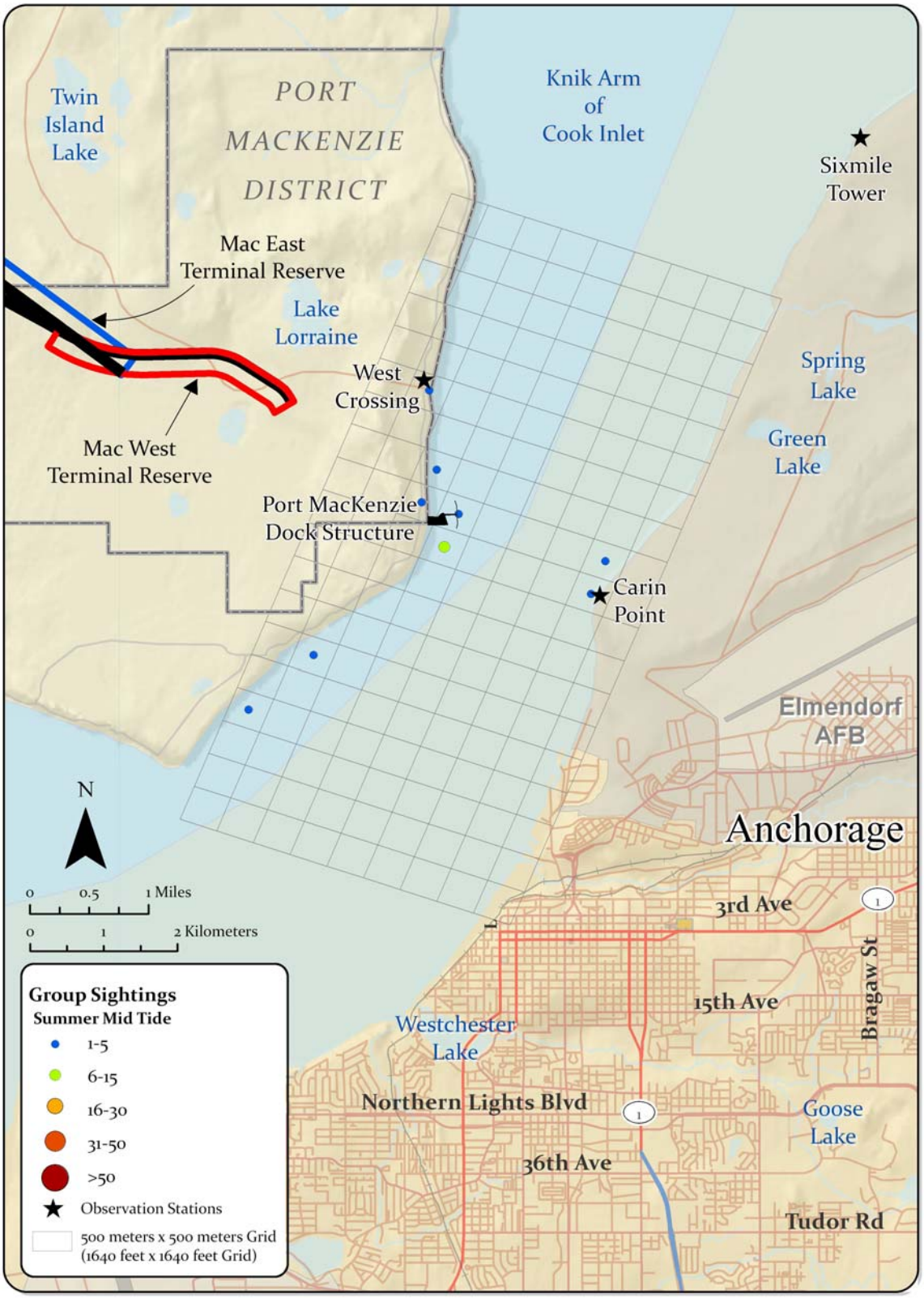

Figure 10. Beluga Whale Group Sightings During Summer (May through July) at Mid Tide (12 To 22 Feet) Near Port Mackenzie; Interpreted from Funk *et al.* (2005)

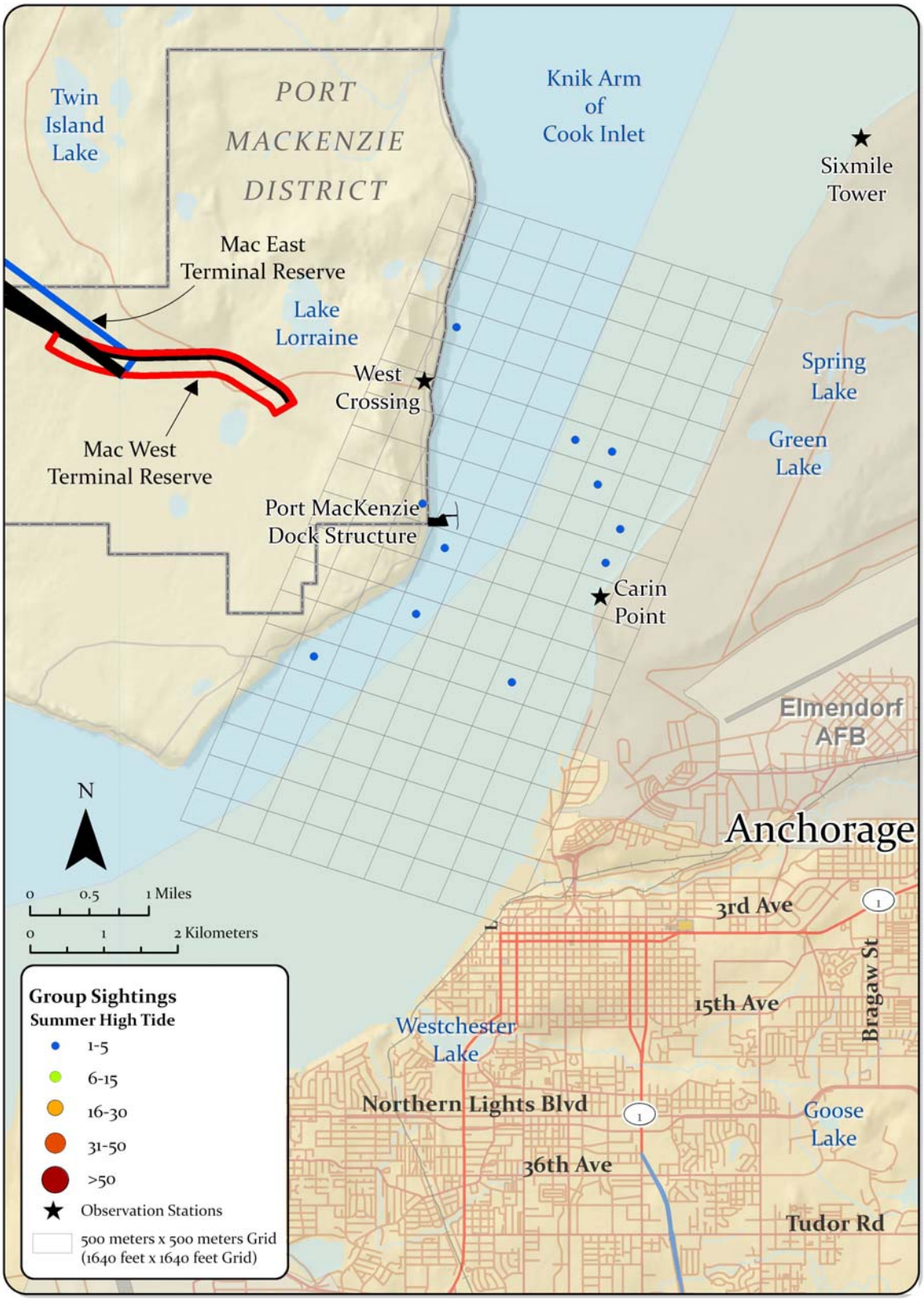

Figure 11. Beluga Whale Group Sightings During Summer (May through July) at High Tide (>22 Feet) Near Port Mackenzie; Interpreted from Funk *et al.* (2005)

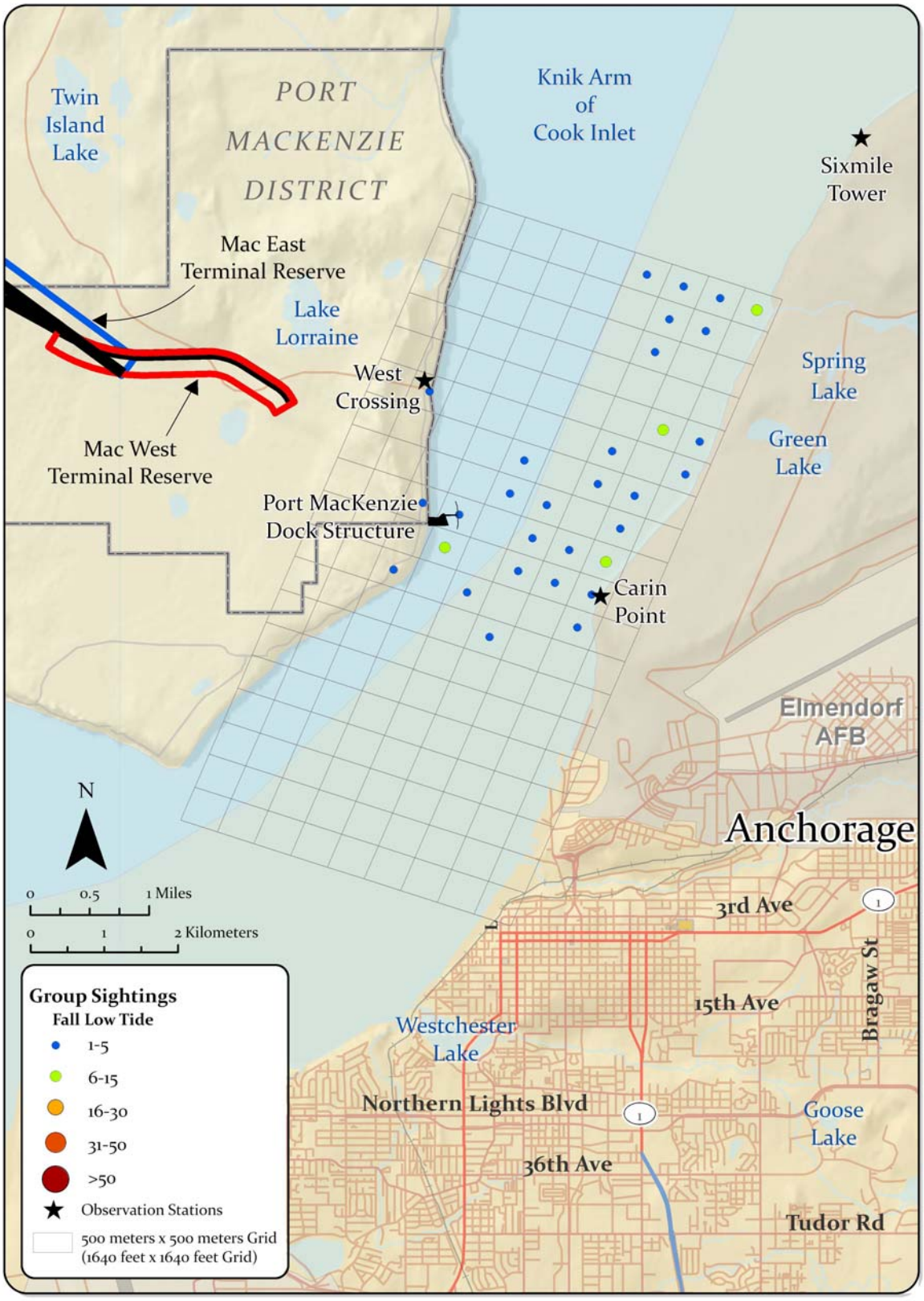

Figure 12. Beluga Whale Group Sightings During Fall (Late July through October) at Low Tide (< 12 Feet) Near Port Mackenzie; Interpreted From Funk *et al.* (2005)

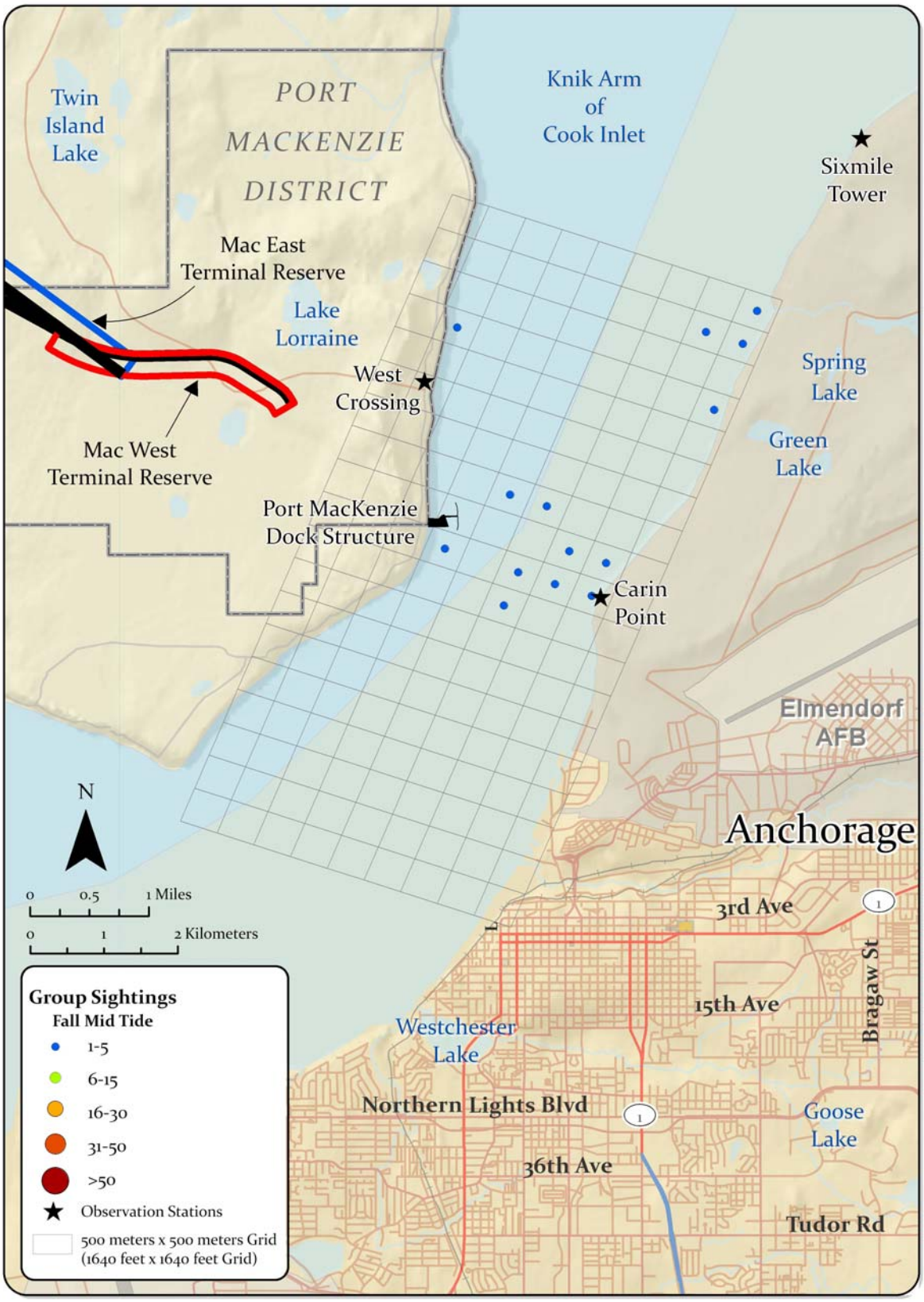

Figure 13. Beluga Whale Group Sightings During Fall (Late July through October) at Mid Tide (12 To 22 Feet) Near Port Mackenzie; Interpreted from Funk *et al.* (2005)

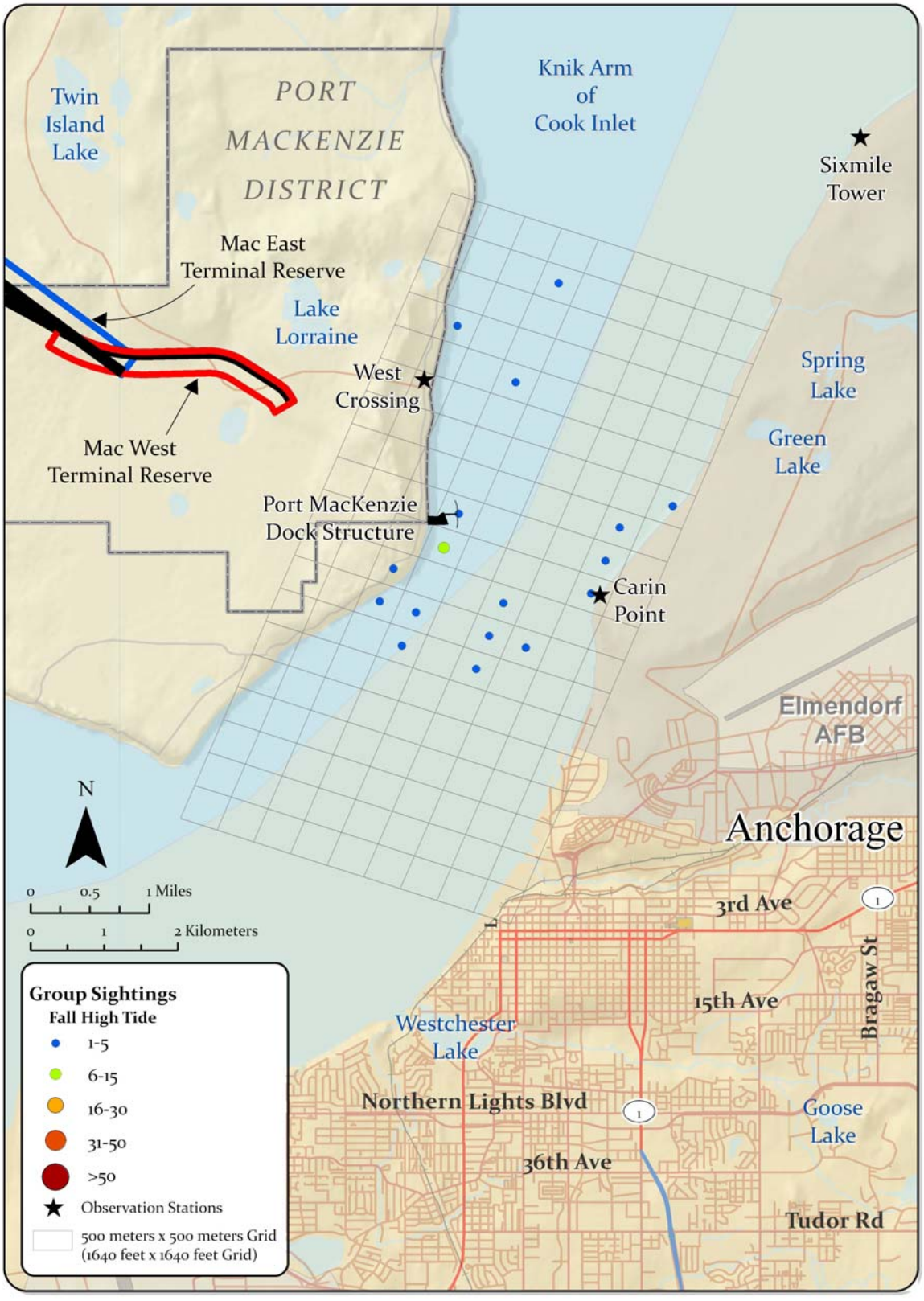

Figure 14. Beluga Whale Group Sightings During Fall (Late July through October) at High Tide (>22 Feet) Near Port Mackenzie; Interpreted from Funk *et al.* (2005)

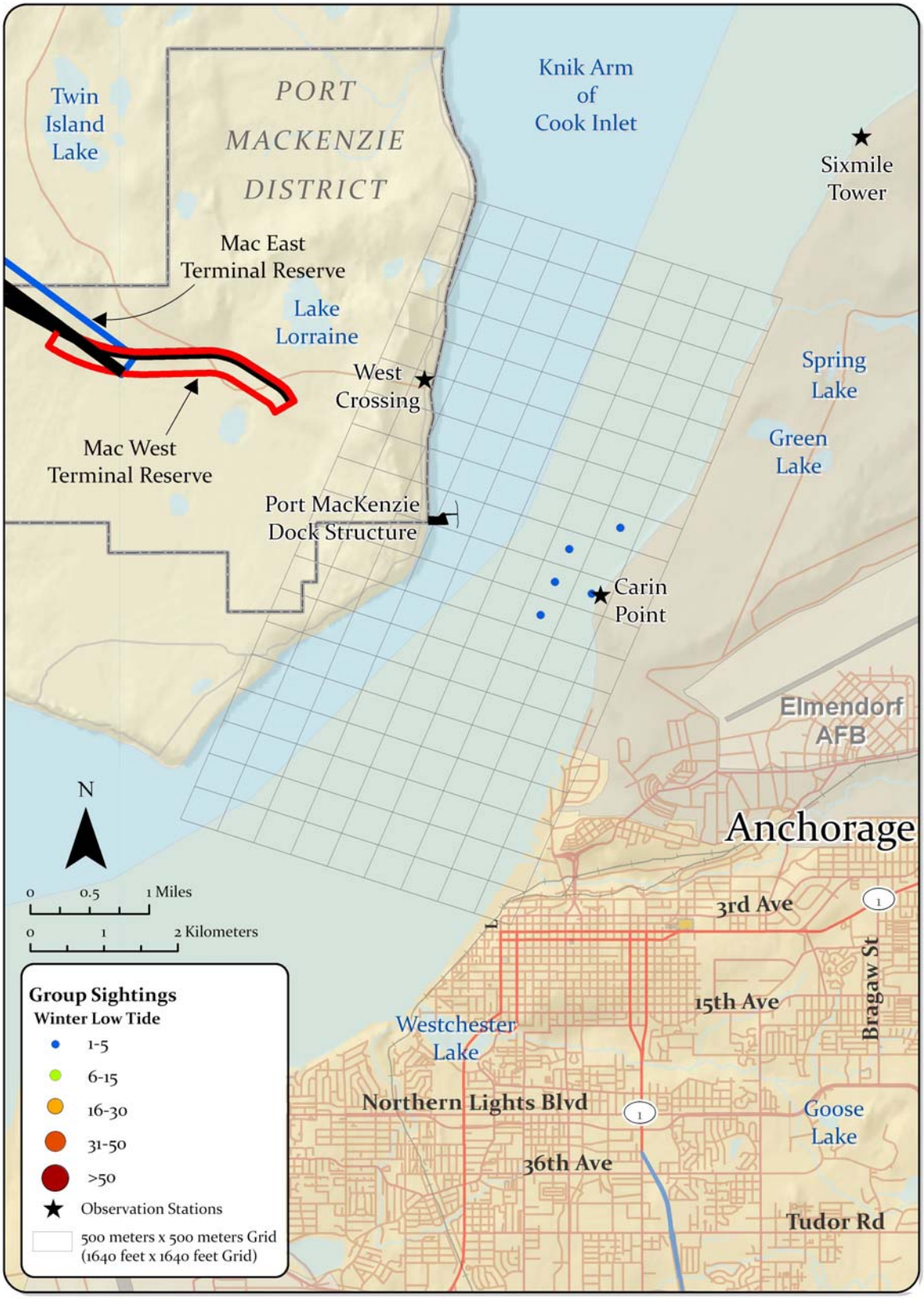

Figure 15. Beluga Whale Group Sightings During Winter (November through January) at Low Tide (< 12 Feet) Near Port Mackenzie; Interpreted from Funk *et al.* (2005)

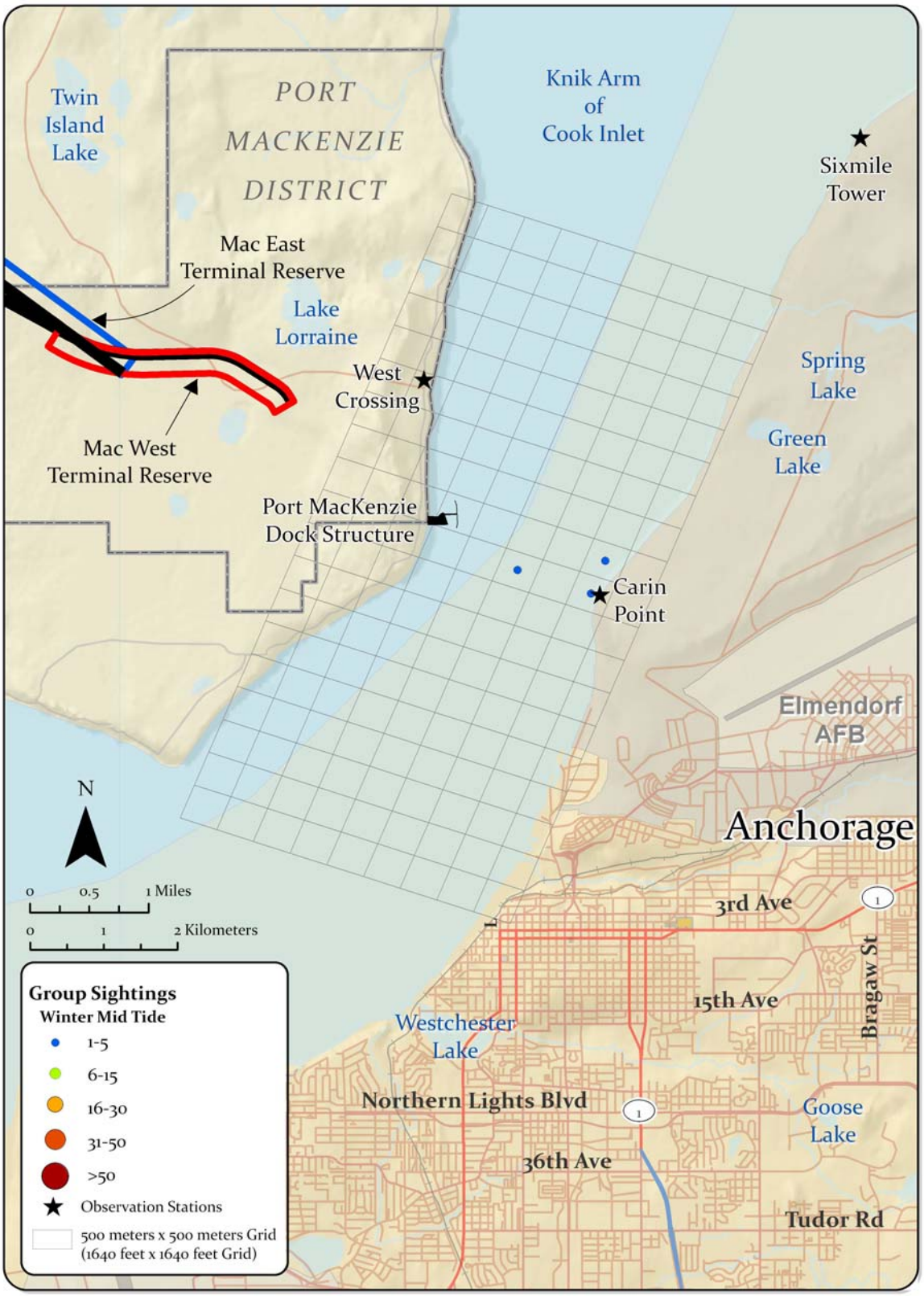

Figure 16. Beluga Whale Group Sightings During Winter (November through January) at Mid Tide (12 To 22 Feet) Near Port Mackenzie; Interpreted from Funk *et al.* (2005)

stages, with more groups observed during low tide and high tide within grid cells near the Port MacKenzie dock (Figures 12 through 14; Funk *et al.*, 2005). No winter monitoring occurred from the station nearest Port MacKenzie (Funk *et al.*, 2005), and few whales were sighted during winter within the Knik Arm Narrows from the observation location on the east side of the Narrows. No beluga whales were sighted near the dock structure during any winter tidal phase, but a few whales were sighted within the Kink Arm narrows during low and mid tide phase, with no sightings during high tide phases in winter (November through January; Figures 15 and 16; Funk *et al.*, 2005).

Observations of vessel activity from the West Crossing location (labeled West Crossing in Figures) indicated that 600 potential non-aircraft and 9,544 aircraft disturbance events were noted during the 1,098 hours of observation during July and August of 2004 and April through July of 2005 (Funk *et al.*, 2005). Potential non-aircraft disturbances were primarily skiffs (61 percent), followed by tugs and barges (24 percent), and ships (3 percent) (Funk *et al.*, 2005). Potential aircraft disturbances were primarily fighter jets (39 percent) and single propeller aircraft (34 percent) (Funk *et al.*, 2005). During the summer and fall of 2005, Port MacKenzie reported 5 barges and 2 ships operating at Port MacKenzie (Table 1).

The Knik Arm Narrows is a fairly active and noisy marine terminal area; ambient noise monitoring levels were 115-133 dB re: 1 µPa (Table 2; Blackwell and Greene, 2002). Vessel traffic to and from the shipping lanes between Fire Island, which is located 3 miles west of the land occupied by Anchorage International Airport, and Point MacKenzie associated with both the Port of Anchorage and Port MacKenzie, and air traffic associated with Elmendorf Air Force Base and the Anchorage International Airport contribute to the relatively high ambient noise monitoring levels (Blackwell and Greene, 2002). Tidal currents increase ambient noise by about 15 dB re: 1 µPa (Table 2; Blackwell and Greene, 2002).

Shipping noise is produced by the ships' propellers, machinery, passage of the hull through the water, and sonar and depth sounders. Machinery noise is produced by mechanical vibration and is transmitted through the ships hull. Propellers produce noise through vibration and through the creation of bubbles (or cavities) that result from a buildup of low or negative pressure at the tips of the propeller blade. As the bubbles collapse, either in turbulence or against the propeller surface, a sharp pulse of sound is produced and this process is called "cavitation." Most noise from shipping is concentrated in the low frequency range (less than 5 kHz), with noise from container ships and freighters generally at frequencies less than 0.5 kHz, and tugs and barges ranging up to 5 kHz (Table 2). These frequencies are outside of the relatively high frequencies where beluga whales hear best (10 to 100 kHz), which is generally above the level of much industrial noise (Blackwell and Green, 2002 in NMFS, 2009). However, beluga whales may hear sounds as low as 0.04 to 0.075 kHz, although this noise would have to be very loud (NMFS, 2009).

Reactions of beluga whales to vessel traffic are varied depending on the type of vessel, surrounding conditions, and vessel speed. Documented responses have included the following:

1. Changes in vocalizations
    a. Reduction in calling rate
    b. Increases in falling tonal calls and three pulsed-tone calls

c. Increase in repetition of specific calls
d. Shift in frequency bands used for vocalization from 3.6 kHz to 5.2-8.8 kHz

2. Changes in behavior
   a. Change in group integrity (e.g., splitting and separation)
   b. Change in surfacing and diving behaviors
   c. Cessation of feeding
   d. Change in direction and swimming speed

3. Avoidance behavior
   a. Avoidance of tugs by more than 2 km
   b. Movement away from vessel course and displacement for 1-2 days
   c. Strong reactions to outboard motors
   d. Reactions to very low levels of received sound (considered to be barely perceptible) (Simmonds *et al.*, 2004)

Table 1
Summary of Vessel Traffic at Port MacKenzie during 2005 to 2008 and the Port of Anchorage during August to November 2005[a]

	Port MacKenzie Vessel Traffic				Port of Anchorage Vessel Traffic[b]
Month	**2005**	**2006**	**2007**	**2008**	**(2005)**
January		-	-	-	-
February	2 (ship)	-	-	-	-
March	1 (ship)	-	-	-	-
April		-	-	-	-
May	3 (barge)	-	-	-	-
June	1 (ship)	-	-	-	-
July	1 (barge)	-	1 (ship)	2 (landing craft)	-
August	1 (barge) 1 (ship)	-	-	185 (barge)[c]	39 per day
September		-	-	-	39 per day
October		-	-	-	22 per day
November		-	-	-	17 per day
December	1 (barge) 1 (ship)	-	-	-	-
Total Annual Ships	**12**	**0**	**1**	**187**	**514**

[a] Source: Van Dongen, 2009b; Prevel Ramos *et al.*, 2006; Port of Anchorage & U.S. Department of Transportation, 2005.
[b] Average ships per day reported by Prevel Ramos *et al.* (2006) during beluga whale monitoring may include replicate sightings of ships remaining at port. Ships observed include tankers, tugs, barges, military vessels, and possibly some smaller vessels. Total annual ships for Port of Anchorage as reported by Port of Anchorage & U.S. Department of Transportation (2005). Vessel traffic at the Port of Anchorage was used in calculating the ambient noise due to ship traffic in the Knik Arm. However, as sound underwater attenuates rapidly as the distance from the source increases, this traffic is not relevant to include in the calculation of traffic in the immediate vicinity of Port MacKenzie.
[c] These vessels are associated with gravel transportation for development at the Port of Anchorage. Construction at the Port of Anchorage is slated to continue through 2014. As this work may overlap with operation of the proposed rail line, these 185 vessels were included in the calculation of average annual traffic at Port MacKenzie.

Table 2
Summary of Sound Frequencies and Source Levels Produced by Shipping Traffic and Ambient Noise Levels at Port MacKenzie, the Port of Anchorage and Within Cook Inlet [a]

Type of Vessel or Location	Frequency (kHz)	Source Level (dB re: 1 µPa)	Measurement Distance
Typical Vessels			-
Jetski	0.80-50.0	75-125	-
Rigid Inflatable Boat	6.30	152	-
20 foot – Outboard Motor Boat	0.63	156	-
Fishing Boat	0.25-1.0	151	-
Tug & Empty Barge	0.04-5.0	145-166	-
Tug & Loaded Barge	1.0-5.0	161-170	-
100 foot – Twin Diesel Workboat	0.63	159	-
Containership	0.1-0.5	180	3 feet
Freighter (450 foot)	0.04	172	-
Cook Inlet Vessel Noises			
Northern Lights – Cargo-freight (docked)	-	126	374 feet
Emerald Bulker – Cargo-bulk (with 2 tugs)	-	134	1,770 feet
Leo – Tug (with gravel barge)	0.2-1.0	149	335 feet
Avon Rubber Boat	-	142	28 feet
Overflights – Military Jets	-	122-134	-
Overflights – Commercial Airliners	-	110-124	-
Cook Inlet Underwater Noise Levels			
Birchwood	-	95	-
Mouth of Little Susitna	-	100	-
Anchorage Airport	-	105	-
Shipping Channel – between Fire Island and Little Susitna River	-	113	-
Anchorage Harbor	-	113	-
Port MacKenzie – including strong currents	0.01-10.0	115-133	-
Port MacKenzie – without currents	-	115-118	-

[a] Source: Simmonds *et al.*, 2004; Richardson et al., 1995 in NMFS, 2009; Blackwell, 2005; Blackwell & Greene, 2002.

Effects Analysis

This section describes the potential indirect effects and interdependent/interrelated effects associated with the proposed project on the beluga whale. SEA, in consultation with the National Marine Fisheries Service, did not identify any direct impacts that would result from construction or operation of the rail line to beluga whales or beluga whale habitats in the waters of Cook Inlet, within the lower reaches of the Sustina River, or the Little Susitna River. Effects were analyzed using information from literature reviews, professional knowledge and experience, and discussions with Federal, state, and consulting biologists.

Threats to the continued survival of the Cook Inlet beluga include: natural threats (e.g., stranding events, predation, parasitism, disease, environmental change) and human impacts (e.g., subsistence harvest, poaching, fishing, pollution, vessel traffic, tourism, whale watching, coastal development, noise, oil and gas activities, scientific research) (National Marine Fisheries Service, 2008). Projects that reduce anadromous fish runs could also negatively impact beluga foraging success (National Marine Fisheries Service, 2008). Activities that could restrict or deter access to Type 1 habitat could reduce beluga calving success, impair their ability to secure prey,

and increase their susceptibility to predation by killer whales (National Marine Fisheries Service, 2008). Concentration of belugas in Type 1 habitat predisposes them to harm from oil spills (National Marine Fisheries Service, 2008).

The proposed rail line could indirectly affect the beluga whale via two mechanisms:

1) Potential degradation of forage species habitats in upper Cook Inlet tributary rivers and streams (i.e., anadromous fish resources)
2) Potential increased noise and disturbance from vessel loading and unloading, and induced increases in vessel traffic and anchorage near Port MacKenzie

Due to their slower speed and straight line movement, ship strikes from large vessels are not expected to pose a significant threat to Cook Inlet beluga whales (NMFS, 2009). Because vessels would generally come into port escorted by tugs and at relatively slow speeds, and because beluga whales would be able to avoid these ships, the likelihood of vessel strikes from the increased traffic was considered to be non-existent and will not be further discussed. While no Critical Habitat has yet been designated for the Cook Inlet beluga whale, the indirect effects of increased noise and disturbance from induced increases in vessel traffic near Port MacKenzie would occur within what has been designated as Type 1 habitat (National Marine Fisheries Service, 2008) that may be designated as Critical Habitat for this species.

Potential Degradation of Forage Species Habitat

The proposed rail line alternatives would cross the following drainages important for supporting anadromous fish in the upper Cook Inlet: Willow Creek, Little Willow Creek, Rolly Creek and Fish Creek–Susitna River drainage; Little Susitna River drainage; Big Lake drainage, Goose Creek drainage; and drainages in the East Susitna Flats. These drainages support between one and five species of Pacific salmon. The lower reaches of the Susitna River support spawning runs of eulachon, another important forage species for belugas.

Construction of the proposed rail line could have adverse impacts on anadromous fish habitats. Proposed project alternatives include construction of bridges and culverts for between 5 and 9 anadromous fish-bearing streams (Table 3, Figure 17). Two alternatives would include streambed relocation. Project-related effects on anadromous fish freshwater habitats at proposed stream crossings could include:

- Loss or alteration of instream and riparian habitats
- Mortality from instream construction
- Blockage of fish movements
- Degradation of water quality
- Alteration of stream hydrology and breakup
- Noise and vibration impacts

Loss or alteration of instream and riparian habitats would result in reduced capacity of the habitats to produce anadromous fish. Blockage of fish movement could further limit available

Table 3
Summary of Anadromous Fish-Bearing Streams Crossed by Alternatives [a]

	Mac West - Conn 1 - Willow	Mac West - Conn 1 - Houston - Houston North	Mac West - Conn 1 - Houston - Houston South	Mac West - Conn 2 - Big Lake	Mac East - Conn 3 - Willow	Mac East - Conn 3 - Houston - Houston North	Mac East - Conn 3 - Houston - Houston South	Mac East - Big Lake
Fish Communities								
Anadromous	7	9	6	8	6	8	5	8
Habitat								
Spawning	6	3	2	2	6	3	2	2
Rearing	7	9	6	8	6	8	5	8
Migration	7	7	6	8	6	6	5	8
Over-Winter	5	5	5	4	5	5	5	4
Conveyance Structure								
Bridge	4	1	1	0	4	1	1	0
Culvert	2	5	3	1	1	4	2	1
Drainage Structure[b]	1	3	2	6	1	3	2	6
Relocation	0	0	0	1	0	0	0	1
Total Crossings	**7**	**9**	**6**	**8**	**6**	**8**	**5**	**8**

[a] Source: Johnson and Daigneault, 2008; Noel *et al.*, 2008.
[b] Drainage structures would be determined during the final design process and could include multi-plate culverts, pre-cast arches, and single or multiple short span bridges.

fish habitat, also resulting in reduced capacity of the habitat to produce anadromous fish. Because beluga whales compete with both commercial and recreational fisheries for available anadromous fisheries resources, and because the configuration of the river mouth appears to be critical to beluga whale feeding efficiency (National Marine Fisheries Service, 2008), small changes in available anadromous fish resources within Type 1 habitats of the upper Cook Inlet could have a disproportionate effect on beluga whales.

In addition to the Applicant's voluntary measures listed above, SEA has developed the following preliminary measures to protect anadromous fish freshwater habitats.

- Unless otherwise approved by the Alaska Department of Fish and Game, project-related detonation of explosives within, beneath, or in proximity to fish-bearing waters shall not result in overpressures exceeding 2.7 pounds per square inch unless the water body, including its substrate, was frozen solid. Peak particle velocity stemming from explosive detonation shall not exceed 0.5 inches per second during the early stages of egg incubation.

- The Applicant shall not narrow an anadromous water body between its ordinary high water marks for the project, unless authorized in writing by Alaska Department of Fish and Game (ADF&G) prior to project-related construction, thereby enabling ADF&G to apply reasonable design criteria or requirements.

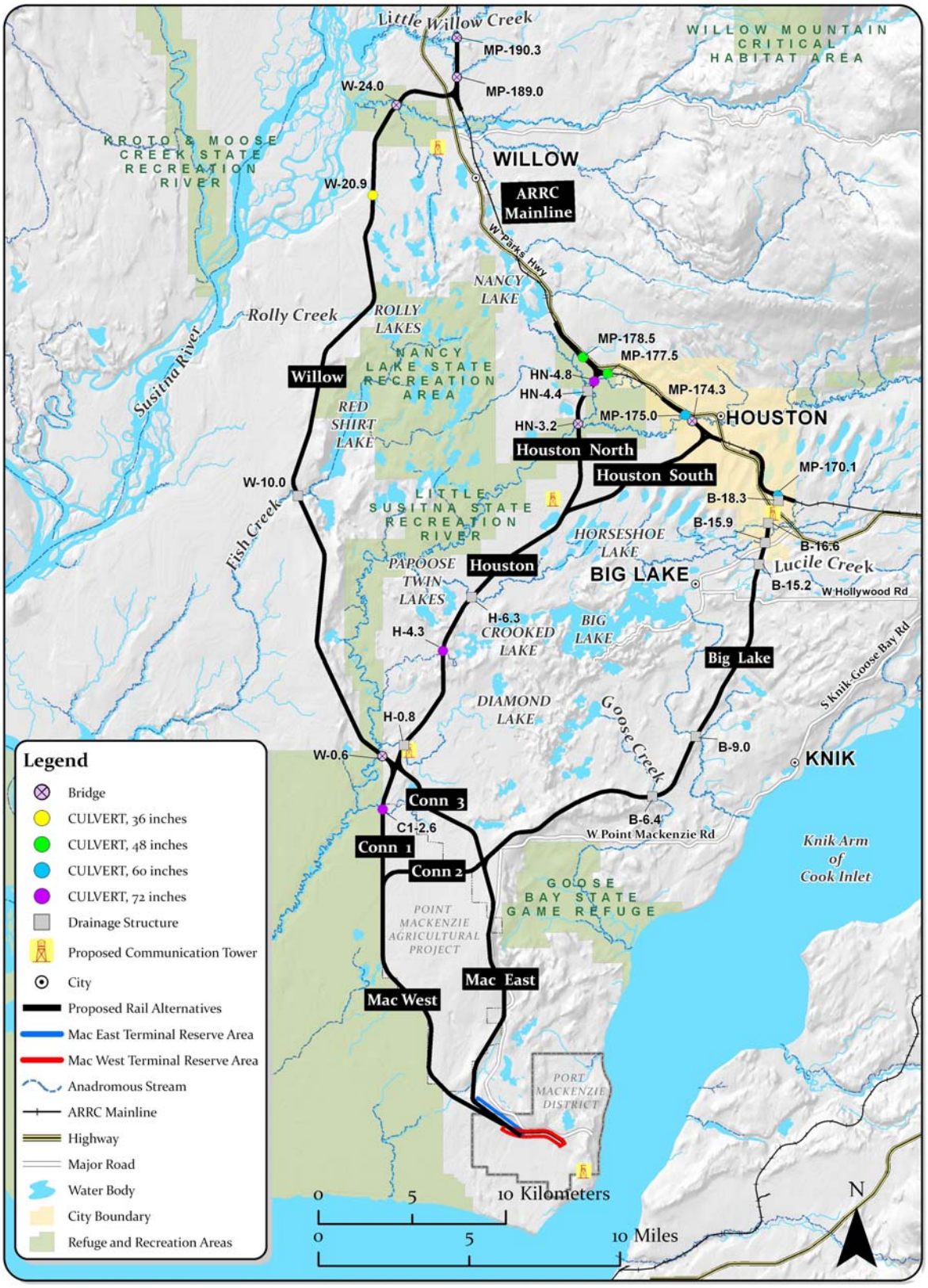

Figure 17. Anadromous Fish-Bearing Streams Crossed by the Port MacKenzie Rail Extension Alternatives (Johnson and Daigneault, 2008; Noel *et al.*, 2008)

- During project construction, the Applicant shall not clear riparian vegetation within 100 feet of fish-bearing water bodies and 50 feet of non-fish bearing water bodies and emergent wetlands, unless approved by the Alaska Department of Natural Resources.

- The Applicant shall design, construct, and operate the rail line and associated facilities, including bridge abutments, to maintain existing water patterns and flow conditions and provide long-term hydrologic stability by conforming to natural stream gradients and stream channel alignment and avoiding altered subsurface flow, to the extent practicable. Project-related supporting structures (e.g. bridge piers) shall be designed to minimize scour and increased flow velocity, to the extent practicable.

- During project-related design, the Applicant shall align road and track crossings of water bodies perpendicular or near perpendicular to water bodies, where practicable, to minimize crossing length and potential bank disturbance.

- During project-related construction, the Applicant shall remove all project-related construction debris (including construction materials, soil, or woody debris) from water bodies, including wetlands, as soon as practicable during the open-water period, or prior to break-up for debris on top of or within ice or snow crossings.

- The Applicant shall follow all applicable Federal regulations and standard protocols for transporting hazardous substances and other deleterious compounds to minimize the potential for a spill occurrence near or adjacent to water bodies.

- The Applicant shall ensure that all project-related culverts and bridges are sufficiently clear of debris to avoid stream-flow alteration and increased flooding. The Applicant shall inspect all drainages, bridges, and culverts semi-annually (or more frequently, as seasonal flows dictate) for debris accumulation and remove and properly dispose of debris promptly.

- The Applicant shall comply with the reasonable requirements of Alaska Statute (AS) 16.05.841, Fishway Required, and AS 16.05.871, Protection of Fish and Game, regarding project-related winter ice bridge crossings and summer ford crossings of all anadromous and resident fish streams. If necessary, natural ice thickness could be augmented (through removing snow, adding ice or water, or other technique) if site-specific conditions, including water depth, are sufficient to protect fish habitat and maintain fish passage.

- Prior to construction, the Applicant shall complete jurisdictional delineations of wetlands and other surface waters that are subject to Section 404 of the Clean Water Act for all associated facilities proposed outside of the right-of-way.

- Prior to initiating project-related construction activities, the Applicant shall mark stream channels and existing culvert locations in the project construction area before snowfall obscures their location to avoid damage to these areas.

- The Applicant shall construct project-related water crossings in a manner that minimizes disturbances to streambeds, streambanks, and flow. Measures to meet these goals could include installing bridge piers during the winter, and initially constructing permanent project-

related crossing structures, when practicable, to avoid the need to construct both temporary and permanent crossing structures.

- Prior to construction, the Applicant shall consult with the Alaska Department of Environmental Conservation or other regulatory agencies to determine appropriate regulations and associated requirements for project-related tank storage facilities. At a minimum, the Applicant shall place tank storage facilities as far as practicable from streams or rivers, and implement secondary containment measures (e.g., use of lined and bermed pits).

- The Applicant shall direct the operators of project-related vehicles to not drive in or cross streams other than at crossing points determined by the Alaska Department of Environmental Conservation and U.S. Army Corp of Engineers.

- During final design of the project, the Applicant shall conduct all siting, design, and development of the rail line and associated facilities according to the reasonable requirements within the jurisdiction of the Alaska Department of Natural Resources and the Alaska Department of Fish and Game.

- The Applicant shall return all project-related stream crossing points to their preconstruction contours to the extent practicable.

- The Applicant shall implement all reasonable best management practices imposed by the U.S. Army Corps of Engineers' (USACE) Section 404 Permit under the Clean Water Act to minimize project-related impacts to waters of the U.S., including wetlands. Standard best management practices are specified in the USACE Alaska District's Nationwide Permits General Best Management Practice Guide (U.S. Army Corps of Engineers, 2007. "Nationwide Permits: General Best Management Practices." Alaska District, Regulatory Program. Online at: http://www.poa.usace.army.mil/reg/NWPs.htm). and could include the following:
    - Containing sediment and turbidity at the work site by installing diversion or containment structures.
    - Disposing of dredge spoils or unusable excavated material not used as backfill at upland disposal sites in a manner that minimizes impacts to wetlands.
    - Revegetating wetlands as soon as possible, preferably in the same growing season, by systematically removing vegetation, storing it in a manner to retain viability, and replacing it after construction to restore the site.
    - Using fill materials that are free from fine material.
    - Stockpiling topsoil and organic surface material, such as root mats, separately from overburden and shall return it to the surface of the restored site.
    - Dispersing the load of heavy equipment such that the bearing strength of the soil (the maximum load the soil can sustain) is not exceeded. Suitable methods could include, but are not limited to, working in frozen or dry ground conditions, employing mats when working in wetlands or mudflats, and using tracked rather than wheeled vehicles.

- Using techniques such as brush layering, brush mattressing, live siltation (a revegetation technique used to trap sediment), jute matting and coir logs to stabilize soil and reestablish native vegetation.

Increased Vessel Traffic

Shipping traffic and associated noise from ships and loading facilities have the potential to displace belugas from the port area. Increased shipping traffic that could be induced by operation of the proposed rail line has a potential to restrict or deter access of belugas to Type 1 habitat in the Knik Arm through noise and disturbance. Operation of the rail line including export of bulk materials from Port MacKenzie, would potentially increase vessel traffic in Knik Arm from an average of 50 ships per year during 2005 to 2008 (Table 1) to as many as 55 and up to 63 ships per year (ARRC, 2009) depending on market conditions.

NMFS is currently in the process of developing new criteria to determine what constitutes "take" of a marine mammal under the Marine Mammal Protection Act (MMPA) and ESA as a result of exposure to anthropogenic noises in the marine environment (70 FR 1871 and NMFS, 2009). NMFS currently uses generic exposure level thresholds under the MMPA's Level A and Level B harassment definitions to determine harassment "take" (70 FR 1871 and NMFS, 2009). Level A harassment is defined as any act of pursuit, torment, or annoyance which has the potential to injure a marine mammal or marine mammal stock in the wild. The current Level A (injury) underwater noise threshold for cetaceans (whales, dolphins, and porpoises) is 180 dB re: 1 µPa. Level B harassment includes actions that have the potential to disturb a marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering. The current Level B (disturbance) underwater noise threshold for cetaceans is 160 dB re: 1 µPa for impulse noise and 125 dB re: 1 µPa for continuous noise (70 FR 1871 and NMFS, 2009). Shipping vessels produce low frequency sounds at pressure levels generally below the 180 dB re: 1 µPa level (Table 2), the level considered to cause Level A (injury) harassment. Beluga exposure to sound pressure levels and potential effects sound can have on belugas depends on both the source and the whale's distance from the source, and the intensity, frequency and duration, behavior of the whale, and the acoustic environment. Much of upper Cook Inlet is characterized by its shallow depth, sand and mud bottoms, and high background noise from currents and glacial till thereby making it a poor acoustic environment (Blackwell and Greene, 2002 in NMFS, 2009). In general, marine mammals can reduce the level of sound pressure to which they are exposed by moving away from the source. Belugas occurring near the Port MacKenzie facilities might be exposed to sound pressure levels exceeding 160 dB re: 1 µPa, but are unlikely to be exposed to sound pressure levels exceeding 180 dB re: 1 µPa. While large ships generate some broadband noise, the majority of this sound energy would fall below the hearing range of beluga whales and is not expected to elicit behavioral reaction (NMFS, 2009). Large vessel frequencies are outside the range of beluga whale hearing and vocal communications, and sound pressure levels would attenuate within short distances from the source to levels well below the Level B harassment threshold of 160 dB re: 1 µPa. In addition, as no replacement for the barge traffic to the Port of Anchorage is expected at this time, the vessel traffic at Port MacKenzie would likely be lower in the future, resulting in even less exposure to sound pressure.

Based on the observations of beluga whales illustrated in Figures 6 to 16, and summarized in Table 4, for areas within about 1,000 feet of the Port MacKenzie dock, 90 groups of beluga whales—an estimated 540 individuals, if each group contains an estimated 6 belugas—could potentially be displaced from the area within about 1,000 feet of the dock by increased vessel activity induced by the proposed rail line over the course of a year (or annually), primarily during spring through fall. Individual groups and individual whales would potentially be exposed to noise and traffic disturbance multiple times over the course of the year.

Table 4
Estimate of Beluga Whale Groups Occurring Within 1,000 Feet of the Port MacKenzie Dock [a, b]

	NW of Dock (K2)			At Dock (K3)			South of Dock (J3)			Dock Area		
Season - Tide	**Min**	**Max**	**Mid**	**Min**	**Max**	**Mid**	**Min**	**Max**	**Mid**	**Min**	**Max**	**Mid**
Spring - Low	0	0	0	1	5	3	1	5	3	2	10	6
Spring - Mid	0	0	0	1	5	3	1	5	3	2	10	6
Spring - High	0	0	0	1	5	3	1	5	3	2	10	6
Spring Total	*0*	*0*	*0*	*3*	*15*	*9*	*3*	*15*	*9*	*6*	*30*	*18*
Summer - Low	1	5	3	1	5	3	6	15	10.5	8	25	16.5
Summer - Mid	1	5	3	1	5	3	6	15	10.5	8	25	16.5
Summer - High	1	5	3	0	0	0	1	5	3	2	10	6
Summer Total	*3*	*15*	*9*	*2*	*10*	*6*	*13*	*35*	*24*	*18*	*60*	*39*
Fall - Low	1	5	3	1	5	3	6	15	10.5	8	25	16.5
Fall - Mid	0	0	0	0	0	0	1	5	3	1	5	3
Fall - High	0	0	0	1	5	3	6	15	10.5	7	20	13.5
Fall Total	*1*	*5*	*3*	*2*	*10*	*6*	*13*	*35*	*24*	*16*	*50*	*33*
Winter - Low	0	0	0	0	0	0	0	0	0	0	0	0
Winter - Mid	0	0	0	0	0	0	0	0	0	0	0	0
Winter - High	0	0	0	0	0	0	0	0	0	0	0	0
Winter Total	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Annual - Low	2	10	6	3	15	9	13	35	24	18	60	39
Annual - Mid	1	5	3	2	10	6	8	25	16.5	11	40	25.5
Annual - High	1	5	3	2	10	6	8	25	16.5	11	40	25.5
Annual Total	***4***	***20***	***12***	***7***	***35***	***21***	***29***	***85***	***57***	***40***	***140***	***90***

[a] Source: interpreted from Funk *et al.* (2005)
[b] Note: Sighting records may involve multiple resightings of the same groups and individuals over the course of a year.

As many as 62 percent (an average of 24 percent) of Cook Inlet beluga whales use the Knik Arm during June and July (Figure 4), having passed through the Knik Arm Narrows and between the Port of Anchorage and Port MacKenzie. A potentially larger proportion of the population uses the Knik Arm during fall (Funk *et al.*, 2005). The Port MacKenzie area currently has relatively high levels of noise related to construction, shipping, and aircraft, but continues to be used by beluga whales. The Port MacKenzie bulk loading facility does not produce significant levels of noise during operation (Van Dongen, 2009a). Belugas would be expected to continue to travel through this area, consistent with the primary observed behavior of whales in this area (Funk *et al.*, 2005). Belugas may dive, rest, and feed less frequently near the Port MacKenzie dock while ships are at the dock.

The National Marine Fisheries Service has recommended the following conservation measures that relate to ship traffic for Port MacKenzie expansion (Mecum, 2008):

1. Belugas shall not be exposed to sound levels in excess of 180 dB re: 1µPa (160 dB re: 1 µPa without a Small Take Authorization). The radius surrounding such noise sources should be determined empirically and established based on propagation loss equations fit to the data.

2. No ships or boats working with Port Mackenzie should anchor or travel north of Cairn Point in Knik Arm.

3. Minimize beluga exposure to construction, vessel, dredging, and operational noise resulting from Port MacKenzie. Develop, in consultation with the National Marine Fisheries Service, an underwater noise reduction plan through the use of structural design, operational procedures, and encouraging vessel modifications to reduce propeller cavitation noise.

Port MacKenzie monitored construction noise produced during recent dock expansion activities (Blackwell, 2005), but does not currently have an underwater noise reduction plan for normal port operations (Van Dongen, 2009a).

Interrelated or Interdependent Actions

An interrelated action is an activity that is part of the proposed action and depends on the proposed action for its justification. There are no interrelated activities associated with the proposed project. An interdependent action is an activity that has no independent utility apart from the action under consultation. Projected future expansion of Port MacKenzie by the Matanuska-Susitna Borough, which could have potential direct impacts on the Cook Inlet beluga, is not a component of the proposed rail line, would have independent utility, and is therefore not an interdependent activity.

Determination of Effect

SEA has determined that construction and operation of the proposed Port MacKenzie Rail Extension ***may affect, but is not likely to adversely affect*** the Cook Inlet beluga whale, or its access to Type 1 habitats within the Knik Arm. Development of avoidance, minimization, and mitigation measures for potential construction- and operation-related impacts during consultation with the National Marine Fisheries Service would likely eliminate or reduce potential significant effects to the 5 to 9 anadromous fish stream habitats that would be crossed by proposed project alternatives, such that changes in anadromous fish runs that support beluga whales would not be expected to occur as a result of the proposed project. Provided that Port MacKenzie adopts the conservation measures recommended by the National Marine Fisheries Service that would reduce potential affects of port operation on noise and disturbance to the Cook Inlet beluga whale, expanded port activities that could be induced by operation of the proposed rail line would not be expected to create noise and disturbance sufficient to affect the continued use by the beluga whale of the Knik Arm and areas near Port MacKenzie.

References

ARRC (Alaska Railroad Corporation). 2009. ARRC's Response to SEA's January 30, 2009 Document Request. Finance Docket No. 35095. Correspondence from Kathryn Kusske Floyd to Victoria Ruston, Chief, Section of Environmental Analysis, Surface Transportation Board, Washington, D.C.

Blackwell, S.B. 2005. Underwater Measurements of Pile Driving sounds during the Port MacKenzie Dock Modifications, 13-16 August 2004. Greeneridge Report 328-1, 33 pp. Goleta, California and Anchorage, Alaska, Prepared for the Knik Arm Bridge and Toll Authority, Department of Transportation and Public Facilities, and Federal Highway Administration. Prepared by Greeneridge Sciences, Inc., LGL Alaska Research Associates, Inc., in association with HDR Alaska, Inc.

Blackwell, S.B., Greene, C.R. 2002. Acoustic Measurements in Cook Inlet, Alaska, during August 2001. Contract number 40HANF100123, Greeneridge Report 271-1, 42 pp. Aptos and Santa Barbara, California, Prepared for the National Marine Fisheries Service, Protected Resources division. Prepared by Greeneridge Sciences, Inc.

Funk, D.W., Markowitz, T.M., Rodrigues, R. 2005. Baseline Studies of Beluga Whale Habitat Use in Knik Arm, Upper Cook Inlet, Alaska: July 2004-July 2005. Anchorage, Alaska, Prepared by LGL Alaska Research Associates, Inc., in association with HDR Alaska, Inc. Prepared for Knik Arm Bridge and Toll Authority, Anchorage, Alaska; Department of Transportation and Public Facilities, Anchorage, Alaska; and Federal Highway Administration, Juneau, Alaska.

Hobbs, R.C., Rugh, D.J., DeMaster, D.P. 2000. Abundance of Belugas, *Delphinapterus leucas*, in Cook Inlet, Alaska, 1994-2000. Marine Fisheries Review 62[3], 37-45.

Hobbs, R.C., Sheldon, K.E.W. 2008. Supplemental Status Review and Extinction Risk Assessment of Cook Inlet Belugas (*Delphinapterus leucas*). AFSC Processed Rep. 2008-08, 76 pp. Seattle, Washington, Alaska Fisheries Science Center, National Oceanic and Atmospheric Administration, National Marine Fisheries Service.

Hobbs, R.C., Sheldon, K.E.W., Rugh, D.J., Norman, S.A. 2008. Status Review and Extinction Risk Assessment of Cook Inlet Belugas (*Delphinapterus leucas*). AFSC Processed Rep. 2008-02, -116 pp. Seattle, Washington, Alaska Fisheries Science Center, National Oceanic and Atmospheric Administration, National Marine Fisheries Service.

Johnson, J., and Daigneault. M. 2008. Catalog of waters important for spawning, rearing, or migration of anadromous fishes – Southcentral Region, Effective June 2. Alaska Department of Fish and Game, Special Publication No. 08-05, Anchorage, Alaska.

Mecum, R.D., POA-1979-412, Knik Arm. 3 pp. 2008. Juneau, Alaska, Correspondence to Colonel Kevin J. Wilson, U.S. Army Corps of Engineers from Acting Administrator, Alaska Region, National Marine Fisheries Service.

Moore, S.E., Shelden, K.E.W., Litzky, L.K., Mahoney, B.A., Rugh, D.J. 2000. Beluga, *Delphinapterus leucas*, Habitat Associations in Cook Inlet, Alaska. Marine Fisheries Review 62[3], 60-80.

National Marine Fisheries Service (NMFS). 2008. Conservation Plan for the Cook Inlet Beluga Whale. 122 pp. Juneau, Alaska, National Marine Fisheries Service, Office of Protected Resources.

NMFS. 2009. Endangered Species Section 7 Consultation Biological Opinion (BO) for the Marine Terminal Redevelopment Project at the Port of Anchorage. Alaska Region.

Noel, L.E., L. Bontrager, K. McDonnell, and C. Anderson. 2008. "Fisheries and hydrology data deliverable." Unpublished Field Study Data Deliverable, November. Prepared by ENTRIX, Inc. and USKH Inc., Anchorage, Alaska for the Port MacKenzie Rail Extension EIS, Surface Transportation Board, Section of Environmental Analysis, Washington, D.C. Digital Data Deliverable.

Port of Anchorage, U.S. Department of Transportation. 2005. Port Intermodal Expansion Project: Marine Terminal Redevelopment Environmental Assessment. Final. Seattle, Washington, Port of Anchorage, Anchorage, Alaska and U.S. Department of Transportation.

Prevel Ramos, A., Markowitz, T.M., Funk, D.W., Link, M.R. 2006. Monitoring Beluga Whales at the Port of Anchorage: Pre-expansion Observations, August-November, 2005. Anchorage, Alaska, Prepared by LGL Alaska Research Associates, Inc., in association with HDR Alaska, Inc. Prepared for Knik Arm Bridge and Toll Authority, Anchorage, Alaska; Department of Transportation and Public Facilities, Anchorage, Alaska; and Federal Highway Administration, Juneau, Alaska.

Richardson, J.W., Greene Jr., C.R., Malme, C.I. & Thomson D.H. (eds.)(1995). *Marine Mammals and Noise*. Academic Press, Inc. San Diego, California, 576 pp.

Rugh, D.J., Goetz, K.T., Mahoney, B.A., Smith, B.K., Ruszkowski, T.A. 2005a. Aerial Surveys of Belugas in Cook Inlet, Alaska, June 2005. 17 pp. Seattle, Washington and Anchorage, Alaska, National Marine Mammal Laboratory, Alaska Fisheries Science Center and Alaska Regional Office, National Marine Fisheries Service, National Oceanic and Atmospheric Administration.

Rugh, D.J., Goetz, K.T., Mocklin, J.A., Mahoney, B.A., Smith, B.K. 2007. Aerial Surveys of Belugas in Cook Inlet, Alaska, June 2007. 16 pp. Seattle, Washington and Anchorage, Alaska, National Marine Mammal Laboratory, Alaska Fisheries Science Center and Alaska Regional Office, National Marine Fisheries Service, National Oceanic and Atmospheric Administration.

Rugh, D.J., Goetz, K.T., Sims, C.L., Shelden, K.W., Shpak, O.B., Mahoney, B.A., Smith, B.K. 2006. Aerial Surveys of Belugas in Cook Inlet, Alaska, June 2006. 17 pp. Seattle, Washington and Anchorage, Alaska, National Marine Mammal Laboratory, Alaska Fisheries Science Center and Alaska Regional Office, National Marine Fisheries Service, National Oceanic and Atmospheric Administration.

Rugh, D.J., Shelden, K.E.W., Sims, C.L., Mahoney, B.A., Smith, B.K., Litzky, L.K., Hobbs, R.C. 2005b. Aerial Surveys of Belugas in Cook Inlet, Alaska, June 2001, 2002, 2003, and 2004. NOAA Technical Memorandum NMFS-AFSC-149, 71 pp. Seattle, Washington and Anchorage, Alaska, U.S. Department of commerce, National Oceanic and Atmospheric Administration, National Marine Mammal Laboratory, Alaska Fisheries Science Center and Alaska Regional Office.

Shelden, K.E.W., Rugh, D.J., Goetz, K.T., Brattstrom, L.V., Mahoney, B.A. 2008. Aerial Surveys of Belugas in Cook Inlet, Alaska, June 2008. 19 pp. Seattle, Washington and Anchorage, Alaska, National Marine Mammal Laboratory, Alaska Fisheries Science Center, and Alaska Regional Office, National Marine Fisheries Service, National Oceanic and Atmospheric Administration.

Simmonds, M., Dolman, S., Weilgart, L., 2004. Oceans of Noise. 2004: A WDCS Science Report. 169 pp. Chippenham, Wiltshire, United Kingdom. The Whale and Dolphin Conservation Society.

USACE (U.S. Army Corps of Engineers). 2007. "Nationwide Permits: General Best Management Practice." Alaska District, Regulatory Program. Online at: http://www.poa.usace.army.mil/reg/NWPs.htm

Van Dongen, M., 2009a. Noise Reduction Plan – Port MacKenzie Rail Extension EIS. 3 pp. Palmer, Alaska, Correspondence from Port Director, Port MacKenzie to Lynn Noel, ENTRIX, Inc.

Van Dongen, M., 2009b. Request for Vessel Traffic Information – Port MacKenzie Rail Extension EIS. 3 pp. Palmer, Alaska, Correspondence from Port Director, Port MacKenzie to Lynn Noel, ENTRIX, Inc.