

Conveyance of Transportation & Port Easements to CIRC as Mandated by Public Law 94-204 Environmental Information Document (EID)

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ACRONYMS AND ABBREVIATIONS

C°	Celsius
µg/L	Micrograms per liter
µS/cm	Microsiemens per centimeter
ADF&G	Alaska Department of Fish and Game
ADNR	Alaska Department of Natural Resources
AHRS	Alaska Historic Resources Survey
ANCSA	Alaska Native Claims Settlement Act
ANILCA	Alaska National Interest Lands Conservation Act
AS	Alaska Statute
AWC	Anadromous Waters Catalog
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
cm	centimeter
CIRI	Cook Inlet Region, Incorporated
CWA	Clean Water Act
DOI	U.S. Department of the Interior
EAD	Environmental Analysis Document
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
GMU	Game Management Unit
HGM	HighGold Mining, Inc.
km	kilometer
km ²	square kilometers
LCNPP	Lake Clark National Park and Preserve
m	meter
mg/L	milligrams per liter
ng/L	nanograms per liter
NEPA	National Environmental Policy Act
NLURA	Northern Land Use Research Alaska
NPS	National Park Service
OHA	Office of History and Archaeology
pH	potential hydrogen
PL	Public Law
PND	PND Engineers, Inc.
USACE	U.S. Army Corps of Engineers
WOTUS	Waters of the U.S.

1. PROPOSED ACTION

The U.S. Department of the Interior (DOI) plans to complete the mandatory conveyance of transportation and port easements within the Lake Clark National Park and Preserve (LCNPP) to Cook Inlet Region, Incorporated (CIRI). The U.S. Congress granted CIRI an entitlement to these easements as part of the Cook Inlet Land Exchange, which was approved by Congress in 1976 in partial fulfillment of CIRI's land selection rights under the Alaska Native Claims Settlement Act of 1971 (ANCSA). Pursuant to the "Terms and Conditions for Land Consolidation and Management of the Cook Inlet Area" (Terms and Conditions), as ratified by Congress through Public Law (PL) 94-204 (Jan. 2, 1976) and clarified through Public Law 94-546 (Oct. 4, 1976), the easements must allow for a port that "shall reasonably provide for receiving, shipping, storage and incidental facilities thereto, of the minerals extracted from" a land parcel known as the Johnson Tract, and the transportation of those minerals from the Johnson Tract to a port. The Johnson Tract is on the west side of Cook Inlet about 125 miles southwest of Anchorage, Alaska. A general location map is shown in Figure 1.

In accordance with the Terms and Conditions and PL 24-204, CIRI has requested and DOI plans to convey easements that will provide sufficient flexibility for optimal siting of the facilities if such designs are developed in the future. CIRI's proposed easement locations are shown in Figure 2. The legal instrument conveying the easements will require CIRI to amend the proposed easements to fit the ultimately constructed facilities. The transportation easement currently being proposed by CIRI abuts the eastern boundary of the Johnson Tract and travels southeast along fluvial and glacial terraces of the Johnson River for approximately three miles, then trends north along the west flank of Slope Mountain and crosses Bear Pass. The proposed easement then descends north into the Bear Creek drainage and bifurcates into two options for access to the port. The proposed port easement is an area along the western shore of Tuxedni Channel.

2. PURPOSE AND NEED FOR ACTION

The purpose and need for the proposed action by DOI is the fulfillment of the congressional mandate that it convey transportation and port easements to CIRI as described above. The “Terms and Conditions for Land Consolidation and Management of the Cook Inlet Area” specifically provide that the Secretary “shall” convey to CIRI the transportation and port easements.

CIRI’s additional purpose and need for requesting this conveyance is to bring effect to its property entitlements, which were secured in exchange for the forfeiture of CIRI’s shareholder’s aboriginal claims to ancestral lands and resources under ANCSA. The easements proposed by CIRI to meet its purpose and need is intentionally broad to accommodate additional forthcoming engineering and environmental information that will instruct the specific location of the transportation route and port site within the broader easement area. The future selection of a port site and transportation route within the proposed easement areas will be directly coordinated. Based on recent discussions between CIRI and DOI, there is agreement that any proposed easements will be reduced in size and scope in the future when specific infrastructure locations have been identified. No specific mine, road, rail line or port sites are being proposed as part of CIRI’s current actions, and there is considerable uncertainty whether a mine, road, rail line or port will be constructed in the future.

3. BACKGROUND

3.1. CIRI's Land Entitlements

CIRI is one of 12 land-based Alaska Native regional corporations created pursuant to ANCSA. ANCSA provided for a process in which each of those Alaska Native regional corporations could select and withdraw lands from public ownership for their own use and ownership. During the ANCSA Native lands selection process, CIRI was not able to make its full land selection because most of the land in the Cook Inlet region was already under private, federal, municipal or state ownership. Through the courts and a subsequent negotiation process with the DOI and the State of Alaska, the Cook Inlet Land Exchange was passed by Congress and signed by the President in 1976 to fulfill CIRI's ANCSA land selections.

Under the Terms and Conditions, Congress granted CIRI an entitlement to various property rights, including the Johnson Tract and the transportation and port easements. Congress explicitly mandated the conveyance of the easements to CIRI "as conveyances under the [Alaska Native Claims] Settlement Act." *See* PL 94-204, § 12(c), 89 Stat. 1145, 1152 (1976).

Under the Terms and Conditions, CIRI received the 20,942 acre Johnson Tract, a known mineral prospect on the west side of Cook Inlet at the head of the Johnson River. The Johnson Tract consists of two smaller tracts: the South Tract, an 11,342 acre fee simple tract where CIRI received both surface and subsurface estates, and the North Tract, a 9,600 acre tract where CIRI received the subsurface estate and where the surface estate of the North Tract is managed by the National Park Service (NPS). The South Tract surface use by CIRI is restricted for purposes of mining and mineral extraction by covenant. These conveyances to CIRI were made by the Bureau of Land Management on May 14, 1979 and March 10, 1982, respectively.

In 1980, when LCNPP was established in Section 201(7) of ANILCA, Congress significantly expanded the original park proposal's boundaries to the shores of Cook Inlet. Within this expanded area, the Johnson Tract was solely within the LCNPP boundaries. The law specifically excluded privately owned lands such as the Johnson Tract from NPS management policies for the LCNPP and recognized "valid existing rights." Therefore, for the Johnson Tract CIRI retains fee simple ownership of the South Tract and subsurface mineral rights on the North Tract, and now requests the DOI fulfill its entitlement to the transportation and port easements.

3.2. Previous Easement Assessments

In the 1990s, the NPS Alaska Regional Office collaborated with CIRI on the development of an Environmental Analysis Document (EAD) that evaluated four alternative transportation easements and related port easements (CIRI and Westmin 1993). The EAD concluded that the transportation easement option from the Johnson Tract following the Johnson River to a port location on Cook Inlet would have significantly greater environmental impacts than other easement options.

In addition to the CIRI and Westmin (1993) EAD analysis, there have been several other previous Johnson River and vicinity easement corridor data collection and assessment studies. Like the CIRI and Westmin EAD, these other studies identified and evaluated potential transportation routing options. These

studies include a Johnson River road reconnaissance study (PND 1992), a preliminary geotechnical and geophysical investigation (Golder 1995), and a preliminary access routes reconnaissance study (RECON LLC 2023). The scope and key findings of these previous transportation easement routing assessments are summarized in Appendix A.

Available information and conclusions from all four of these previous easement assessments are relatively consistent. The conclusions indicate that a route from the Johnson Tract site along the length of the entire Johnson River to tidewater should be eliminated from consideration as a viable transportation easement option. Elimination of the Johnson River route as a viable option leaves a route over Bear Pass as the most practical route option from the Johnson Tract to tidewater. Engineering and geotechnical uncertainties of the Bear Pass route necessitate broad easement areas as currently proposed by CIRI.

3.3. Purpose of this EID Document

This EID document is provided as an assemblage of available environmental data relating to the conveyance of mandatory easements provided for in PL 94-204 for CIRI to access tidewater from the Johnson Tract lands. These data include information collected since the 1990s along with recent updates from HighGold Mining (HGM), CIRI's current Johnson Tract lease-holder, and NPS studies and reports. The information documents the biological, chemical, and cultural resources that exist within the easement areas proposed by CIRI. Review of this available information has not identified any unique or critical environmental conditions. The data included in this EID will support the DOI decision-making process in approving the mandatory conveyance of easements to CIRI.

While this document provides summaries of various environmental resource information collected and analyzed since the early 1990s, this document is not produced as a requirement of the National Environmental Policy Act (NEPA). Under the terms of PL 94-204, conveyances of the Johnson Tract and the associated transportation and port easements to CIRI are considered as conveyances under ANSCA. Section 910 of the Alaska National Interest Lands Act (ANILCA) of 1980 states that conveyances, withdrawals, easement determinations, or other actions that lead to conveyances to Native corporations pursuant to ANSCA are exempt from NEPA review.

4. AFFECTED ENVIRONMENT

To support review of CIRI's proposed easements, baseline information about potentially affected lands and associated environmental resources is summarized in this section of the EID. Environmental resources summarized in this chapter are limited to previously identified issues through discussions between CIRI, HGM, and DOI. These previously identified issue areas include physical resources (geology and soils, water quality); aquatic resources (waters of the U.S. including wetlands, aquatic life); vegetation; wildlife (mammals, avian); recreation; cultural, archaeological and historical resources; and subsistence.

4.1. Physical Resources

4.1.1. Geology and Soils

The Johnson River area is underlain by a sequence of Jurassic-aged volcanic and sedimentary rocks that dip gently towards the southeast. These are overlain by a relatively thin mantle of glacially derived sediments, recent volcanic ash, and fluvial reworked deposits. The surficial unconsolidated deposits overlaying the Jurassic rocks is a combination of material derived from glaciation and volcanic ash material derived from nearby volcanoes, such as Augustine, Iliamna, and Redoubt.

The western portion of the proposed transportation easement traverses a quaternary alluvial floodplain with infrequent erosional exposure of the Early Jurassic sandstone and conglomerate in the Johnson River. As the proposed transportation easement begins to move north out of the Johnson River valley the Middle Jurassic Tuxedni group of thinly bedded marine graywacke, conglomerate, and shale (Detterman and Hartsock 1966) is exposed on the hillsides and is the base material as the easement travels over Bear Pass. As the easement descends and bifurcates into the two tidewater access options quaternary alluvial deposits are encountered mixed with variable deposits of unconsolidated volcanic ash.

The major soil group for the proposed transportation and port easements is generically mapped as Maritime Upland Rock Barrens, Shrublands, and Forests (NPS 2011) and more specifically the Typic Cryandepts (IAII), which exist in the high elevations of Bear Pass, and is prominent in the lower elevations on either side of the pass. The principal components are: Typic Cryandepts, on steeper slopes consisting of shallow, well-drained volcanic ash over very gravelly glacial till and bedrock on valley sides and rounded hills found on either side of Bear Pass; and Riverwash consisting of recent deposits of sand and gravel on floodplains and braided rivers. In the Johnson River and Bear Creek drainages, where ash has accumulated to a depth of 8 or more inches, the soils generally are poorly drained, even on some relatively steep side slopes. This seems to be due in part to the highly stratified and variable composition of the ash layers, some of which drain very slowly (CIRI and Westmin 1993).

4.1.2. Water Quality

Water quality sampling has been conducted during ice free periods in the Johnson River area starting in 1999 and has continued intermittently through 2023. Most recently, sampling and laboratory analyses were conducted by HGM from 2020 through 2023 (HGM 2022-2023). In situ water quality measurements of parameters and laboratory analysis of samples collected were conducted at seven sites in Hungryman Creek (15 sampling events), the Johnson River (15 sampling events), two Johnson River tributaries (SBC-

01, 5 sampling events; SBC-02, 3 sampling events), Bear Creek (5 sampling events), and Little Bear Creek (6 sampling events) (Table 4-1, Figure 3). Results from 2020–2023 data collection are presented in Appendix B. In situ and laboratory water quality data presented in Appendix B represent the baseline seasonal water quality condition as no substantial activity with potential to alter water chemistry has been conducted in the area. The data provided have not undergone rigorous quality assurance and quality control procedures.

Laboratory determined analyte concentrations were compared against State of Alaska water quality standards for the protection of aquatic life including the hardness based aquatic life standards when appropriate. Hungryman Creek (sites HC01 and HC02) exceeded the aquatic life standard for total aluminum of 87 µg/L in both July and August 2023 but not during the other 13 sampling events. No exceedances for other constituents were detected in the dataset. Little Bear Creek (Site NBC02) exceeded the aquatic life standard for total mercury of 12 nanograms per liter (ng/L) in October 2022 by 0.2 ng/L and during one sampling event in July 2023 at Bear Creek (site NBC01) the laboratory detection limit for the sample was above the aquatic life standard. Most samples from Bear and Little Bear creeks exceeded the aquatic life standard of 87 µg/L for total aluminum, while Bear Creek frequently exceeded the hardness based standard for copper and Little Bear Creek exceeded it once. Most samples from Bear and Little Bear creeks exceeded the standard of 1,000 µg/L for total iron. In one instance from Bear Creek, the total lead detection limit was above the total lead aquatic life standard. Two unnamed tributaries of the Johnson River, site SBC01 and site SBC02, had exceedances for total aluminum and iron, and there was one sample with a detection limit for total lead in exceedance of the standard. Water quality samples from the Johnson River (Site JT-02) show exceedances of the aquatic life standard for total mercury during at least one sampling event in all years sampled. Similar to Bear Creek, total aluminum, copper, and iron all exceeded the aquatic life standards during some sampling events. Total aluminum was almost always in exceedance followed by total iron. Total copper exhibited exceedances of the hardness based aquatic life standard for at least one sampling event in all years except 2020. Total lead was in exceedance of the aquatic life standard only in the July 2023 sample.

During September 2022, basic water quality sampling was conducted in conjunction with fish surveys by the Alaska Department of Fish and Game (ADF&G) in waterbodies near the proposed transportation easement associated with development (Brekken 2022). Water quality parameters measured included temperature (Celsius [C°]), dissolved oxygen (milligrams per liter [mg/L]), conductivity (µS/cm), and potential hydrogen (pH). The sampling objectives were to help characterize streams in the area to establish baseline data and to help identify long-term biomonitoring sites, should the area be developed. In situ water quality parameters were measured at 16 sites within the Johnson River area during 2022; at 11 sites in the Johnson River and adjacent drainages and five sites in the Bear Creek and adjacent drainages (Brekken 2022) (Table , Figure 3). Sampling was not conducted in Hungryman, Difficult, Easy, or Open creek drainages due to steep, confined valleys and limited fish habitat. Stream temperatures ranged from 3.45 to 7.45 °C and were generally higher in the Bear Creek drainages. Conductivity measurements were relatively low and ranged from 28.0 to 125.0 uS/cm and were also generally higher in the Bear Creek drainages. Potential hydrogen remained relatively consistent within and across all sites and ranged from 6.3 to 7.53 units. Many of these sites and the addition of several others were sampled again in 2023 by ADF&G. The resulting report and data are expected to be completed and available by May 2024.

Table 4-1. Summary of site locations and years sampled in the Johnson River area by HGM from 2020 through 2023.

WQ ¹ Site ID	WQ Site Name	UTM Zone 5N Northing (NAD83)	UTM Zone 5N Easting (NAD83)	Latitude (NAD83)	Longitude (NAD83)	2020	2021	2022	2023
HC-01	Hungryman Creek 01	6667554	508427	60.14486202	-152.8482541	Yes	Yes	No	Yes
HC-02	Hungryman Creek 02	6668882.712	517690.2763	60.15649636	-152.681336	No	No	No	Yes
JT-02	Johnson River 02	6661757.716	508056.274	60.092826	-152.855203	Yes	Yes	Yes	Yes
NBC-01	N. Bear Creek 01	6664238.326	515762.128	60.114872	-152.716425	No	No	Yes	Yes
NBC-02	N. Bear Creek 02	6664285.209	517331.088	60.115229	-152.688201	No	No	Yes	Yes
SBC-01	S. Bear Creek 01	6661563.802	511021.267	60.091016	-152.801859	No	No	Yes	Yes
SBC-02	S. Bear Creek 02	6659858.553	514527.21	60.075592	-152.738955	No	No	Yes	No

NOTE: ¹ WQ = water quality

Table 4-2. Summary of site locations and water quality measurements in the Johnson River area by ADF&G during late September 2022.

Site	Watershed	Waterbody Name	Latitude	Longitude	Temperature (C°)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)	pH
9	Johnson River or adjacent watershed	Unnamed	60.07519	-152.7871	6.77	110.0	11.18	7.00
9A	Johnson River or adjacent watershed	Unnamed	60.07915	-152.80319	4.25	108.0	12.94	7.53
10	Johnson River or adjacent watershed	AWC ¹ No. 245-2010170-2020	60.06988	-152.76851	7.31	85.0	11.65	6.99
25	Johnson River or adjacent watershed	Unnamed	60.05922	-152.73738	5.5	62.0	12.99	6.84
27	Johnson River or adjacent watershed	Unnamed	60.03243	-152.6588	5.58	71.0	12.32	6.83
12	Bear Creek or adjacent watershed	Little Bear Creek	60.12183	-152.67847	5.47	77.0	12.8	7.45
14	Bear Creek or adjacent watershed	Bear Creek	60.11004	-152.72545	7.22	107.0	11.42	7.29
15	Bear Creek or adjacent watershed	Bear Creek Tributary	60.12846	-152.70073	6.83	66.0	11.56	6.63
16	Bear Creek or adjacent watershed	Unnamed	60.13879	-152.69023	7.28	57.0	11.78	6.89
20	Bear Creek or adjacent watershed	Unnamed	60.12526	-152.66046	5.11	125.0	8.2	6.30

NOTE: ¹ AWC = Anadromous Waters Catalog

4.2. Aquatic Resources

4.2.1. Waters of the U.S. Including Wetlands¹

Three Parameters Plus (summarized in CIRI and Westmin 1993) conducted a reconnaissance evaluation of wetlands in the Johnson River area in 1993. That effort concluded the wetland hydrologic characteristics (hydrophytic vegetation, hydric soils, and wetland hydrology) occur in many places, but that definitive identification of jurisdictional wetlands would require more detailed field investigation. The upper Johnson River drainage was judged to contain only one area that appeared to meet the then-current criteria for a jurisdictional wetland, while in the middle and lower Johnson River drainage, two large wetland systems bordering the river on the north and south were identified. The lower Bear Creek Valley and floodplain were determined to be predominantly jurisdictional wetlands.

Stantec conducted planning-level preliminary aquatic resources mapping in July 2022. It is important to note that, in addition to a proposed road corridor to potential port sites, Stantec's study area covered proposed exploration facilities, including an expanded airstrip, road, and exploration portal. Based on recommendations from this work, a five-day field effort was conducted in September 2022 to focus on areas identified as wetland questionable (WET-Q) and upland questionable (Up-Q), and to collect data on vegetation types (Stantec 2023). Polygon attributes were assigned to delineate aquatic resource status. The attributes assigned are described in Table 4-3 and the results presented in three separate memos are summarized in Table 4-4. The attributes that overlap with the currently proposed transportation and port easements are depicted on Figure 4. Among the important findings from the Stantec work were 1) the highest concentrations of wetlands occurred at the mouths of the Johnson River and Bear Creek, and along both sides of the Johnson River up to Red Creek, and 2) CIRI's proposed transportation easement corridor is 92% upland and 8% wetland, and the port easement corridor is 83% upland and 17% wetland; both easement corridors avoid sedge meadows. The exact acreage of wetlands that would be impacted will be determined by final transportation design.

Table 4-3. Assigned wetland status from Stantec analyses, 2022–2023.

Wetland Status	Description
Relatively permanent waters (RPW)	Waters which connect downstream, directly or through tributaries, to a Traditional Navigable Waters (TNW). For the purposes of this project, the boundaries between TNW and RPW have not been precisely delineated
Traditional navigable waters (TNW)	
Upland (Up)	Land areas of the study area which do not meet the regulatory definition of a wetland.

¹ Waters of the United States (WOTUS), including their adjacent wetlands, fall under the regulatory purview of the U.S. Army Corps of Engineers (USACE) and the U.S. Environmental Protection Agency (EPA). Jurisdictional determinations are issued by the USACE and determine whether a water will be regulated under the Clean Water Act (CWA) Section 404. These determinations are normally based on a formal jurisdictional delineation of waters on a site based on field work and mapping. Section 404 prohibits the discharge of dredge or fill material into all waters of the U.S., including wetlands, without a permit. Therefore, determination of jurisdictional wetlands is often a key element for approval of a proposed project, such as for roads. Unavoidable impacts to wetlands may require compensatory mitigation.

Wetland Status	Description
Upland questionable (Up-Q)	Land areas of the study area which, with a moderate level of confidence, meet the regulatory definition of a wetland. Upland inclusions may be present in some polygons.
Waterbody (WB)	Lakes, ponds, and ocean
Wetland questionable (Wet-Q)	Land areas of the study area which, with a moderate level of confidence, meet the regulatory definition of a wetland. Upland inclusions may be present in some polygons.
Wetland (Wet)	Land areas of the study area which meet the regulatory definition of a wetland. Based on the scale at which the mapping was conducted, some Upland inclusions may occur within polygon boundaries.

Source: Stantec 2023

Table 4-4. Summary of Stantec’s 2022–2023 aquatic resources desktop analysis findings.

Date Data Sources	Study Area	Findings
July 2022 Desktop study. Polygons were attributed by aquatic resource status (Stantec 2022a).	The coastline along the west side of Cook Inlet from Fossil Point near Chisik Island south to the outlet of the Johnson River, excluding a portion where Slope Mountain meets Cook Inlet. Inland up Bear Pass and Johnson River.	The highest concentrations of wetlands occurred at the mouths of the Johnson River and Bear Creek, and along both sides of the Johnson River up to Red Creek. Included results for preliminary mapping along the Johnson River, which was identified in the memo as a road route option leading to Cook Inlet tidewater. Aquatic resources mapped included RPW, TNW, WB, WET, WET-Q, and Up-Q.
December 2022 Desktop study using field data, high-resolution aerial imagery, and LIDAR elevation data collected in 2022 to update the aquatic resource mapping; proprietary and publicly available imagery and elevation datasets (Stantec 2022b).	A 1,077-acre study area along a proposed transportation easement over Bear Pass, partially supported by field work. Updated preliminary mapping of 8,814 acres along the Johnson River to tidewater.	Detailed mapping effort of aquatic resources that included wetlands, waterbodies, rivers, streams, marine waters, and cover. Polygons were attributed by aquatic resource status generally in the same categories as in the July 2022 effort. The Bear Pass study area consisted of 7.6 percent (81.3 acres) WET, 7.7 percent (83.1 acres) waterbody, and 1.1 percent (11.5 acres) stream for an aquatic resources total of 16.3 percent. (176 acres). The Johnson River to tidewater study area consisted of 22.4 percent (1,977 acres) WET and 5.0 percent (440.2 acres) WET-Q. The overall aquatic resources total, including waterbodies and streams, was 45.3 percent (3,992 acres).
July 2023 Desktop study using proprietary imagery, LIDAR-derived elevation data, public data (e.g., National Wetland Inventory and National Hydrography Dataset) (Stantec 2023).	Hungryman Creek area	Built upon detail of July/December desktop mapping of the transportation easement option. Aquatic resources mapped included RPW, TNW, WB, WET, and Up. Includes results for a routing option that deviated from other options about 3 miles (4.8 kilometers [km]) from the coast on the north side of Bear Creek. This route runs northeast along the footslope of the ridge that divides Bear and Hungryman creeks and connects to a potential port location near the mouth of Hungryman Creek. This route and study area completely avoid a large beaver-created

Date	Data Sources	Study Area	Findings
			wetland/pond complex that runs along the north side of Bear Creek. The only other wetlands that were mapped within this study area occur around the edges of Tuxedni Channel. No wetlands were identified in the preliminary mapping of the northern leg of the transportation easement.

Source: Stantec 2022a, 2022b, 2023

4.2.2. Aquatic Life

The proposed transportation easement transitions north out of the Johnson River drainage into the Bear Creek drainage, which flows north from the divide between the Johnson River and Bear Creek into Tuxedni Channel. The proposed port easement along the western shore of Tuxedni Channel lies within the lower reaches of the Bear Creek and Hungryman Creek drainages, though it does not cross Hungryman Creek. The proposed port easement crosses multiple other small drainages, including the locally named Little Bear Creek.

All major and most minor streams within the proposed easements have been investigated for fish presence. The Catalog of Waters Important for Spawning, Rearing, or Migration of Anadromous fishes, also referred to as the Anadromous Waters Catalog (AWC), lists all streams that have been documented to provide habitat for anadromous fishes, such as Pacific salmon, Dolly Varden, and some whitefishes, though it is known that the AWC is not comprehensive of all anadromous waters that exist in Alaska. There are 27 species or species groups considered anadromous in Alaska. Under the Magnuson-Stevens Fishery Conservation Act, all Pacific salmon habitat listed in the AWC is also designated as Pacific salmon Essential Fish Habitat. Streams listed in the AWC are afforded statutory protections under the Anadromous Fish Act (AS 16.05.871). The catalog is updated annually and adopted into regulation.

The fish resource information described herein have been derived from fish data collected by the ADF&G Habitat Section and the NPS in the vicinity of the proposed easements in 2022 and 2023, the 2023 AWC (Giefer and Graziano 2023). ADF&G provided 2022 and 2023 fish survey data through tabular electronic data tables and field trip reports summarizing sampling (ADF&G 2022, ADF&G 2023, Brekken 2022, Brekken 2023). Fish distribution and life stage data have been supplemented by NPS fish sampling in 2022 and 2023, and aerial surveys flown in 2023 (NPS 2022, NPS 2023a and b).

In 2022 the ADF&G Habitat section inspected 29 stream sites for fish and fish habitat. Twenty-two sites were sampled for fish, seven sites were surveyed by air for fish and habitat, and four sites were not sampled due to a lack of habitat. Resident fish were observed at 15 sites, anadromous fish at eight sites, and no fish were found at four sites. In 2023, the ADF&G investigated 12 sites for fish and fish habitat. Eleven of the sites were assessed to potentially provide fish habitat and were sampled for fish. Sampling identified fish at 10 of the sites and anadromous fish were captured or observed at four sites. Some sites sampled in 2023 were in streams initially sampled in 2022. All ADF&G collected fisheries information, including AWC data, are summarized in Table 4-5 and can be viewed in Figure 5. Data collected by NPS are shown on Figure 5 where they provide new information not included in the AWC.

The Johnson River (Stream No. 245-20-10170) is listed in the AWC as providing habitat for chum (*Oncorhynchus keta*), coho (*Oncorhynchus kisutch*), and pink (*Oncorhynchus gorbuscha*) salmon, and

anadromous Dolly Varden (*Salvelinus malma*). Rearing coho salmon juveniles and adults of all species have been documented and are listed, but specific spawning reaches had not been determined for any of the identified species. Aerial surveys conducted by the NPS in 2023 identified spawning chum salmon in a side channel of the lower Johnson River but those data are not currently represented in the AWC. The western-most end of the proposed transportation easement within the Johnson River drainage crosses the Johnson River within a reach documented as providing Dolly Varden habitat but approximately 1.5 miles (2.4 km) upstream from the nearest Pacific salmon habitat listed in the AWC. However, NPS aerial surveys conducted in 2023 identified adult coho salmon approximately 0.5 miles (0.8 km) further upstream than the current upstream extent for coho salmon in the AWC (Figure 5). The remainder of the proposed transportation easement within the Johnson River drainage does not cross any anadromous fish streams. Sampling conducted by the ADF&G Habitat Section in 2022 and 2023 identified resident Dolly Varden at sites both up and downstream from the proposed transportation easement at sites 9A and 23-9B (ADF&G 2022, ADF&G 2023) (Figure 5). Both these sites appear to be within the headwaters of an anadromous stream; however, ADF&G indicated that surface water connectivity to the Johnson River was uncertain. At the dogleg, the proposed easement is within two unnamed drainages listed in the AWC as supporting coho salmon rearing and presence (Stream No. 245-20-10170-2020, Stream No. 245-20-10170-2020-3001). Stream No. 245-20-10170-2020-3001 is downstream from sites 9A and 23-9B described above and may not be well connected to the upper reaches sampled. In addition, ADF&G sampling identified resident Dolly Varden using each stream.

Along the north side of the Johnson River, downstream from the easement dogleg, ADF&G and NPS sampling identified a minimum of three additional anadromous and at least one documented fish-bearing tributary that would have to be crossed, part of alignments considered historically and dismissed (Table 4-5). Along the south side of the Johnson River, two AWC listed streams and three streams found to be used by juvenile and/or adult coho salmon by NPS would be crossed to reach tidewater (Table 4-5, Figure 5).

The remainder of the proposed transportation easement lies within the Bear Creek drainage. The lower 2.9 miles (4.7 km) of Bear Creek, AWC Stream No. 245-30-10130, is documented to provide habitat for chum and coho salmon and no specific reaches are identified for rearing or spawning habitat, though both must occur within the reach as illustrated during NPS aerial and ground surveys that documented spawning chum and pink salmon. It is within the Bear Creek drainage that the proposed transportation easement forks to provide access to the proposed port easement along Tuxedni Channel. Final port site selection would determine which leg of the proposed transportation easement could be used for access. Any crossings of Bear Creek accessing the western portion of the proposed port easement would occur upstream from documented anadromous and resident fish habitat, though resident fish use is likely in upper portions of the drainage.

Table 4-5. Summary of documented fish habitat within the Johnson Tract proposed transportation and port easements, and previously considered easement locations.

Easement Section	Stream Name/ADF&G Sample Site	ADF&G Site (Latitude/Longitude)		AWC Stream No.	Stream Name/ADF&G Sample Site	Resident/Marine Species	Stream Crossing
Transportation / Johnson River	Johnson River			245-20-10170	CHp, COrp, Pp, DVp		Yes
	Unnamed tributary/Site 10 ²	60.06988	-152.76851	245-20-10170-2020	COrp	CO, DV	No
	Unnamed tributary/Site 9 ²	60.07519	-152.7871	245-20-10170-2020-3001	COrp	COr, DV	No
	Site 9A ²	60.07915	-152.80319			DV	Yes
	Site 23-9B ³	60.091181	-152.802193			DV	Yes
Transportation / Bear Creek	Bear Creek			245-30-10130	CHp, COp		At upper extent
	Bear Creek/Site 14 ²	60.11004	-152.72545			DV	Yes
	Bear Creek tributary/Site 15 ²	60.12846	-152.70073			DV	No
	Little Bear Creek/Site 12 ²	60.12183	-152.67847		DVp	DV	No
	Site 23-10U ³	60.118852	-152.685026			DV	No
Port	Hungryman Creek			245-30-10120	CHp		No
	Site 23-25 ³	60.155641	-152.683739		DV	DV	No
	Unnamed tidal stream/Site 23-24 ³	60.144236	-152.687835			Sculpin, NSB	Within easement
	Unnamed tidal stream/Site 23-2 ³	60.143871	-152.691286			NSB, TSB, flounder, sculpin	Within easement
	Unnamed tidal stream/Site 16 ²	60.13879	-152.69023			DV, TSB	
	Bear Creek			245-30-10130	CHp, Cop		
	Little Bear Creek/Site 12 ²	60.12183	-152.67847		DVp	DV	Within easement
	Site 23-10 ³	60.128022	-152.664875		COr	DV, sculpin	At boundary /tidal flat edge
	Site 23-10U ³	60.118852	-152.685026			DV	Yes

Easement Section	Stream Name/ADF&G Sample Site	ADF&G Site (Latitude/Longitude)		AWC Stream No.	Stream Name/ADF&G Sample Site	Resident/Marine Species	Stream Crossing
Port (contd.)	Unnamed tidal stream/Site 20 ²	60.12526	-152.66046			DV	Adjacent to boundary
	Unnamed tidal stream/Site 20A ²	60.12429	-152.65995			DV	Adjacent to boundary
	Unnamed tidal stream/Site 19 ²	60.12188	-152.65805	245-30-10135	COr	DV	Adjacent to boundary
	Site 23-19	60.121646	-152.657862	245-30-10135		Sculpin	Adjacent to boundary
	Unnamed tidal stream/Site 21A ²	60.11989	-152.65647			DV	Within easement
	Site 23-21 ³	60.12053	-152.655423			Sculpin	Adjacent to boundary
	Unnamed high gradient stream/Site 23-22 ³	60.116856	-152.638792			DV	Adjacent to boundary
Eliminated from Consideration/Lower Johnson River (North)	Unnamed tributary/Site 10 ²	60.06988	-152.76851	245-20-10170-2020	COrp	CO, DV	Yes, if north
	Unnamed tributary/Site 9 ²	60.07519	-152.7871	245-20-10170-2020-3001	COrp	COr, DV	Yes, if north
	Unnamed Johnson River tributary			245-20-10170-2010	CHp, COp, Pp		Yes, if north
	Johnson River Tributary/Site 25 ²	60.05922	-152.73738			DV, NSB	Yes, if north
Eliminated from Consideration/Lower Johnson River (South)	Red Creek			245-20-10170-2031	COp		Yes, if south
	Triangle Peak Creek/Site 27 ²	60.03243	-152.6588	245-20-10170-2001	COp, CHp		Yes, if south

NOTES: ¹ Species and life stage codes: CH = chum salmon, CO = coho salmon, P = pink salmon, DV = Dolly Varden, NSB = ninespine stickleback, TSB = threespined stickleback, p = presence, r = rearing | ² ADF&G 2022 | ³ ADF&G 2023

The eastern fork of the proposed transportation easement could cross Bear Creek near the upper extent of anadromy for Pacific salmon and likely within a reach documented by ADF&G sampling at site 14 (Bear Creek) as fish bearing by resident Dolly Varden. The eastern fork of the proposed transportation easement meets the proposed port easement at or near the divide into Little Bear Creek near where ADF&G identified resident and juvenile Dolly Varden (Site 23-10U, Site 12, Little Bear Creek) and one adult anadromous Dolly Varden (Site 12, Little Bear Creek).

Within the proposed port easement, only Bear Creek, described above, provides a substantial riverine length of anadromous and resident fish species stream habitat. Little Bear Creek, also described above, provides primarily resident fish species habitat, and at least some degree of habitat for anadromous Dolly Varden as evidenced by the single observation at Site 12 (Little Bear Creek). The downstream most sampling location in Little Bear Creek (Site 10) is at the transition to tidelands and juvenile coho salmon, Dolly Varden and sculpin were captured. The northernmost portion of the proposed port easement ends within the Hungryman Creek drainage but does not cross the creek. Hungryman Creek, AWC Stream No. 245-30-10120, is listed for chum salmon presence and ADF&G sampling in 2023 further identified anadromous adult Dolly Varden and juvenile Dolly Varden at Site 23-25 in the lower reaches of the creek. Moving south within the proposed port easement between Hungryman and Bear creeks, ADF&G sampled three creeks that are essentially a tidal gut extending from the mud flats upslope into the nearby uplands. Fish species were indicative of tidal influence, including marine sculpin, flounder, and threespine stickleback (*Gasterosteus aculeatus*), and no anadromous fish were captured. (Sites 23-23 and 23-24). The tidal stream associated with ADF&G Site 16 appears somewhat more defined and, in addition to threespine stickleback, resident Dolly Varden were captured. NPS minnow trapping efforts in 2022 also found juvenile coho salmon in the ponded areas of the stream upstream from the ADF&G sampling location (NPS 2022). Streams sampled by ADF&G between Little Bear Creek and the southern terminus of the proposed port easement are generally described as high gradient, or as providing limited upstream habitat once the creeks transition landward from the tidal flats. However, resident Dolly Varden were captured at most creeks right at the transition away from the mudflats (Figure 5). One exception is AWC Stream No. 245-30-10135, which is primarily a tide gut but has been documented to provide coho salmon rearing habitat to just upstream from the tidal mud flats, as well as resident Dolly Varden.

4.3. Vegetation

The predominant vegetation type identified along the proposed easements from recent surveys is shrub thicket as defined by Viereck et al. (1992). Shrub thicket vegetation consists largely of Closed Tall Alder Shrub (Stantec 2022b) mixed with willow along streams and on the alluvial fans. The shrub thicket is almost impenetrable in many places, and occurs along with Devil's club (*Oplopanax horridus*), blueberry (*Vaccinium* spp.), huckleberry (*V. parvifolium*), salal (*Gaultheria shallon*), salmonberry (*Rubus spectabilis*), false hellebore (*Veratrum viride*), and fireweed in the understory. Beneath the alders there is often a well-developed grass and fern layer, as well as a number of herbs and shrubs.

Forested vegetation in the proposed easement areas is limited to deciduous forests dominated by black cottonwood (*Populus trichocarpa*). North of the proposed easements near Fossil Point small stands of spruce and hemlock are found. Vegetation mapping as provided from the Stantec 2022 field surveys for the proposed easements is provided in Table 4-6 (Stantec 2022b).

Table 4-6. Transportation easement vegetation mapping¹

Vegetation Group	Vegetation Classification	Acres	Percent Study Area
Deciduous Forest	Open deciduous forest	68.0	4.2
	Woodland deciduous forest	82.5	5.12
	Total	105.5	9.3
Alder and/or Willow Shrub	Closed Tall Alder Shrub	680.3	42.1
	Closed Tall Alder – Willow Shrub	281.5	17.4
	Closed Tall Willow Shrub	25.4	1.6
	Open Low Alder-Willow Shrub	25.0	1.5
	Open Low Willow Shrub	61.7	3.8
	Open Tall Alder Shrub	45.8	2.8
	Open Tall Alder-Willow Shrub	68.9	4.3
	Open Tall Willow Shrub	25.1	1.6
	Total	1,213.7	75.1
Other Shrub	Low Shrub Tundra	3.7	0.2
	Total	3.7	0.2
Herbaceous	Mesic Herbaceous	68.5	4.2
	Wet Herbaceous	41.0	2.5
	Aquatic Herbaceous	2.0	0.1
	Total	111.4	6.9
Ground Cover	Partially Vegetated	13.6	0.8
	Barren	8.1	0.5
	Total	21.7	1.3
Water	Open Water	115.6	7.1
	Total	115.6	7.1
Grand Total		1,616.6	100.0

Source: Table 5; Stantec 2022b

4.4. Wildlife

4.4.1. Mammals

The primary wildlife species considered, and with data available for this document, include brown bears, (*Ursus arctos*) and black bears (*Ursus americanus*), moose (*Alces alces gigas*), and beaver (*Castor canadensis*). Caribou (*Rangifer tarandus*) and Dall’s sheep (*Ovis dalli dalli*) are also present in parts of the Lake Clark area but are not found within the proposed easement areas which lack preferred habitats for both species. Dall’s sheep are exclusively found on the western side of the mountain divide in Lake Clark (Zanon et al 2016). Caribou in Lake Clark, part of the Mulchatna herd, are primarily found in the

western and southwestern areas of the park, beyond Iliamna Lake (Zanon et al 2016). Brown bears were surveyed from 1994–1996 by the NPS, with aerial surveys in Chinitna Bay, as well as ground observations in Chinitna Bay, Tuxedni Bay, and Herbs Lagoon. Aerial survey observations of brown bear peaked at 87 sightings on July 11, 1995 (Bennett 1996). Localized densities at survey locations exceeded 11/km² in some places. This study also found significant summer usage of salt marsh environments by brown bears. During the 1994–1996 surveys, black bears were observed far less due to their preference for forested habitat. The majority of black bear observations were in the Tuxedni Channel, the Silver Salmon Lakes, and the Johnson River Delta (Bennett 1996). More recent work has been carried out by the NPS to document bear movement and habitat usage. Between 2021 and 2023, 15 brown bears and 9 black bears were radio collared in the area. In 2022 and 2023, bear activity was particularly high in Chinitna and Tuxedni bays, as well as on the outer coast, and a significant portion of the inland area between the two bays, where the Johnson Tract is located (Figure 6). The proposed easements lie within ADF&G Game Management Unit (GMU) 9, sub-unit A (GMU 9A). GMU 9 has an area of 33,600 mi² (87,024/km²) and 9A is the smallest of the 5 sub units. Brown bear densities within the GMU trend upwards from north to south with lowest densities estimated in the northern-most sub units 9A and 9B (Crowley 2023). Brown bear densities in GMU 9A were estimated by two different studies between 1989 and 2009 and estimates ranged from 105 to 178 bears/1,000 km², with densities within LCNPP representing some of the highest contribution to overall density estimates for the sub unit (Crowley 2023). Composition count summaries in 2003–2004 estimated GMU 9A densities at 150 bears/1,000 km². Generally, harvest decreased over the period from 2011 through 2017 while the percentage of harvest of older male and particularly female bears increased. As a result, the Board of Game recommended a season reduction for all sub units except 9A and 9B, ostensibly due to low overall harvest in those sub units.

Moose have been consistently surveyed in recent years, with aerial surveys conducted from 2019–2023. Survey efforts varied by year, as some study efforts aimed to survey all coastal moose habitat, while others were focused on specific areas, such as the Johnson River drainage. A total of 170 moose observations were made during these surveys (NPS 2019-2023). The results of these surveys show a high density of moose in the Johnson River drainage across all years (Figure 7); however, they are possibly skewed due to area-specific surveys. Moose were also observed, though in lower density, along the northern coast of Chinitna Bay and West Glacier Creek as well as in Tuxedni Bay and the Crescent River area. The moose population in the unit peaked in the 1960s and in the late 1990s to early 2000s was stable or declining (Crowley 2017). In 1983, a census in central 9E estimated 2,500 moose, while the estimate for GMU 9C (not including Katmai National Park) was 800, 9B was 2,000, 9A was 300, and 9D was 600 moose. Predation on moose calves by brown bears was considered the limiting factor for moose populations. Overall moose harvest in GMU 9 during regulatory years 2010 through 2014 stabilized at an average of 100 moose after a long period of decline (Crowley 2017). GMU 9A accounted for 2–6 moose harvested annually over the same period.

Information on beaver habitat usage and presence primarily comes from NPS datasets. In 2023, efforts were made to document the total presence of lodges throughout the project area. Surveys were conducted via observations from an aircraft. Most lodges were located in the middle reaches of the Johnson River, around the confluence with Red Creek (NPS 2023; Figure 8).

4.4.2. Avian

Abundant avian resources exist within the proposed transportation and port easements. An initial study of the area conducted by the NPS (Bennett 1996) from 1994 to 1996 surveyed shorebirds, waterfowl, raptors and seabirds. Preliminary studies were comprised of aerial surveys, and ground transects where possible. For shorebirds, surveys were flown in the spring to account for migratory bird populations. Species observed included the highly abundant Western sandpipers (*Calidris mauri*) and dunlins (*C. alpina*) as well as common snipe (*Gallinago gallinago*), short billed dowitchers (*Limnodromus griseus*), and semipalmated plovers (*Charadrius semipalmatus*) among others. During the spring migration these species are highly concentrated within Tuxedni and Chinitna bays.

For coastal waterfowl, aerial surveys were conducted weekly between April 15–May 20 and August 15–October 15, and monthly from December to March. Duck populations were most abundant during the spring and fall migrations (late April and early September), with percentage of observations by species shown in Table 4-7.

Table 4-7. Dabbling duck spring migration composition 1994–1996.

Species	Percent of Observations
Mallard (<i>Anas platyrhynchos</i>)	57%
Northern pintail (<i>A. acuta</i>)	28%
Green-winged teal (<i>A. crecca</i>)	7%
American wigeon (<i>A. americana</i>)	4%
Northern shoveler (<i>A. clypeata</i>)	3%

Seasonal variations between spring and fall include increases in mallard (*Anas platyrhynchos*) and green-winged teal (*A. crecca*) sightings and decreases in pintail sightings (*A. acuta*). The dominant diving duck species observed were greater scaup (*Aythya marila*) and lesser scaup (*A. affinis*). Sea ducks were the most abundant waterfowl in all months except May, with 96 percent of the population comprised of scoters (*Melanitta* sp.), primarily surf scoters (*M. perspicillata*) and white winged scoters (*M. deglandi*). Counts peaked in mid-August 1994, at 18,500 observed. Geese occurred mainly in Tuxedni Bay during fall migration, primarily Canada geese (*Branta canadensis*) and white-fronted geese (*Anser albifrons*), though brant (*Branta bernicla*) and emperor geese (*Chen canagica*) were also observed (Bennett 1996).

Raptor surveys were conducted for bald eagles (*Haliaeetus leucocephalus*) via fixed wing aircraft, skiff, and ground surveys. The main focus was on nesting sites, with the number of active and occupied nesting sites fluctuating between 20–30 per year. Nesting sites were primarily located within 300 feet (100 m) of the coastline. Approximately half of the sites observed from 1994–1996 were successful in producing fledglings. Peregrine falcon eyries, fledglings, or adults exhibiting breeding behavior were observed at six sites along the coast during the 1994–1996 survey period. Nesting sites included cliff sites in both Tuxedni and Chinitna bays.

Raptor surveys were undertaken again in May 2022 by ABR, Inc. within the vicinity of the proposed easements. Surveys were conducted from helicopters and all potential raptor habitat was surveyed for nests and individuals. Thirteen nests were recorded; eleven bald eagle nests and two golden eagle nests (*Aquila chrysaetos*). Both of the golden eagle nests identified in the survey were located within the

Johnson Tract and outside the boundaries of the proposed easements. Of the bald eagle nests, six had incubating chicks, or showed signs of occupancy. Bald eagle nesting habitat, typically old growth black cottonwood in this area, occurs throughout the Johnson River and Bear Creek drainages. High quality golden eagle nesting habitat (large, protected cliff outcrops) was somewhat limited, though moderate quality habitat is available in areas such as August Hill (ABR 2022). Locations of identified bald eagle nests are provided in Figure 9.

4.5. Recreation

Recreation in the proposed transportation and port easement areas is largely if not exclusively confined to the coastal area and along navigable inland waterways, given the lack of roadways and airstrips in the area. The NPS notes that popular recreational uses include “river floating, hiking, backpacking, mountaineering, sport fishing, and bear and other wildlife viewing” (NPS 2014). Reported visitor numbers are small—fewer than 20,000 visits to the entirety of the LCNPP are recorded each year (NPS 2024). While the discrete numbers that visit the proposed transportation easement area or the vicinity are not available, recreational uses of the coastal area are known. Fossil Point is reported as a popular attraction; commercial lodges at Snug Harbor on Chisik Island and at Silver Salmon Creek just south of the Johnson River (Figure 10) advertise visits to the area for boat touring, bear viewing, and bird watching, among other activities.

Recreational fishing may occur in the vicinity of the proposed port easement. Waterways in the area support salmon runs (Hungryman Creek and Bear Creek) and may be locations for recreational fishing; Johnson River also supports salmon runs, but no sport fishing is reported to occur here (CIRI and Westmin 1993).

4.6. Cultural, Archaeological, and Historical Resources

4.6.1. Cultural, Archaeological, and Historical Resources

Cultural, archaeological, and historical resource reviews have been conducted within the vicinity of the proposed transportation and port easements, and on other private and public lands in the wider area. Two assessments specific to the proposed easements are provided in Lobdell (1993) and Northern Land Use Research Alaska, LLC (NLURA 2024).

The cultural resources assessment reported in Lobdell (1993) included a comprehensive aerial reconnaissance and photographic documentation within the proposed transportation and port easement area, along with pedestrian surveys of three potential port site locations. Goals of the cultural resources assessment include:

- Identify known or unknown archeological, historical, or ethnographical sites within or near the proposed use areas.
- Document any previously unknown archaeological, historical, and ethnographical sites for inclusion in the Alaska Historic Resources Survey (AHRs) file.
- Determine site significance under criteria defined by 36 CFR 800.70 and other appropriate regulations, if applicable.

- Provide field level data.

The NLURA report *Cultural Resources Reconnaissance Report on NPS Lands in Lake Clark National Park and Preserve, Cook Inlet, Alaska* (NLURA 2024) presents the results of a desktop assessment of the proposed transportation and port easement areas and a cultural resources reconnaissance survey of the area, provided under confidential cover. A reconnaissance survey, as defined by the Office of History and Archaeology (OHA), is used to inspect an area, characterize its cultural resources in a general sense, and provide information for further and more in-depth surveys. While the 2024 survey falls within the parameters of a Phase I (identification) Survey (as defined by the OHA in Historic Preservation Series No. 11, revised 2019) (ADNR 2019 [2003]), it was not intended to satisfy all the requirements of a Phase I survey, but was designed to gather data on the local conditions, terrain, and land features.

4.6.1.1. Existing Cultural Resources

Five historic-era cultural resources at four locations (KEN-00814, KEN-00815, KEN-00816, KEN-00817) within the proposed transportation and port easement areas (Figure 11) are listed on the Alaska Heritage Resources Survey (AHRS); no determination of eligibility has been made for any of these resources.

4.6.1.2. Cultural Resources Potential

Lobdell (1993) notes that the potential transportation easement area is “of very low potential for containing cultural resources,” citing as reasons the heavy spring runoff and neoglaciation which have, through physical processes, likely eradicated any cultural resources. The physical characteristics (narrow beaches, steep slopes behind the beaches, high energy beach environments) of the potential port site easement area that overlaps with the area evaluated by Lobdell suggests low potential for containing cultural resources.

None of the known cultural resources within the proposed transportation and port easement areas are prehistoric or protohistoric; however, NLURA (2024) notes that the presence of the Magnetic Island Site (KEN-00324) located more than 2 miles (3.2 km) north of the proposed transportation and port easement areas, illustrates the potential to encounter significant prehistoric materials within the area, particularly along the shoreline. The NLURA assessment notes that previous research indicates that the area is located within the traditional lands of the Outer Inlet Dena’ina, and that sites, place names, and the available ethnographic materials indicate that Dena’ina resources may be encountered in the area.

As part of its desktop assessment, NLURA identified three areas with a high probability for the presence of cultural resources:

- High Probability Area 1 is a landform at the top of Bear Pass, which was thinly vegetated and provided a clear view into the Johnson River drainage and, to a lesser extent, the Bear Creek drainage. Archaeologists noticed multiple knobs and terraces on this landform during a helicopter overflight, suggesting this landform was a potential lookout site.
- High Probability Area 2 is located along the shoreline of Cook Inlet. This area is relatively sheltered by Chisik Island, and provides access to marine resources, including a mud flat known to contain clams. The area at the mouth of Little Bear Creek (referred to as Corrie

Creek in some supporting documents) was of particular interest due to the presence of fresh water. No prominent landforms were noted in this area during a helicopter overflight.

- The mouth of Hungryman Creek. The presence of a freshwater source and easy access from the Tuxedni Channel give the elevated/dry area at the mouth of Hungryman Creek a high potential for prehistoric, protohistoric, and historic settlement.

High Probability Area 1 was subject to pedestrian survey and test unit excavation; no evidence of historic or prehistoric cultural resources and no areas that would be considered to have a high potential to contain such sites were identified during the pedestrian survey. Archaeologists excavated two 20 inch x 20 inch by 39 inch (50 centimeter [cm] x 50 cm x 1 meter [m]) deep, test points in a flat area to the east of the headwaters of the creeks forming in Bear Pass; no cultural materials were found in either pit.

High Probability Area 2 was subject to pedestrian survey and low-level helicopter reconnaissance. During the survey and reconnaissance, five structures at four locations, and one cultural depression, were identified. Information gathered from residents and a review of historical aerial imagery taken in 1954 indicates that structures at two of the sites could potentially be 50 years of age or older and therefore potentially eligible for listing on the National Register of Historic Places.

In addition to High Probability Area 1 and Area 2, NLURA identified the area at the mouth of Hungryman Creek as an area with a high potential for prehistoric, protohistoric, and historic settlement; this area is higher and appears to be dryer than the terrain inland, has a fresh water source, and provides easy access from the Tuxedni Channel.

In general, both the Lobdell and NLURA assessments note that the non-coastal portions of the proposed transportation and port easement areas appear undisturbed; no sites or features were observed during helicopter reconnaissance overflights and no landforms in these areas were deemed to have a high potential to contain intact cultural resources. Select portions of the proposed transportation and port easement area along the shore of the Tuxedni Channel, around the mouth of Little Bear Creek (referred to as Corrie Creek in some supporting documents) and Hungryman Creek, and south of Fossil Point are considered to have a higher potential to contain intact cultural resources. Historic cabins and a cultural depression are located along the coast, some of which were located in areas with good shore access, dry ground, fresh water, and shelter from the wind. Based on these geographic features and the history of human occupation, these locations may contain prehistoric or protohistoric resources.

4.6.2. *Paleontological Resources*

The existence of, and potential for, paleontological resources in proximity to the proposed transportation and port easements have been evaluated by commercial entities and by the NPS. In support of previous proposed developments in the area, a single field reconnaissance that overlaps part of the proposed transportation and port easement area was performed in 1993. The reconnaissance was focused, in part, on the identification of paleontological resources. The results of the reconnaissance are reported in Lobdell (1993).

Lobdell (1993) notes that “[n]o previously unknown ... paleontological resources were noted during this field reconnaissance.” The assessment notes the presence of a previously known paleontological resources location—Fossil Point. Fossil Point—which is outside the boundaries of the proposed

easements—is a paleontological site at the tip of a small peninsula on the southern shore of Tuxedni Bay. The outcrops at Fossil Point are well known paleontological resources, and are listed on the AHRs as KEN-00042. The lower outcrop face of Fossil Point and several beach finds were examined during the reconnaissance. The majority of reported finds were large, now-extirpated mollusks (Mollusca) or brachiopods (Brachiopoda), although other fossil forms have been reported; these are relatively common paleontological resources (Lobdell 1993). Fossil Point is north and outside of the proposed easements.

The NPS has produced a report that summarizes the paleontology and paleontological resources within LCNPP. The report includes comprehensive documentation of fossil sites, and provides baseline documentation of paleontological resources and their condition (NPS 2020). Data presented in the report indicates that the majority of the length and area of the proposed easements overlie Quaternary-age alluvial fan and surficial deposits, and outwash deposits, that have a low probability for containing fossils. A portion of the proposed easements overlie geologic units with rock exposures that hold the potential for future fossil discoveries. These include the following:

- Chinitna Formation. Fossils can be found throughout the formation. Ammonites are more common and diverse, specifically in the Tonnie Siltstone Member (Figure 12) of this unit than in the underlying Tuxedni Group.
- Talkeetna Formation, Horn Mountain Tuff. There have been a few accounts of fossils in the park, but fossils from this rock unit are of high geologic interest. Documented fossils include a fern fossil likely from the Horn Mountain Tuff Member near the Johnson River and well-preserved plant fossils and large tree stumps on Horn Mountain (Figure 12).
- Tuxedni Group. Ichthyosaur remains have been found in the Tuxedni Group in the Talkeetna Mountains. The abundant and diverse molluscan assemblage found at Fossil Point are from the Tuxedni Group (Figure 12).

The NPS report also identifies fossil occurrences with levels of management interest/concern ranging from low to high in the area of the proposed easements. Of the occurrences identified, two are assigned a ‘high’ management interest/concern. However, the report further notes that—based on factors such as the potential for human activity and access, erosion potential, fossil quality, fossil abundance, management interest, and geologic interest—only three occurrences may warrant future monitoring and management; none of which are located within the boundaries of the proposed easements.

4.7. Subsistence

Subsistence is defined within ANILCA, Section 803, as:

“...the customary and traditional uses by rural Alaska residents of wild, renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools, or transportation; for the making and selling of handicraft articles out of non-eatable by-products of fish and wildlife resources taken for personal or family consumption; for barter, or sharing for personal or family consumption; and for customary trade.”

The Lobdell (1993) report prepared for CIRI and Westmin provided an initial assessment of subsistence status in the potential easement locations. Many traditional subsistence practices have occurred on the west side of Cook Inlet for a diversity of species. There are also ethnohistoric accounts of subsistence

practices in the area, but it is important to assess the current status of subsistence in the study area to assess potential issues and impacts from any human activity.

Subsistence tends to occur in areas close to settlement or where access to subsistence resources is available. The Johnson River area is distant to subsistence users on the west side of Cook Inlet. Data assessed at the time of the Lobdell report indicated that the Johnson River area has not been a primary subsistence focus in the prehistoric or historic past. The closest area of subsistence focus to the Johnson River is Tyonek, approximately 80 miles (130 km) northeast of any Johnson Tract activities.

5. CONCLUSIONS

As described within this EID, CIRI has identified and proposed broad transportation and port easement locations that will be reduced in size and scope if and when a transportation route and port are developed in the future. The easements that CIRI has proposed would satisfy DOI's congressional mandate to convey port and transportation easements to support potential mineral development of the Johnson Tract. A thorough review of available environmental resources documentation and previous easement option evaluations has been conducted by the Owl Ridge Natural Resource Consultants team. Based on this review, the option of a transportation easement route from the Johnson Tract along the length of the Johnson River to tidewater is not a viable option. This conclusion is consistent with previous easement option evaluations.

Elimination of the Johnson River route as a viable option leaves a route over Bear Pass as the most practical transportation route from the Johnson Tract to tidewater. Engineering, geotechnical, and environmental uncertainties of a Bear Pass route necessitate broad easement areas as currently proposed by CIRI. The conveyance of the transportation and port easements proposed by CIRI in and of itself is not likely to result in significant impacts on the environmental resources described in this EID. DOI approval of the transportation and port easements proposed by CIRI would meet the purpose and need for both DOI and CIRI.

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FIGURES



COOK INLET REGIONAL, INC.

GENERAL LOCATION MAP

ENVIRONMENTAL INFORMATION DOCUMENT

SCALE:

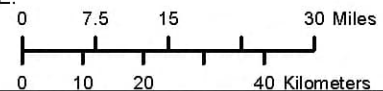
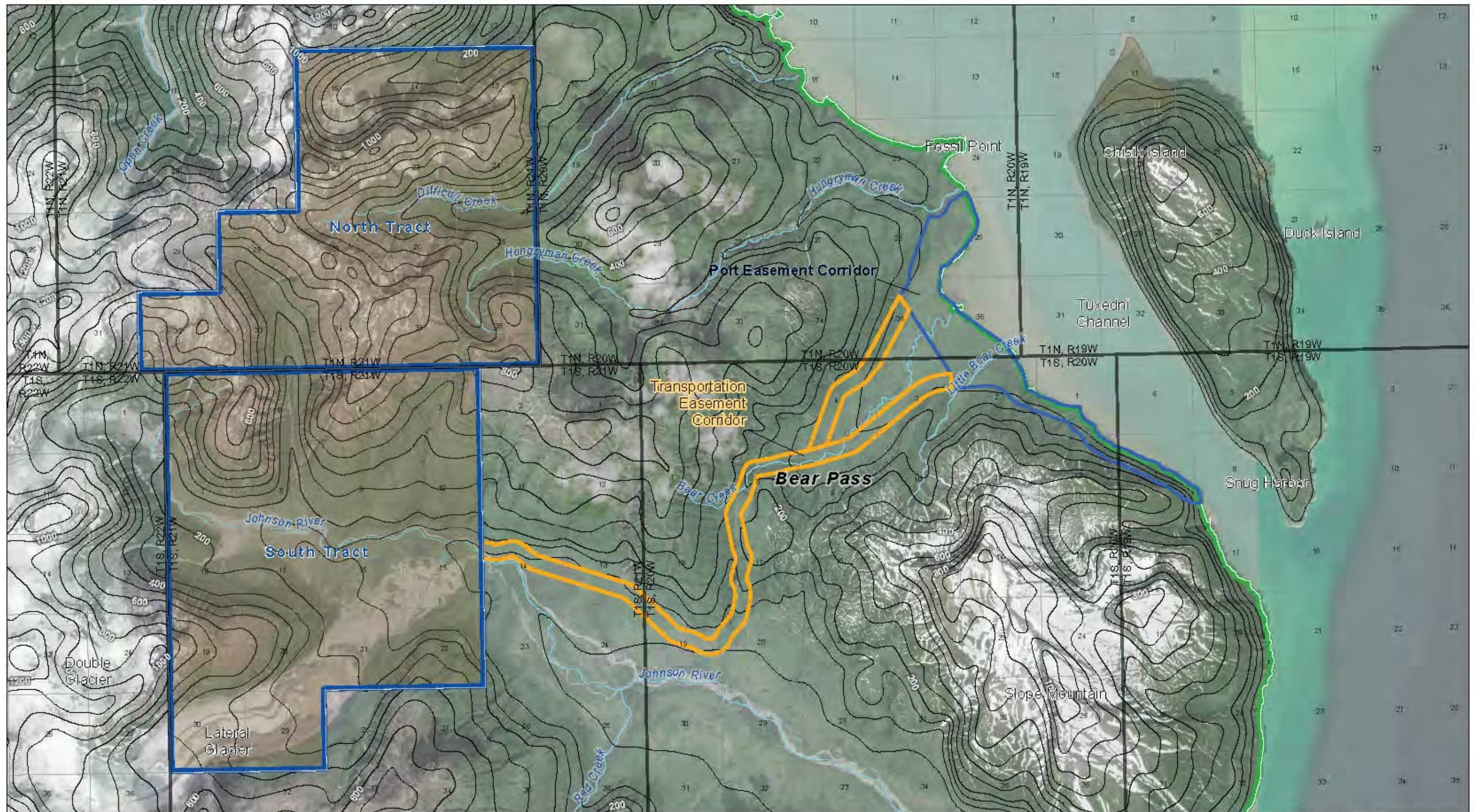


FIGURE:

1



- | | | |
|-------------------------------------|----------------------------------|----------------|
| Johnson Tracts | Easement Corridor | Contour (100') |
| CIRI Conveyed Land | Port Easement Corridor | |
| Lake Clark National Park & Preserve | Transportation Easement Corridor | |

MERIDIAN: SEWARD



CIRI JOHNSON TRACTS AND PROPOSED EASEMENT CORRIDORS

ENVIRONMENTAL INFORMATION DOCUMENT

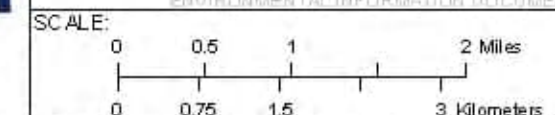


FIGURE:
2



Johnson Tracts

CIRI Conveyed Land

Lake Clark National Park & Preserve

Easement Corridor

Port Easement Corridor

Transportation Easement Corridor

HGM Water Quality Sites (Table 4-1)

ADF&G Water Quality Sites (Table 4-2)

Contour (100')

Meridian: SEWARD

CIRI

COOK INLET REGIONAL, INC.

WATER QUALITY DATA
COLLECTION SITES

ENVIRONMENTAL INFORMATION DOCUMENT

SCALE:

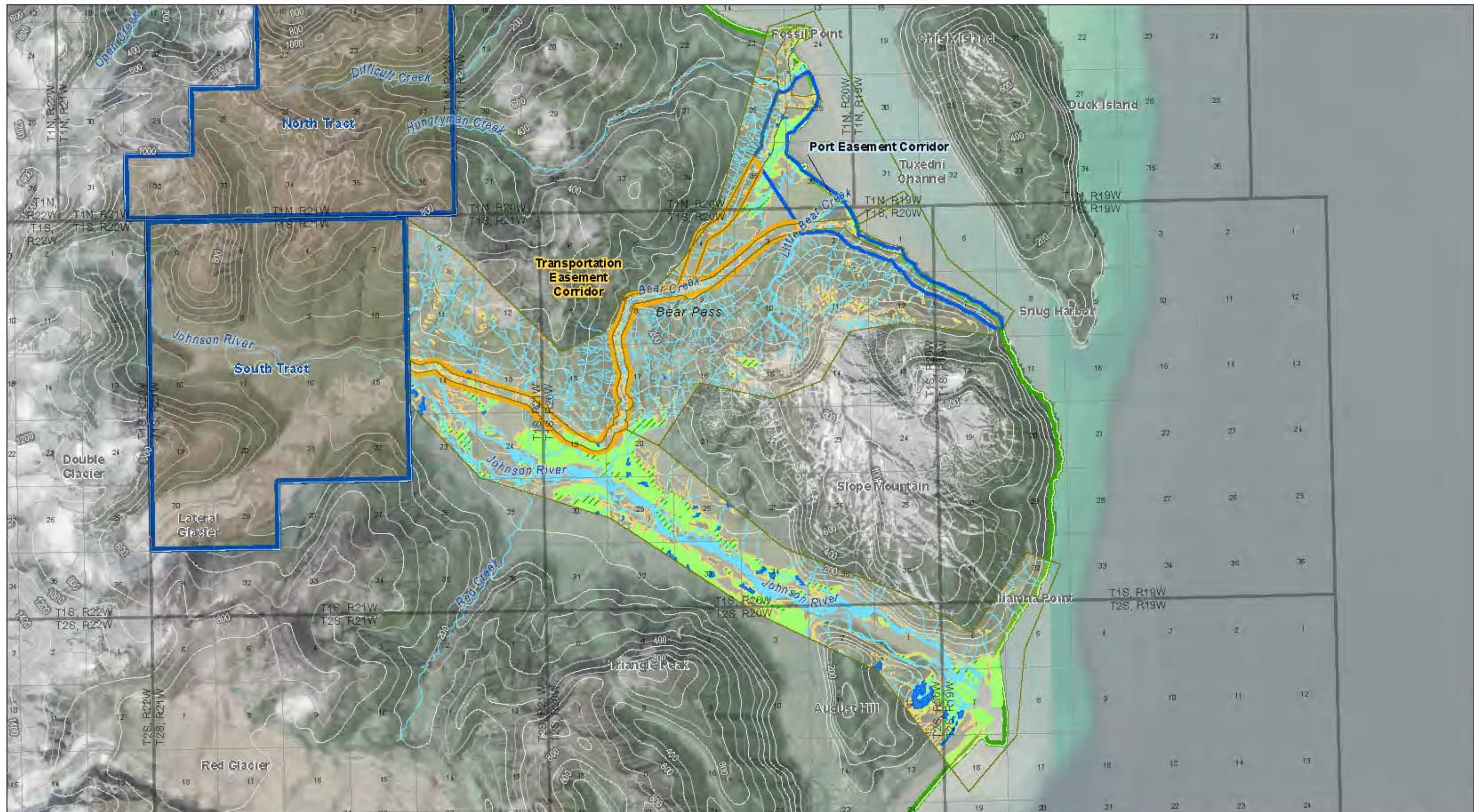
0 0.5 1 2 Miles

0 0.75 1.5 3 Kilometers

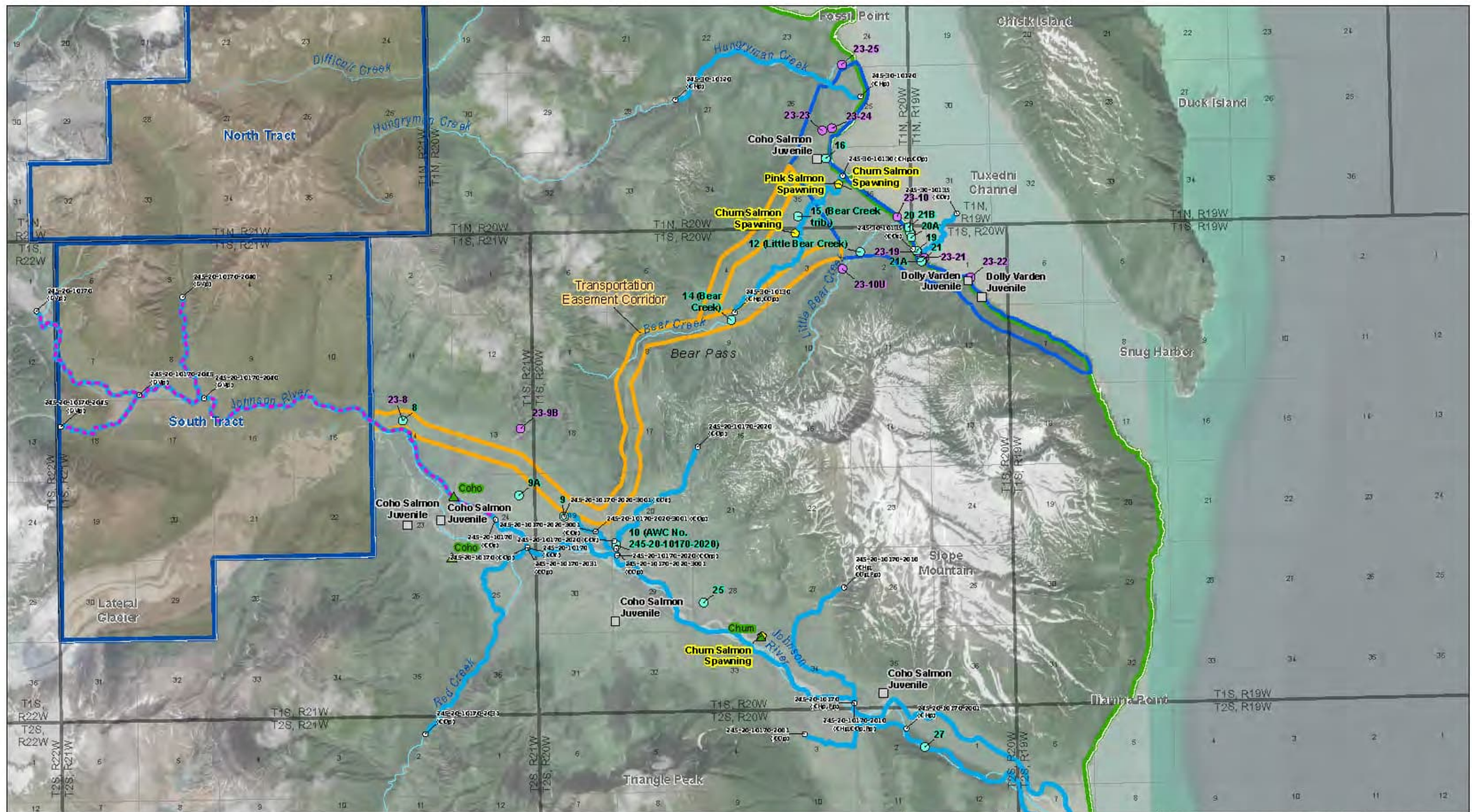
FIGURE:

3

ORNR-CIRI0010.aprx, 5/16/2024, R04



<ul style="list-style-type: none"> Johnson Tracts CIRI Conveyed Land Lake Clark National Park & Preserve 	Easement Corridor <ul style="list-style-type: none"> Port Easement Corridor Transportation Easement Corridor 	<ul style="list-style-type: none"> Contour (100') Johnson Tract Wetland Study Areas 	Wetland Status <ul style="list-style-type: none"> Wetland Wetland - Questionable Upland Upland - Questionable Relatively Permanent Water Traditional Navigable Water; Waterbody 	<p>PROJECT LOCATION</p>	<div> </div> <div> AQUATIC RESOURCES PLANNING-LEVEL MAPPING OVERVIEW <small>ENVIRONMENTAL INFORMATION DOCUMENT</small> </div> <div> SCALE: 0 0.5 1 2 Miles 0 0.75 1.5 3 Kilometers </div> <div> FIGURE: 4 </div>
---	---	---	--	-------------------------	--



- Johnson Tracts
- CIRI Conveyed Land
- Lake Clark National Park & Preserve

- Easement Corridor
- Port Easement Corridor
- Transportation Easement Corridor

- ADF&G Anadromous Waters Catalog Location
- ADF&G Anadromous Waters Catalog Stream
- ADF&G Anadromous Waters Dolly Varden Only

- ADF&G Sample Site (2023)
- ADF&G Sample Site (2022)

- NPS JR Aerial Survey 2023
- NPS Aquatic Resource Permit (ARP) SF 2022
- NPS Aquatic Resource Permit (ARP) SF 2023



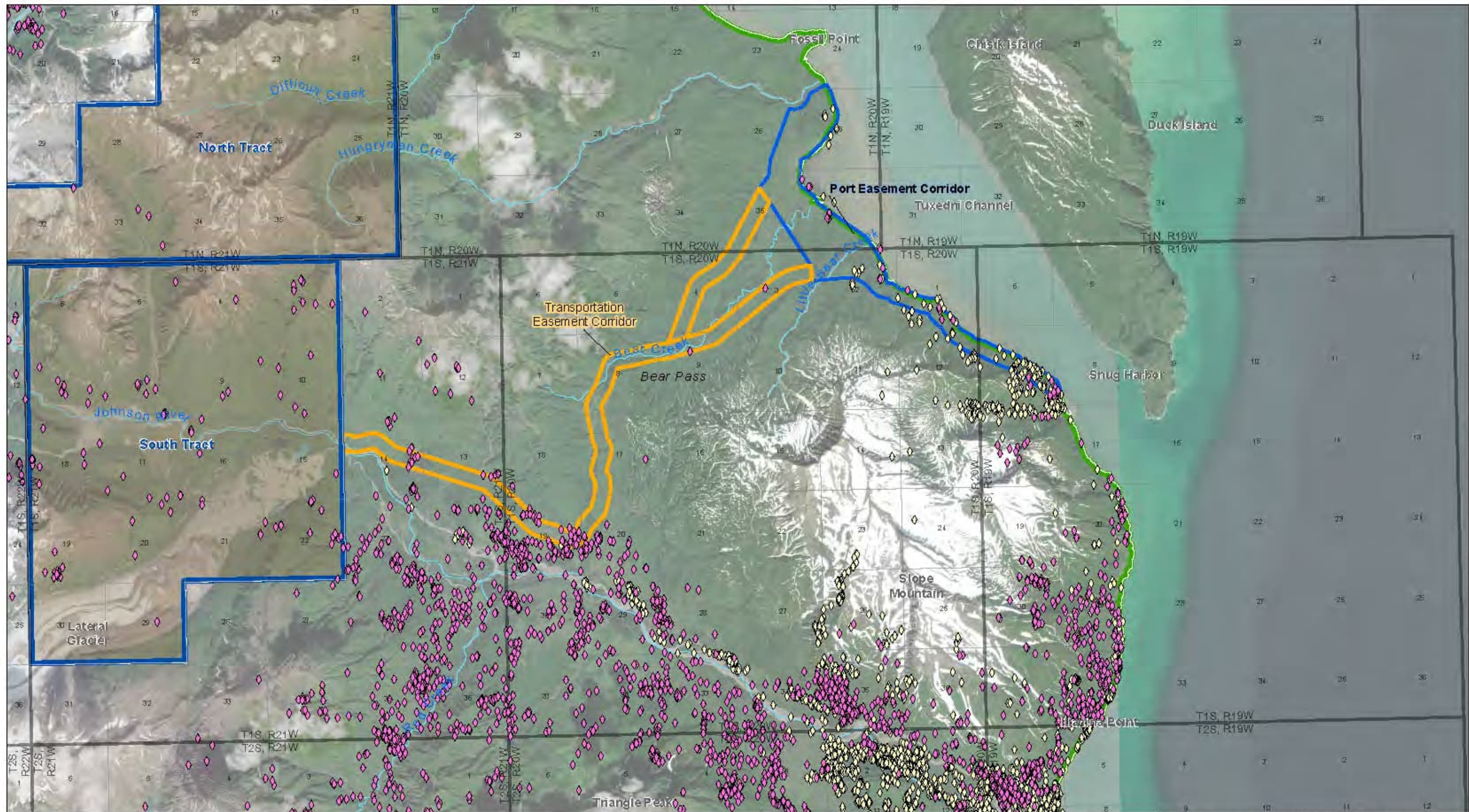
ANADROMOUS WATERS CATALOG STREAMS AND 2022-2023 SAMPLING SITES (ADF&G, NPS)

ENVIRONMENTAL INFORMATION DOCUMENT

SCALE: 0 0.5 1 2 Miles
0 0.75 1.5 3 Kilometers

FIGURE: 5

MERIDIAN: SEWARD



- Johnson Tracts
- CIRI Conveyed Land
- Lake Clark National Park & Preserve

- Easement Corridor**
- Port Easement Corridor
 - Transportation Easement Corridor

- Bear Location Tracks (2022)
- Bear Location Tracks (2023)

MERIDIAN: SEWARD

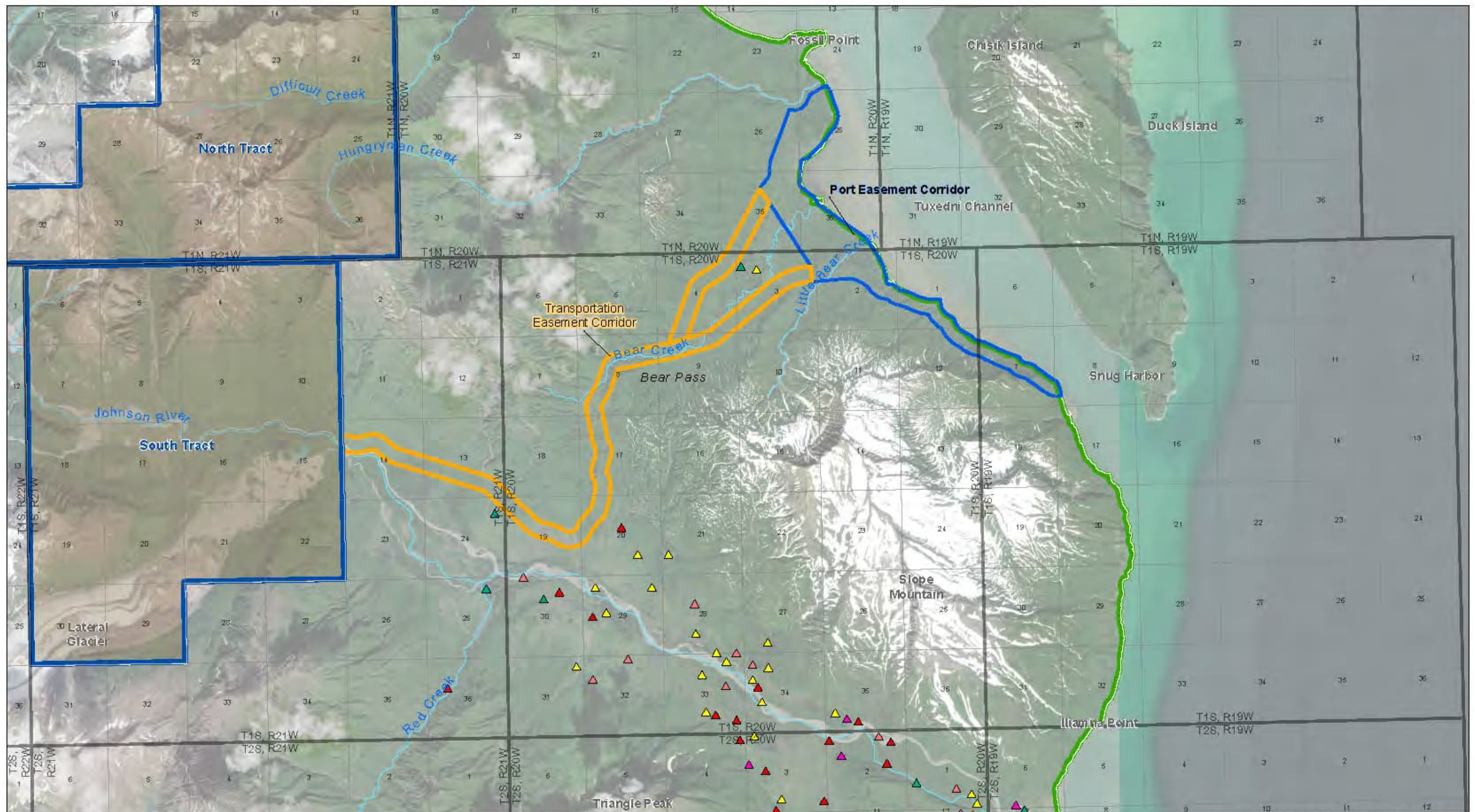


LOCATION TRACKS OF COLLARED BLACK AND BROWN BEARS BY YEAR 2022-2023 (NPS)

ENVIRONMENTAL INFORMATION DOCUMENT

SCALE: 0 0.5 1 2 Miles
0 0.75 1.5 3 Kilometers

FIGURE: 6



- Johnson Tracts**
- Johnson Tracts
 - Ciri Conveyed Land
 - Lake Clark National Park & Preserve
- Easement Corridor**
- Port Easement Corridor
 - Transportation Easement Corridor

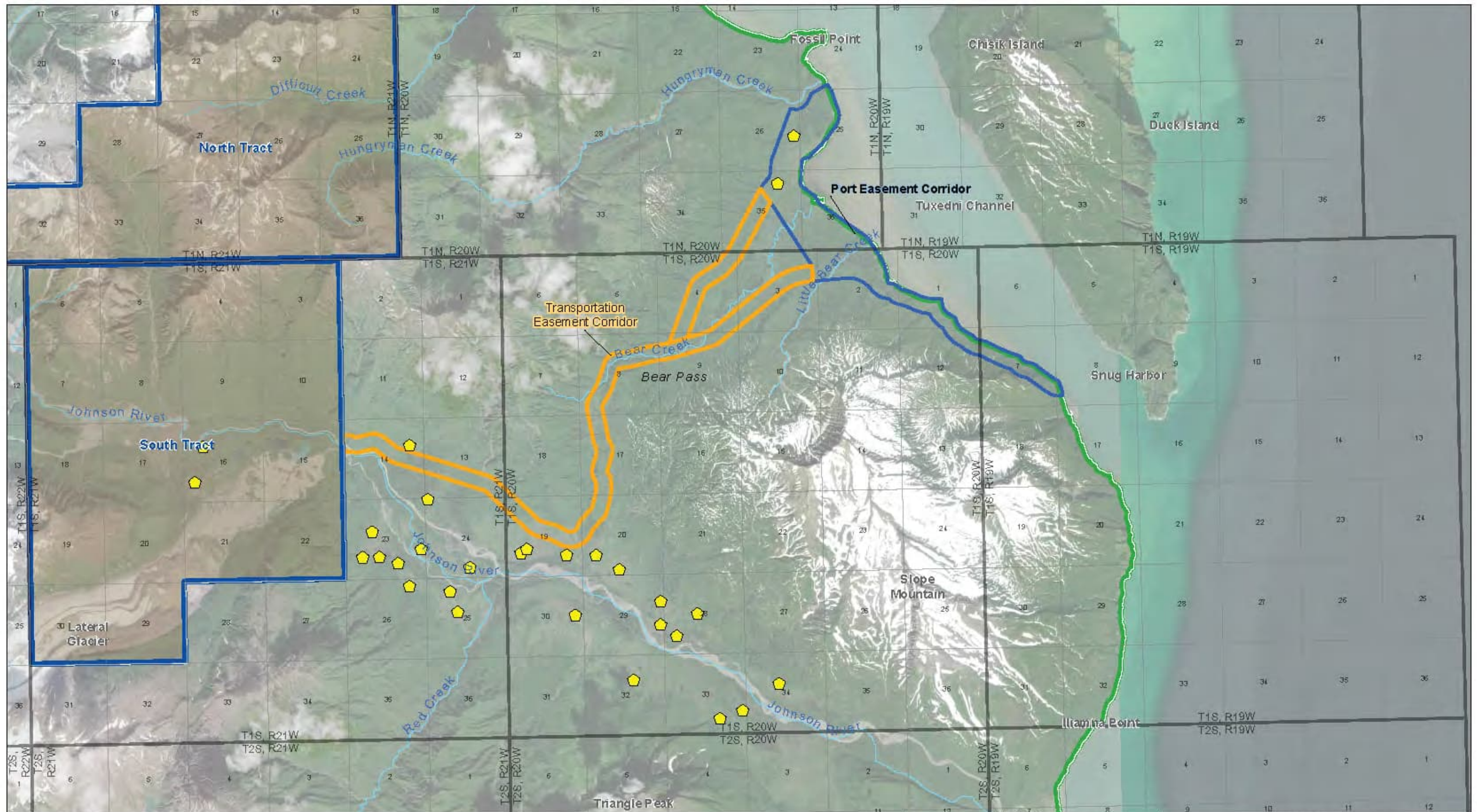
- Aerial Moose Observation (2019)
- Aerial Moose Observation (2020)
- Aerial Moose Observation (2021)
- Aerial Moose Observation (2022)
- Aerial Moose Observation (2023)



MOOSE AERIAL SURVEY OBSERVATION LOCATIONS 2019-2023 (NPS)

SCALE: 0 0.5 1 2 Miles
0 0.75 1.5 3 Kilometers

FIGURE:
7



Johnson Tracts

Ciri Conveyed Land

Lake Clark National Park & Preserve

Easement Corridor

Port Easement Corridor

Transportation Easement Corridor

Aerial Observation Beaver Lodge Location

MERIDIAN: SEWARD



BEAVER LODGE AERIAL SURVEY OBSERVATION LOCATIONS 2023 (NPS)

ENVIRONMENTAL INFORMATION DOCUMENT

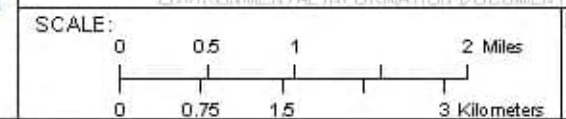
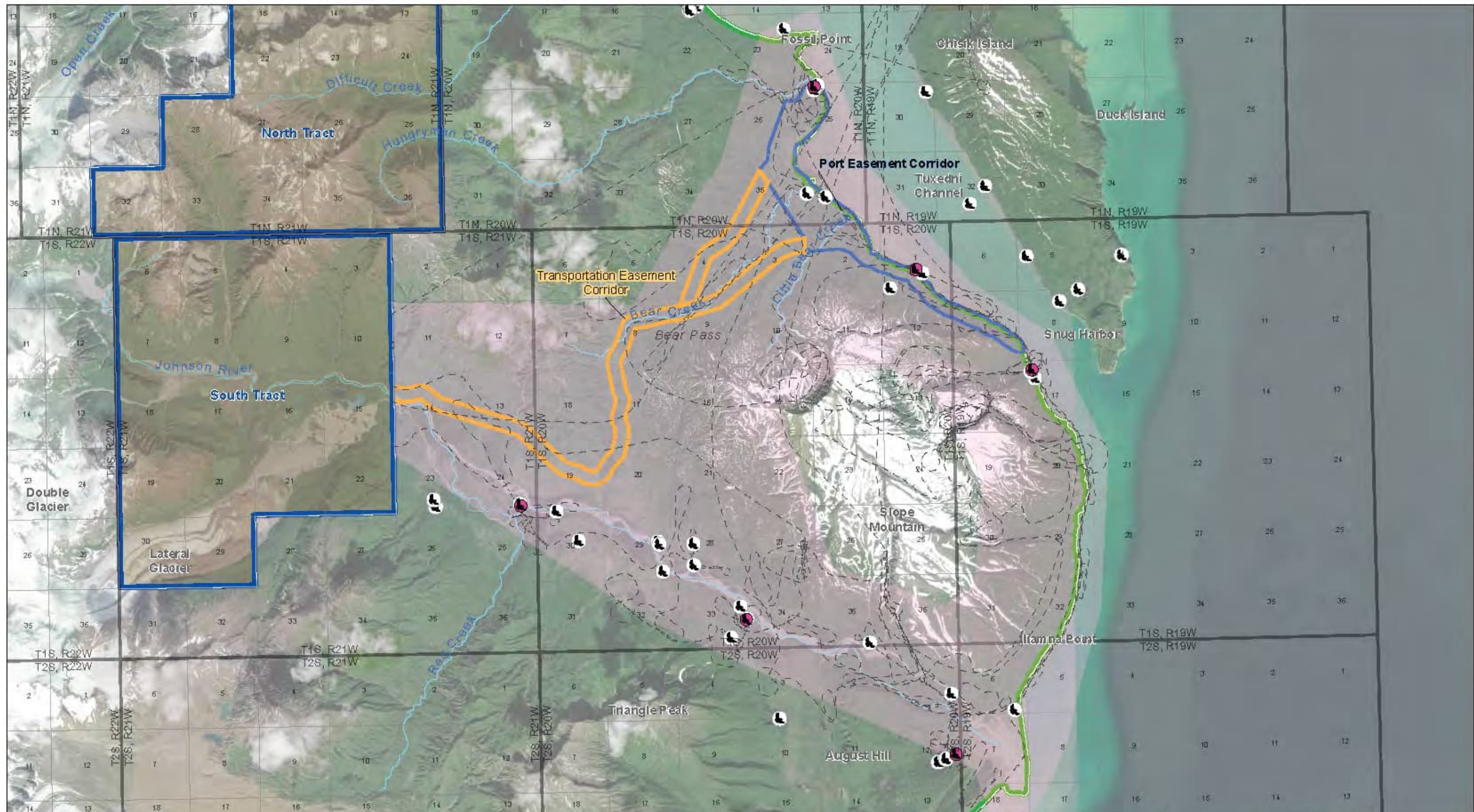


FIGURE:

8



Johnson Tracts

CIRI Conveyed Land

Lake Clark National Park & Preserve

Easement Corridor

Port Easement Corridor

Transportation Easement Corridor

2022 Survey Identified Bald Eagle Nest

Previously Mapped Eagle Nests (LCP)

2022 Survey Tracklines

2022 Raptor Study Area

BALD EAGLE NEST LOCATIONS

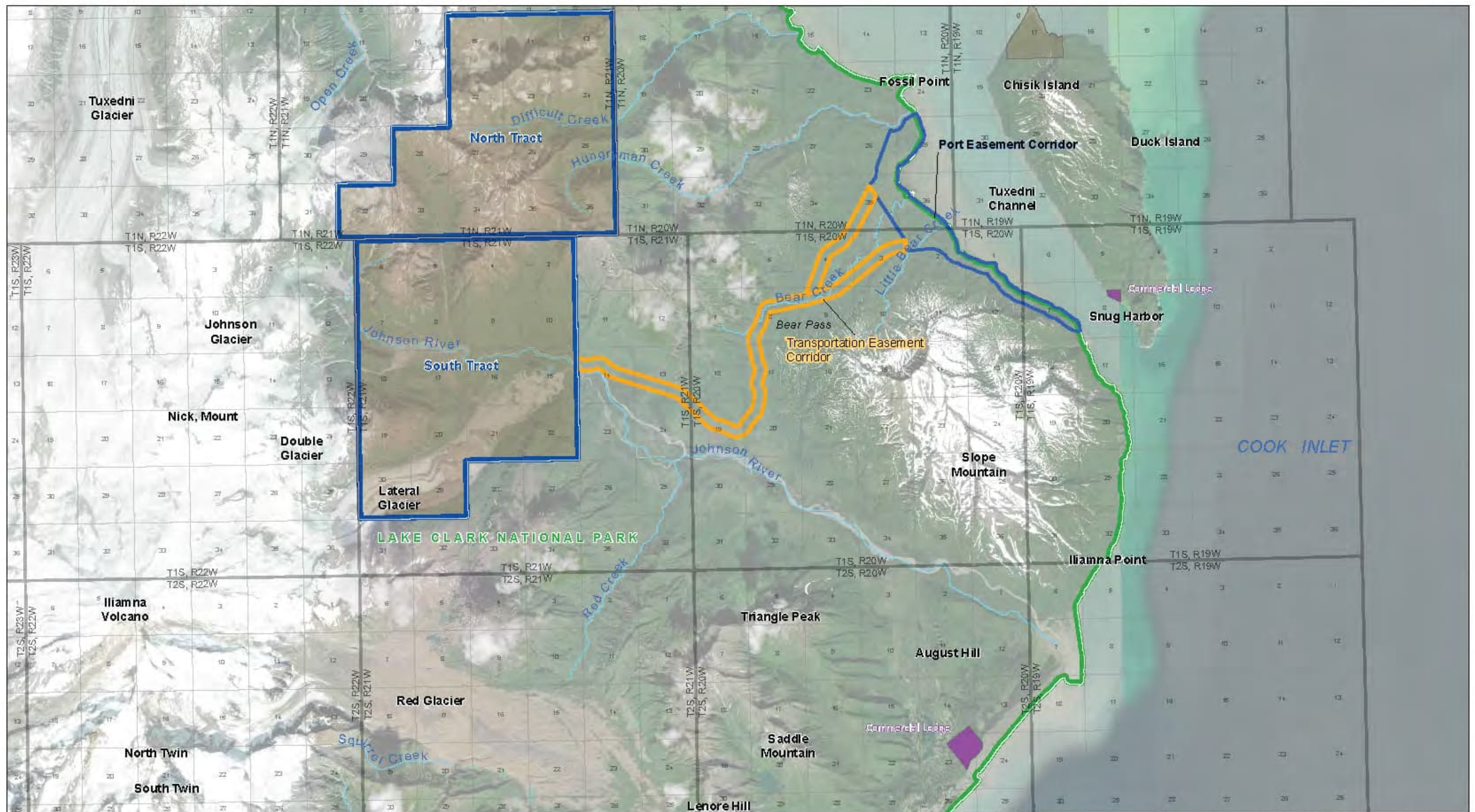
ENVIRONMENTAL INFORMATION DOCUMENT

SCALE: 0 0.5 1 2 Miles
0 0.75 1.5 3 Kilometers

FIGURE: 9

MERIDIAN: SEWARD

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- | | | |
|-------------------------------------|----------------------------------|------------------|
| Johnson Tracts | Port Easement Corridor | Commercial Lodge |
| CIRI Conveyed Land | Transportation Easement Corridor | |
| Lake Clark National Park & Preserve | | |

MERIDIAN: SEWARD



COMMERCIAL LODGES IN VICINITY OF PROPOSED EASEMENT CORRIDORS

ENVIRONMENTAL INFORMATION DOCUMENT

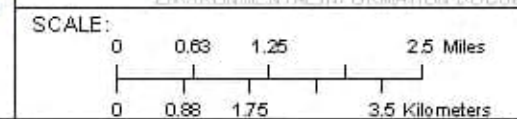
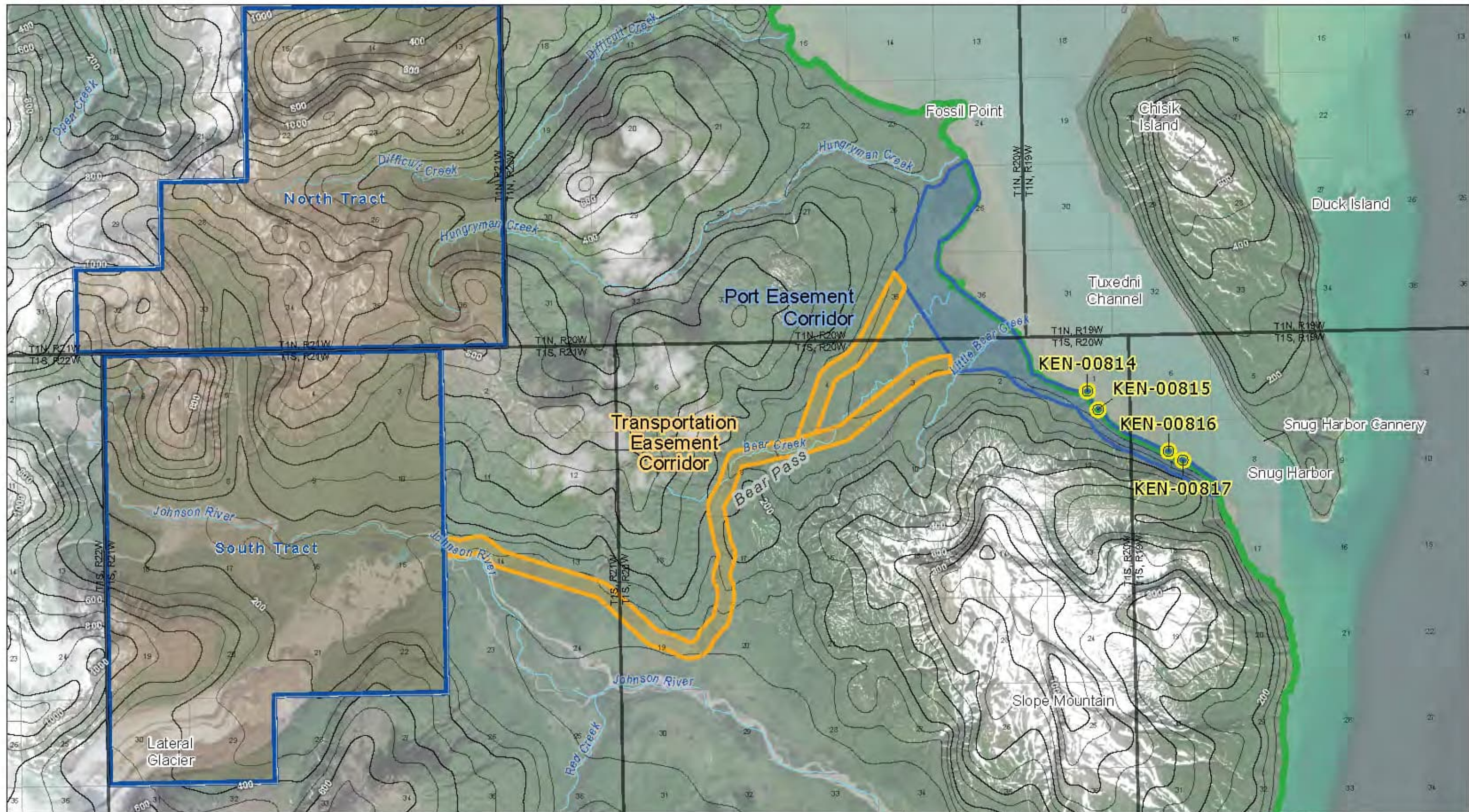


FIGURE:
10



Easement Corridor

- Port Easement Corridor
- Transportation Easement Corridor

- Lake Clark National Park & Preserve
- Contour (100')



Historic-era cultural structures (generalized to protect true location)

MERIDIAN: SEWARD

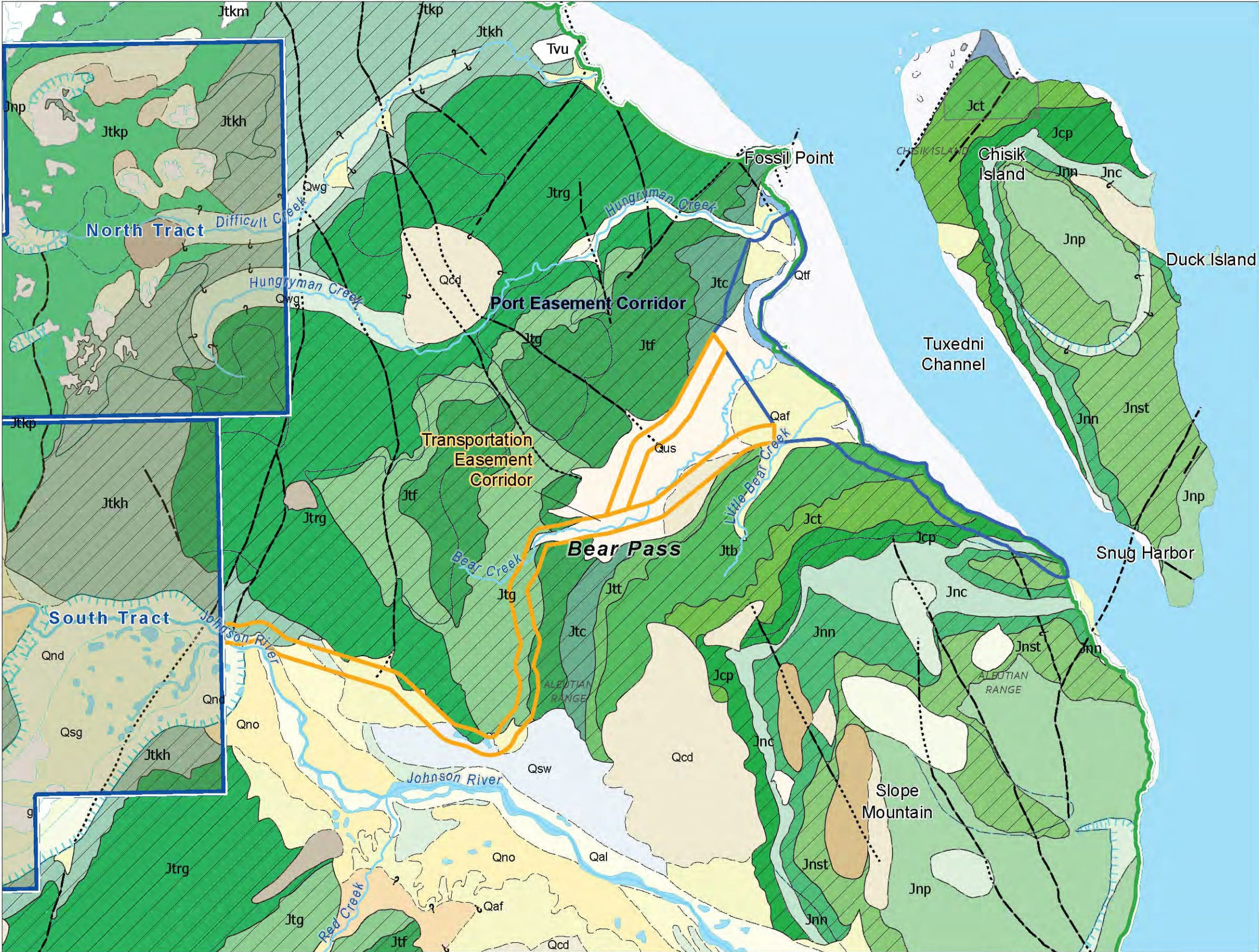


CULTURAL RESOURCES

SCALE: 0 0.8 1.6 Miles
0 1.25 2.5 Kilometers

FIGURE:
11

- Regional Geology**
- Water
 - Jnp - Pomeroy Arkose Member
 - Jnn - Northeast Creek Sandstone Member
 - Jnst - Snug Harbor Siltstone Member
 - Jnc - Chisik Conglomerate Member
 - Jcp - Chinitna Formation, Paveloff Siltstone Member
 - Jct - Chinitna Formation, Tonnie Siltstone Member
 - Jtb - Tuxedni Group, Bowser Formation
 - Jtt - Tuxedni Group, Twist Creek Siltstone
 - Jtc - Tuxedni Group, Cynthia Falls Sandstone
 - Jtf - Tuxedni Group, Fitz Creek Siltstone
 - Jtg - Tuxedni Group, Gaikema Sandstone
 - Jtrg - Tuxedni Group, Red Glacier Formation
 - Jtkh - Talkeetna Formation, Horn Mountain Tuff Member
 - Jtkp - Talkeetna Formation, Portage Creek Agglomerate
- Regional Surficial Deposits**
- water
 - g - Glaciers and permanent icefields (Holocene)
 - Qtf - Modern tidal flat and estuarine deposits (Holocene)
 - Qal - Alluvium (Holocene)
 - Qaf - Alluvial fan deposits (Quaternary)
 - Qcd - Colluvial deposits, undivided (Quaternary)
 - Qsw - Swamp deposits (Quaternary)
 - Qsf - Solifluction deposits (Quaternary)
 - Qnd - Moraines of Neoglacial and modern glaciers
 - Qno - Outwash deposits (Holocene)
 - Qus - Surficial deposits, undivided (Quaternary)
 - Qls - Landslide deposits (Quaternary)
 - Qat - Terrace deposits (Quaternary)
 - Qbd - Beach deposits (Quaternary)
 - Qwg - Undifferentiated glacial deposits of Late Wisconsin
 - Qsg - Superglacial drift (Holocene)



- Contacts**
- known or certain
 - known or certain, internal
 - approximate
 - approximate, internal
 - inferred and queried
 - inferred and queried, internal
- Easement Corridor**
- Port Easement Corridor
 - Transportation Easement Corridor

- Contacts**
- quadrangle boundary, internal
 - concealed, internal
 - ice or glacial, approximate
 - water or shoreline
- Faults**
- normal fault, approximate
 - normal fault, inferred
- Glacial Feature Lines**
- moraine crest, approximate
 - limit of glacial deposits, approximate
- MERIDIAN: SEWARD

COOK INLET REGIONAL, INC.

PALEONTOLOGICAL RESOURCES

ENVIRONMENTAL INFORMATION DOCUMENT

SCALE: 0 0.5 1 2 Miles
0 0.75 1.5 3 Kilometers

FIGURE: 12

ORNR/CIRI0011.aprx, 3/25/2024, R01

APPENDICES

Appendix A. Summary of Options

Appendix A. Summary of Johnson Tract to tidewater transportation and port easement reconnaissance and evaluation studies.

Scope of Work	Route Options Evaluated	Conclusions
Report: Johnson River Access Road Reconnaissance Project 1992 Author: Prepared by Peratrovich, Nottingham and Drage, Inc. (PND) for Hunt, Ware and Proffett. November 1992		
<p>Perform a brief access road route reconnaissance of two possible routes from Johnson Tract to Cook Inlet tidewater. The primary source of information was helicopter survey.</p>	<p>The two routes that would share a common alignment along the upper Johnson River but diverge near the base of Slope Mountain were investigated.</p> <p>Johnson River Valley route would start at the Johnson Tract and then proceed directly down the length of the Johnson River Valley to Cook Inlet tidewater.</p> <p>Bear Creek Valley route would start at the Johnson Tract down the upper Johnson River Valley, then proceed over a pass to the Bear Creek Valley, and then down Bear Creek Valley to tidewater at the Tuxedni Channel.</p>	<p>The conclusions from this reconnaissance study included:</p> <p>The lower Johnson River Valley route crosses several wetland areas. This and other geographical factors make this route less desirable than the Bear Creek Valley route.</p> <p>The Bear Creek Valley route would be viable but road construction is constrained by steep grades crossing the pass between the Johnson River Valley and the Bear Creek Valley.</p> <p>The report concluded that, overall, the Bear Creek route appeared to be the more desirable of the two options studied.</p>

Report: Johnson Tract Transportation and Port Easements Identification Process, Environmental Analysis Document Author: Prepared by CIRI and Westmin Resources, Ltd for U.S. Department of the Interior Secretary Bruce Babbitt, December, 1993 and updated in June, 1994.		
<p>Conduct a comprehensive assessment of easement options, including a description of environmental resources and potential impacts of the routing options in the study area.</p> <p>Analyze four easement alternatives using three criteria: technical feasibility, environmental reasonableness, and economic viability.</p> <p>This CIRI/Westmin document includes a matrix of potential environmental impacts associated with each of the easement options considered. The impact matrix provides impact information on a resource-by-resource format so that the impacts associated with each easement option can be easily compared.</p>	<p>Four potential easement options were initially considered, with a fifth identified late in the process but not evaluated.</p> <p>One route option would start from the Johnson Tract, follow down the upper Johnson River and continue down the Johnson River to Cook Inlet tidewater.</p> <p>The three other routing options would start from the Johnson Tract, proceed down the upper Johnson River and then change course to pass through Bear Creek Valley to tidewater at Tuxedni Channel.</p>	<p>The analysis confirmed that any transportation easement would have to proceed down the Johnson River for at least the first 7.9 miles (12.7 km) on the north side of the valley to avoid crossing the Johnson River.</p> <p>The option along the length of the Johnson River was determined to not meet any of the selection criteria and this option was eliminated from further consideration as a viable easement option.</p> <p>Two of the options that passed through the Bear Creek Valley were designated as co-preferred options, stating that designating these two options as co-preferred “would be in the best interests of CIRI, Westmin, and the NPS at this time.”</p> <p>The report eliminated consideration of rail or pipeline transportation and focused on road options.</p>

Scope of Work	Route Options Evaluated	Conclusions
---------------	-------------------------	-------------

Report: Preliminary Geotechnical Site Work and Geophysical Surveying Johnson River Project Author: Prepared by Golder Associates for Westmin Resources, Limited. October 1995		
<p>Conduct geotechnical, hydrological, and geophysical investigations of potential Johnson Tract easement locations. The field work was carried out by Golder in August, 1995 concurrent with the Westmin summer exploration program.</p> <p>The evaluation of easement options was focused on identifying constraints from an engineering and constructability perspective for each option.</p> <p>The evaluation was based on review of existing information collected from previous study projects, interpretation of aerial photographs, field reconnaissance by the Golder team, and a marine geophysical survey.</p>	<p>Four transportation route options were considered, all similar to those evaluated in the 1993–94 Westmin analysis.</p> <p>One route option would continue from the Johnson Tract down the length of the Johnson River to Cook Inlet tidewater.</p> <p>The three other routing options would start from the Johnson Tract, move down the upper Johnson River and then change course through the Bear Creek Valley to tidewater at Tuxedni Channel.</p>	<p>The report concluded that the routing option down the length of the Johnson River was not viable.</p> <p>The remainder of the Golder report focused on engineering and construction aspects of the most viable of the Bear Creek Valley route options to Tuxedni Channel tidewater.</p>

Report: Johnson Tract Project Preliminary Access Routes Reconnaissance, 2022 Fieldwork Summary and Observations Author: Prepared by RECON LLC for HighGold Mining Inc., January 18, 2023		
<p>Conduct a preliminary engineering evaluation of two potential easement route options, exploration support facility locations, and port sites.</p>	<p>Two potential access routes were evaluated based on past studies and helicopter aerial reconnaissance.</p> <p>The primary focus of the reconnaissance was major stream crossings and drainages such as Johnson River and Bear Creek.</p> <p>The primary access route evaluated trends west to east from the Johnson Tract to the Tuxedni Channel through the Bear Pass.</p> <p>The Johnson River valley route was evaluated as an alternative to the Bear Pass.</p>	<p>RECON concluded that an easement through Bear Pass was a viable route from the Johnson Tract to tidewater.</p> <p>RECON recommended further evaluation of drainage crossing locations and road geometry constraints, but overall the evaluation of the Bear Pass routing option was favorable.</p> <p>The Johnson River route was deemed unfavorable due to terrain issues such as steep slopes and presence of environmental constraints.</p>

Appendix B. Water Quality Data Summary

CIRI Public Law 94-204 Easement
Environmental Information Document
Cook Inlet Region, Inc.

Notes: ¹ Analytes are by element symbol and results as total or dissolved element,
e.g., t-Al = total aluminum; d-Al = dissolved aluminum
North Bear Creek 01 is located in Bear Creek
North Bear Creek 02 is located in Little Bear Creek
South Bear Creek 01 -tributary to the Johnson River
upstream from the proposed easement
Grav cells are exceedances of the aquatic life standard

CIRI Public Law 94-204 Easement
Environmental Information Document
Cook Inlet Region, Inc.

Notes: ¹ Analytes are by element symbol and results as total or dissolved
e.g., t-Al = total aluminum; d-Al = dissolved aluminum
North Bear Creek 01 is located in Bear Creek
North Bear Creek 02 is located in Little Bear Creek
South Bear Creek 01 -tributary to the Johnson River
upstream from the proposed easement
Gray cells are exceedances of the aquatic life standard

Appendix B. Laboratory water quality results and in-situ water quality data collected from 2020 through 2023 ¹.

CIRI Public Law 94-204 Easement
Environmental Information Document
Cook Inlet Region, Inc.

Sample Stn	Site Name	Sample Type	Month	Year	Sample Date:	d-Fe	d-Pb	d-Mg	d-Mn	d-Mo	d-Ni	d-P	d-K	d-Se	d-Si	d-Ag	d-Na	d-Tl	d-Th	d-U	d-V	d-Zn
						200.8 Low Level Diss ug/L	200.8 Low Level Diss ug/L	200.8 Low Level Diss ug/L	200.8 Low Level Diss ug/L	200.8 Low Level Diss ug/L	200.8 Low Level Diss ug/L	200.8 Low Level Diss ug/L	200.8 Low Level Diss ug/L	200.8 Low Level Diss ug/L	200.8 Low Level Diss ug/L	200.8 Low Level Diss ug/L	200.8 Low Level Diss ug/L	200.8 Low Level Diss ug/L	200.8 Low Level Diss ug/L	200.8 Low Level Diss ug/L	200.8 Low Level Diss ug/L	200.8 Low Level Diss ug/L
HC-01	Hungryman Creek 01	Reg	9SEPT	2020	29-Sep-20																	
HC-01	Hungryman Creek 01	Reg	10OCT	2020	20-Oct-20																	
HC-01	Hungryman Creek 01	Dupe	6JUN	2021	27-Jun-21																	
HC-01	Hungryman Creek 01	Reg	6JUN	2021	27-Jun-21																	
HC-01	Hungryman Creek 01	Dupe	7JUL	2021	20-Jul-21																	
HC-01	Hungryman Creek 01	Reg	7JUL	2021	20-Jul-21																	
HC-01	Hungryman Creek 01	Reg	8AUG	2021	25-Aug-21																	
HC-01	Hungryman Creek 01	Reg	9SEPT	2021	22-Sep-21																	
HC-01	Hungryman Creek 01	Reg	10OCT	2021	26-Oct-21																	
HC-01	Hungryman Creek 01	Dupe	10OCT	2021	13-Oct-21																	
HC-01	Hungryman Creek 01	Reg	7JUL	2023	7-Jul-23	20.0 U	0.100 U	536	0.100 U	0.0500 U	0.620 U	25.0 U	50.0 U	1.00 U		0.0200 U	819	0.0200 U	0.100 U	0.0500 U	1.00 U	10.0 U
HC-01	Hungryman Creek 01	Reg	8AUG	2023	5-Aug-23	20.0 U	0.100 U	842	0.100 U	0.118	0.620 U	25.0 U	50.0 U	1.00 U	2350	0.0200 U	1570	0.0200 U		0.0500 U	1.00 U	10.0 U
HC-01	Hungryman Creek 01	Reg	8AUG	2023	30-Aug-23	20.9	0.100 U	707	0.791	0.106	0.620 U	25.0 U	50.0 U	1.00 U		0.0200 U	964	0.0200 U	0.100 U	0.0500 U	1.00 U	10.0 U
HC-01	Hungryman Creek 01	Reg	9SEPT	2023	25-Sep-23	20.0 U	0.100 U	936	0.100 U	0.101	0.620 U	25.0 U	50.0 U	1.00 U		0.0200 U	1470	0.0200 U	0.100 U	0.0500 U	1.00 U	10.0 U
HC-02	Hungryman Creek 02	Reg	9SEPT	2023	25-Sep-23	20	0.100 U	1680	0.100 U	0.215	0.620 U	25.0 U	63	1.00 U		0.0200 U	2170	0.0200 U	0.100 U	0.0500 U	1.00 U	10.0 U
JT-02	Johnson River 02	Reg	9SEPT	2020	29-Sep-20																	
JT-02	Johnson River 02	Reg	10OCT	2020	20-Oct-20																	
JT-02	Johnson River 02	Reg	6JUN	2021	26-Jun-21																	
JT-02	Johnson River 02	Reg	7JUL	2021	19-Jul-21																	
JT-02	Johnson River 02	Reg	8AUG	2021	26-Aug-21																	
JT-02	Johnson River 02	Reg	9SEPT	2021	22-Sep-21																	
JT-02	Johnson River 02	Reg	10OCT	2021	26-Oct-21																	
JT-02	Johnson River 02	Reg	8AUG	2022	4-Aug-22																	
JT-02	Johnson River 02	Dupe	9SEPT	2022	14-Sep-22																	
JT-02	Johnson River 02	Reg	9SEPT	2022	14-Sep-22																	
JT-02	Johnson River 02	Reg	10OCT	2022	8-Oct-22																	
JT-02	Johnson River 02	Reg	7JUL	2023	6-Jul-23	45.9	0.100 U	600	42.4	0.21	1.05	64.5	836	1.00 U		0.0200 U	626	0.0200 U	0.100 U	0.0500 U	1.00 U	10.0 U
JT-02	Johnson River 02	Reg	8AUG	2023	5-Aug-23	49	0.100 U	595	7.51	0.519	0.620 U	25.0 U	316	1.00 U	1220	0.0200 U	666	0.0200 U		0.0500 U	1.00 U	10.0 U
JT-02	Johnson River 02	Reg	8AUG	2023	30-Aug-23	473	0.100 U	846	17.8	0.388	0.620 U	25.0 U	302	1.00 U		0.0200 U	766	0.0200 U	0.100 U	0.0500 U	1.72	10.0 U
JT-02	Johnson River 02	Reg	9SEPT	2023	26-Sep-23	20.0 U	0.100 U	1190	12.2	0.798	0.620 U	25.0 U	438	1.00 U		0.0200 U	1270	0.0200 U	0.100 U	0.0500 U	1.00 U	10.0 U
NBC-01	N. Bear Creek 01	Reg	8AUG	2022	4-Aug-22																	
NBC-01	N. Bear Creek 01	Reg	9SEPT	2022	14-Sep-22																	
NBC-01	N. Bear Creek 01	Reg	10OCT	2022	8-Oct-22																	
NBC-01	N. Bear Creek 01	Reg	7JUL	2023	7-Jul-23	134	0.100 U	1380	1.35	0.194	0.620 U	25.0 U	312	1.00 U		0.0200 U	2290	0.0200 U		0.0500 U	1.00 U	10.0 U
NBC-01	N. Bear Creek 01	Reg	9SEPT	2023	25-Sep-23	20.0 U	0.100 U	1900	0.212	0.239	0.620 U	25.0 U	318	1.00 U		0.0200 U	2940	0.0200 U	0.100 U	0.0500 U	1.00 U	10.0 U
NBC-02	N. Bear Creek 02	Reg	8AUG	2022	4-Aug-22																	
NBC-02	N. Bear Creek 02	Reg	9SEPT	2022	14-Sep-22																	
NBC-02	N. Bear Creek 02	Reg	10OCT	2022	8-Oct-22																	
NBC-02	N. Bear Creek 02	Reg	7JUL	2023	7-Jul-23	47.4	0.100 U	1350	0.876	0.283	0.620 U	25.0 U	206	1.00 U		0.0200 U	2900	0.0200 U		0.0500 U	1.00 U	10.0 U
NBC-02	N. Bear Creek 02	Dupe	7JUL	2023	7-Jul-23	64	0.100 U	1380	1.09	0.298	0.620 U	25.0 U	208	1.00 U		0.0200 U	3010	0.0200 U		0.0500 U	1.00 U	10.0 U
NBC-02	N. Bear Creek 02	Reg	9SEPT	2023	25-Sep-23	20.0 U	0.100 U	2060	0.199	0.319	0.620 U	25.0 U	245	1.00 U		0.0200 U	4030	0.0200 U	0.100 U	0.0500 U	1.00 U	10.0 U
SBC-01	S. Bear Creek 01	Reg	8AUG	2022	4-Aug-22																	
SBC-01	S. Bear Creek 01	Reg	9SEPT	2022	14-Sep-22																	
SBC-01	S. Bear Creek 01	Reg	10OCT	2022	8-Oct-22																	
SBC-01	S. Bear Creek 01	Reg	7JUL	2023	7-Jul-23	81.6	0.100 U	1490	5.69	0.214	0.620 U	25.0 U	123	1.00 U		0.0200 U	1810	0.0200 U	0.100 U	0.0500 U	1.00 U	10.0 U
SBC-01	S. Bear Creek 01	Reg	9SEPT	2023	25-Sep-23	20.0 U	0.111	2430	0.100 U	0.33	0.620 U	25.0 U	128	1.00 U		0.0200 U	2780	0.0200 U	0.100 U	0.0500 U	1.00 U	10.0 U
SBC-02	S. Bear Creek 02	Reg	8AUG	2022	4-Aug-22																	
SBC-02	S. Bear Creek 02	Reg	9SEPT	2022	14-Sep-22																	
SBC-02	S. Bear Creek 02	Reg	10OCT	2022	8-Oct-22																	

Notes: ¹ Analytes are by element symbol and results as total or dissolved, e.g., t-Al = total aluminum; d-Al = dissolved aluminum
North Bear Creek 01 is located in Bear Creek
North Bear Creek 02 is located in Little Bear Creek
South Bear Creek 01 -tributary to the Johnson River
upstream from the proposed easement
Gray cells are exceedances of the aquatic life standard