

**TABLE 6.3-1
IMPACTS OF ALTERNATIVES 2, 3, 4, AND 5 ON PLANKTON AND MARINE INVERTEBRATES**

Action/Event	Frequency	Duration	Scope	Direct Impacts	Indirect Impacts
Ice Roads – Construction	Once	All winter	N/A	None anticipated.	None anticipated.
Ice Roads – Operations	Annually	All winter	N/A	None anticipated.	None anticipated.
Island – Construction	Once	3 Months	Plankton: Local in waters adjacent to Seal Island. Marine Invertebrates: Within the island footprint.	Negligible - To phytoplankton from temporary increase in turbidity due to gravel placement; to plankton and marine invertebrates due to propwash from tugs and dewatering discharges at Seal Island. Minor - To zooplankton and marine invertebrates from temporary increase in turbidity due to gravel placement; to marine invertebrates in soft substrate and hard-bottom communities from burial, trenching/ backfilling, installation of island slope protection system, displacement, and increased turbidity.	None anticipated.
Island - Operation/ Maintenance	Annually	15 years	Plankton: Waters adjacent to Seal Island. Marine Invertebrates: On the island slopes.	None - From island discharges. Minor - To benthic communities from disturbance due to maintenance/repair of island, resulting in temporary losses of numbers at repair locations.	None anticipated.
Offshore Pipeline – Construction	Once	3 Months (Winter)	Temporary disturbance of 21.4 to 36.7 acres (8.7 to 14.9 hectares) of benthic habitat depending on alternative.	Minor - To plankton and marine invertebrates from habitat loss due to disturbance, burial, and plume from spoils on melting ice; from loss in production of epontic community and other marine invertebrates.	None anticipated.
Offshore Pipeline – Operation/ Maintenance	Rare	15 years	Waters adjacent to area requiring maintenance activity.	Negligible - To plankton and marine invertebrates, depending upon maintenance activities, a temporary loss of benthic invertebrates would occur at the maintenance site.	None anticipated.

TABLE 6.3-1 (Cont.)
IMPACTS OF ALTERNATIVES 2, 3, 4, AND 5 ON PLANKTON AND MARINE INVERTEBRATES

Action/Event	Frequency	Duration	Scope	Direct Impacts	Indirect Impacts
Onshore Pipeline – Construction	Once	6 Months (Winter)	Habitat loss of benthic habitat for Alternative 5.	None anticipated.	None anticipated.
Onshore Pipeline – Operation/Maintenance	Weekly	15 years	N/A	None anticipated.	None anticipated.
Gravel Mining Construction Operation	Once Occasionally	3 Months (Winter) Unknown	N/A	None anticipated.	None anticipated.
Large Oil Spill	Rare	Unknown	Marine water areas contacted by oil - up to 200 miles (322 km) from the release site.	Minor - Mortality of individuals contacted resulting in temporary (few days) reduction in population numbers in the affected area.	None anticipated.
Abandonment	Once	3 to 6 Months	Hard bottom community on island slopes.	Minor - To plankton and marine invertebrates from impacts similar to those from construction; to hard bottom community from loss of habitat on island slopes.	None anticipated.

Notes: km = Kilometers
 N/A = Not applicable

TABLE 6.4-1
COMPOSITION OF FISH SPECIES CAUGHT IN NEARSHORE WATERS
1985-1994 Endicott Fish Monitoring Studies

Common Name	Scientific Name	Inupiaq Name	Total Catch ¹	Percent
Anadromous/Amphidromous				
Arctic cisco	<i>Coregonus autumnalis</i>	<i>Qaaktaq</i>	805,241	11.8
Least cisco	<i>Coregonus sardinella</i>	<i>Iqalusaaq</i>	277,699	4.1
Char	<i>Salvelinus</i> sp.	<i>Iqalukpik</i>	149,811	2.2
Broad whitefish	<i>Coregonus nasus</i>	<i>Aanaakliq</i>	141,297	2.1
Rainbow smelt	<i>Osmerus mordax</i>	<i>Ilhuagniq</i>	105,569	1.5
Humpback whitefish	<i>Coregonus pidschian</i>	<i>Pikuktuuq</i>	7,040	0.1
Hybrid cisco	<i>Coregonus</i> sp.	<i>Aanaakliq</i>	437	<0.1
Pink salmon	<i>Onchorhynchus gorbuscha</i>	<i>Amaqtuuq</i>	244	<0.1
Chum salmon	<i>Onchorhynchus keta</i>	<i>Iqalugruaq</i>	29	<0.1
Bering cisco	<i>Coregonus laurettae</i>	<i>Qaaktaq</i>	2	<0.1
Freshwater				
Ninespine stickleback	<i>Pungitius pungitius</i>	NIR	22,086	0.3
Round whitefish	<i>Prosopium cylindraceum</i>	<i>Aanaakliq</i>	17,380	0.3
Arctic grayling	<i>Thymallus arcticus</i>	<i>Sulukpaugaq</i>	6,478	0.1
Burbot	<i>Lota lota</i>	<i>Tittaaliq</i>	97	<0.1
Threespine stickleback	<i>Gasterosteus aculeatus</i>	NIR	89	<0.1
Slimy sculpin	<i>Cottus cognatus</i>	<i>Kanayuk</i>	50	<0.1
Marine				
Arctic cod	<i>Boreogadus saida</i>	<i>Iqalugaq</i>	4,410,172	64.4
Fourhorn sculpin	<i>Myoxocephalus quadricornis</i>	<i>Kanayuk</i>	658,804	9.6

TABLE 6.4-1 (Cont.)
COMPOSITION OF FISH SPECIES CAUGHT IN NEARSHORE WATERS
1985-1994 Endicott Fish Monitoring Studies

Common Name	Scientific Name	Inupiaq Name	Total Catch ¹	Percent
Marine (Cont.)				
Arctic flounder	<i>Liopsetta glacialis</i>	<i>Natagnak</i>	204,048	3.0
Saffron cod	<i>Eleginus navaga</i>	NIR	26,415	0.4
Capelin	<i>Mallotus villosus</i>	<i>Pagmaksraq</i>	8,267	0.1
Snailfish	<i>Liparis</i> sp.	NIR	5,197	0.1
Pacific herring	<i>Clupea pallasii</i>	<i>Uksiuktuuk</i>	233	<0.1
Great sculpin	<i>Myoxocephalus polycanthocephalus</i>	<i>Kanayuk</i>	42	<0.1
Pacific sandlance	<i>Ammodytes hexapterus</i>	NIR	26	<0.1
Wolf-eel	<i>Annarhichthys ocellatus</i>	NIR	14	<0.1
Starry flounder	<i>Platichthys stellatus</i>	<i>Natagnak</i>	6	<0.1
Prickleback	<i>Stichaeidae</i>	NIR	5	<0.1
Rock gunnel	<i>Pholis gunnelus</i>	NIR	3	<0.1
Kelp greenling	<i>Hexagrammos decagrammus</i>	NIR	3	<0.1
Eelpout	<i>Zoarcidae</i>	NIR	2	<0.1
Alaska plaice	<i>Pleuronectes quadrituberculatus</i>	NIR	1	<0.1
Lumpsucker	<i>Cyclopteridae</i>	<i>Kaviksuak</i>	1	<0.1

Notes: 1 = During 1985-1994, out to water depths of 9.8 feet (3 m) deep
 NIR = No information received
 sp. = Species

Source: Fechhelm et al., 1995:7; Webster and Zibell, 1970:1-277

TABLE 6.4-2
RELATIVE ABUNDANCE OF COMMON SPECIES
FROM DIRECTIONAL FISH TRAP CATCHES IN GWYDYR BAY
COMPARED TO THE OVERALL ENDICOTT STUDY AREA

Species	Gwydyr Bay ¹ (percent)	Endicott Total ² (percent)
Arctic cisco	8.0	12.5
Least cisco	17.1	4.3
Broad whitefish	2.0	2.2
Char	4.5	2.3
Arctic cod	41.7	68.4
Fourhorn sculpin	26.8	10.2

Sources: 1 = Compiled from: Cannon et al., 1987:Appendix B
2 = Compiled from: Fechhelm et al., 1995:7

**TABLE 6.4-3
FISH SPECIES CAUGHT BY VARIOUS SAMPLING PROGRAMS,
NORTHSTAR UNIT AND ADJACENT OFFSHORE AREAS**

Location	Water Depth	Type of Sampling	Common Name	Scientific Name	Catch	Percent	Reference
Eastern Chukchi and Western Beaufort Sea	130-1,300 ft (40-400 m)	Bottom trawl	Arctic cod	<i>Boreogadus saida</i>	227	35	1
			Canadian eelpout	<i>Lycodes polaris</i>	121	19	
			Twohorn sculpin	<i>Icelus bicornis</i>	74	11	
			Hamecon	<i>Artediellus scaber</i>	36	6	
			Arctic Alligatorfish	<i>Aspidophoroides olriki</i>	36	6	
			Snailfish	<i>Liparis sp.</i>	34	5	
			Leatherfin lumpsucker	<i>Eumicrotremus derjugini</i>	29	4	
			Fish doctor	<i>Gymnelis viridis</i>	27	4	
			Spatulate sculpin	<i>Icelus spatula</i>	20	3	
			Slender eelblenny	<i>Lumpenus fabricii</i>	11	2	
			Eelpout	<i>Lycodes raridens</i>	10	2	
			Arctic staghorn sculpin	<i>Gymnocanthus tricuspis</i>	5	1	
			Fourline snakeblenny	<i>Eumesogrammus praecisus</i>	4	<1	
			Ribbed sculpin	<i>Triglops pingeli</i>	3	<1	
			Saddled eelpout	<i>Lycodes mucosis</i>	3	<1	
			Threespot eelpout	<i>Lycodes rossi</i>	2	<1	
			Polar cod	<i>Arctogadus glacialis</i>	1	<1	
			Stout eelblenny	<i>Lumpenus medius</i>	1	<1	
Daubed shanny	<i>Lumpenus maculatus</i>	1	<1				
Pingok Island	33-46 ft (10-14 m)	Otter trawl	Arctic cod	<i>Boreogadus saida</i>	47	30	2
			Fourhorn sculpin	<i>Myoxocephalus quadricornis</i>	43	28	
			Spotted snailfish	<i>Liparis callyodon</i>	63	41	
			Wattled eelpout	<i>Lycodes palearis</i>	1	<1	

**TABLE 6.4-3 (Cont.)
FISH SPECIES CAUGHT BY VARIOUS SAMPLING PROGRAMS,
NORTHSTAR UNIT AND ADJACENT OFFSHORE AREAS**

Location	Water Depth	Type of Sampling	Common Name	Scientific Name	Catch	Percent	Reference
Stump Island	6.5-33 ft (2-10 m)	Small mesh otter trawl	Arctic cod	<i>Boreogadus saida</i>	592	93	3
			Fourhorn sculpin	<i>Myoxocephalus quadricornis</i>	14	2	
			Slender eelblenny	<i>Lumpenus fabricii</i>	2	<1	
			Arctic cisco	<i>Coregonus autumnnalis</i>	2	<1	
			Pacific sandlance	<i>Ammodytes hexapterus</i>	8	1	
			Snailfish	<i>Liparis sp.</i>	10	2	
			Capelin	<i>Mallotis villosis</i>	10	2	
East of West dock	0-40 ft (0-12 m)	Small mesh otter trawl	Arctic cod	<i>Boreogadus saida</i>		98	4
			Kelp snailfish	<i>Liparis tunicatus</i>		<1	
			Fourhorn sculpin	<i>Myoxocephalus quadricornis</i>		<1	
			Pacific sandlance	<i>Ammodytes hexapterus</i>		<1	
			Capelin	<i>Mallotis villosus</i>		<1	
			Rainbow smelt	<i>Osmerus mordax</i>		<1	
			Least cisco	<i>Coregonus sardinella</i>		<1	
North of West dock at 0.6, 1.8, 3, and 4 miles (1, 3, 5, and 7 km)	13-30 ft (4-9 m)	Surface tow net	Cod larvae	<i>Gadid species</i>	8096	64	5
			Capelin larvae	<i>Mallotus villosus</i>	3762	30	
			Arctic cod	<i>Boreogadus saida</i>	315	2	
			Snailfish larvae	<i>Liparid sp.</i>	278	2	
			Sculpin larvae	<i>Cottid sp.</i>	130	1	
			Ninespine stickleback	<i>Pungitius pungitius</i>	11	<1	
			Arctic cisco	<i>Coregonus autumnnalis</i>	8	<1	
			Sandlance	<i>Ammodytes hexapterus</i>	2	<1	
			Least cisco	<i>Coregonus sardinella</i>	1	<1	

**TABLE 6.4-3 (Cont.)
FISH SPECIES CAUGHT BY VARIOUS SAMPLING PROGRAMS,
NORTHSTAR UNIT AND ADJACENT OFFSHORE AREAS**

Location	Water Depth	Type of Sampling	Common Name	Scientific Name	Catch	Percent	Reference
North of West Dock	6.5-30 ft (2-9 m)	Surface tow net	Arctic cod	<i>Boreogadus saida</i>	5246	80	6
			Capelin	<i>Mallotus villosus</i>	710	11	
			Arctic cisco	<i>Coregonus autumnalis</i>	413	6	
			Kelp snailfish	<i>Liparis tunicatus</i>	126	2	
			Sculpins	<i>Cottid</i> sp.	20	<1	
			Nine-spine stickleback	<i>Pungitius pungitius</i>	16	<1	
			Arctic flounder	<i>Liopsetta glacialis</i>	5	<1	
			Eelblenny	<i>Lumpenus</i> sp.	4	<1	
Boulder Patch and Narwhal Island	20-40 ft (6-12 m)	Under-ice winter sampling using gill, trammel, or trap nets	Arctic cod	<i>Boreogadus saida</i>	80	84	2
			Snailfish	<i>Liparis</i> sp.	15	16	

Notes: ft = feet
m = meters
sp. = Species

Sources: 1 = Frost and Lowry, 1983:3
2 = Craig and Haldorson, 1981:437, 454
3 = Tarbox and Spight, 1979:2-11
4 = Moulton and Tarbox, 1987:45
5 = Dames and Moore, 1989:6 (Stations 21-24)
6 = Thorsteinson et al., 1991:149-151

**TABLE 6.4-4
IMPACTS OF ALTERNATIVES 2, 3, 4, AND 5 ON MARINE AND FRESHWATER FISH**

Action/Event	Frequency	Duration	Scope	Direct Impacts	Indirect Impacts
Ice Roads - Construction	Once	All winter	N/A	None – To freshwater fish from use of freshwater to construct/complete ice roads.	None anticipated.
Ice Roads - Operations	Annually	All winter	N/A	None anticipated.	None anticipated.
Island - Construction	Once	3 Months	Footprint of island and surrounding waters.	Negligible to Minor - To marine fish from displacement and temporarily increased turbidity from gravel placement and dewatering plume.	None anticipated.
Island - Operation/ Maintenance	Annually	15 years	Approximately the island footprint.	Negligible - To marine fish from displacement and maintenance activities. Beneficial - To marine fish from increased habitat diversity as a result of hard substrate of island slope protection.	Potential long-term beneficial impact from increased habitat diversity.
Offshore Pipeline - Construction	Once	3 Months (Winter)	6 to 9 miles (9.7 to 14.5 km) of pipeline route.	Negligible – To marine and anadromous fish from temporary displacement and temporary loss of habitat; from seafloor alterations. Minor - To marine fish from burial of pipeline under floating ice causing avoidance of area.	None anticipated.
Offshore Pipeline - Operation/ Maintenance	Rare	15 years	Short lengths of pipeline route.	Minor - To marine and anadromous fish from noise and from temporary displacement during potential offshore pipeline repairs, resulting in avoidance of area.	None anticipated.

**TABLE 6.4-4 (Cont.)
IMPACTS OF ALTERNATIVES 2, 3, 4, AND 5 ON MARINE AND FRESHWATER FISH**

Action/Event	Frequency	Duration	Scope	Direct Impacts	Indirect Impacts
Onshore Pipeline - Construction	Once	6 Months (Winter)	N/A	None anticipated.	None anticipated.
Onshore Pipeline - Operation/ Maintenance	Weekly	15 years	N/A	None anticipated.	None anticipated.
Gravel Mining Construction Operation	Once Occasionally	3 Months (Winter) Unknown	Individuals, from creation of 35-acre (14 hectare) lake.	None - To freshwater and anadromous fish.	Beneficial – To freshwater and anadromous fish following site rehabilitation due to creation of additional overwintering habitat.
Large Oil Spill	Rare	Unknown	Marine and fresh water areas contacted by oil - up to 200 miles (322 km) from the release site.	Minor - Mortality of marine and anadromous fish as a result of oil toxicity effects from physiological or behavioral changes, destruction of food organisms, and habitat damage.	None anticipated.
Abandonment	Once	3 to 6 Months	Island and pipeline area.	Minor - To marine and freshwater fish similar to offshore construction.	None anticipated.

Notes: km = Kilometers
N/A = Not applicable

TABLE 6.5-1
MARINE MAMMALS OF THE BEAUFORT SEA

Common Name	Scientific Name	Inupiaq Name¹
Bowhead whale	<i>Balaena mysticetus</i>	<i>Agviq</i>
Beluga whale	<i>Delphinapterus leucas</i>	<i>Qilalugaq</i>
Gray whale	<i>Eschrichtius robustus</i>	<i>Agvigluaq</i>
Ringed seal	<i>Phoca hispida</i>	<i>Natchiq</i>
Bearded seal	<i>Erignathus barbatus</i>	<i>Oogruk</i>
Spotted seal	<i>Phoca largha</i>	<i>Qasigiaq</i>
Pacific walrus	<i>Odobenus rosmarus</i>	<i>Aiviq</i>
Polar bear	<i>Ursus maritimus</i>	<i>Nanuq</i>

Notes: 1 = From Webster and Zibell, 1970; SRB&A and ISER, 1993

**TABLE 6.5-2
IMPACTS OF ALTERNATIVES 2, 3, 4, AND 5 ON MARINE MAMMALS**

Action/Event	Frequency	Duration	Scope	Direct Impacts	Indirect Impacts
Ice Roads - Construction	Once	All winter	Polar Bears: Individuals. Ringed Seals: Less than 35 expected to be displaced in the vicinity of the construction area.	Negligible – To bearded seals from displacement due to noise. Minor - To polar bear from construction activities, resulting in attraction to site or displacement of individuals; to ringed seals from construction noise, resulting in displacement of less than 35 seals within the corridor.	None anticipated.
Ice Roads - Operations	Annually	All winter	Polar Bears: Individuals. Ringed Seals: Less than 35 expected to be displaced in the vicinity of the ice road.	Negligible – To bearded seals from displacement due to noise. Minor - To polar bears from noise and activities, resulting in attraction to site or displacement of individuals; to other marine mammals from noise, resulting in displacement.	None anticipated.
Island - Construction	Once	3 Months	Polar Bears: Individuals. Ringed Seals: Less than 12 expected to be displaced in the vicinity of the construction area.	Minor - To polar bears from disturbance of and attraction to construction activities; to ringed seals displaced due to noise from island reconstruction and would affect less than 12 seals.	None anticipated.
Island - Operation/ Maintenance	Annually	15 years	Individual marine mammals.	Minor - To ringed seals in winter if open water lead formed and entrapped seals; to marine mammals due to noise disturbance from island activities, resulting in temporary displacement of some animals; to some polar bears from possible attraction.	None anticipated.
Offshore Pipeline - Construction	Once	3 Months (Winter)	Polar Bears: Individuals. Ringed Seals: Less than 35 expected to be displaced in the vicinity of the construction area.	Negligible - To bearded seals from noise disturbance resulting in displacement of seals. Minor - To polar bears from construction activities resulting in attraction to site or displacement of individuals; to ringed seals from construction noise, resulting in displacement of less than 35 seals.	None anticipated.

**TABLE 6.5-2 (Cont.)
IMPACTS OF ALTERNATIVES 2, 3, 4, AND 5 ON MARINE MAMMALS**

Action/Event	Frequency	Duration	Scope	Direct Impacts	Indirect Impacts
Offshore Pipeline - Operation/ Maintenance	Rare	15 years	Short length of pipeline route.	Negligible - To marine mammals from noise disturbance during planned pipeline maintenance. Minor - To marine mammals from noise and activities during unplanned maintenance resulting in limited avoidance of the area by a few individuals.	None anticipated.
Onshore Pipeline - Construction	Once	6 Months (Winter)	N/A	None anticipated.	None anticipated.
Onshore Pipeline - Operation/ Maintenance	Weekly	15 years	N/A	None anticipated.	None anticipated.
Gravel Mining Construction Operation	Once Occasionally	3 Months (Winter) Unknown	Within a few hundred feet of mining activity.	None – To whales and seals. Minor – To polar bears from noise disturbance resulting in abandonment of a den.	None anticipated.
Large Oil Spill	Rare	Unknown	Marine waters and ice contacted by oil - up to 200 miles (322 km) from the release site.	Minor - Potential mortality of beluga whales, not normally present in the areas likely to be contacted by oil; mortality of seals from direct contact with oil, consumption of oiled prey, injection during grooming, inhalation of vapors. Significant – Mortality of polar bears from ingestion of oil during grooming, consumption of oiled prey, or loss of insulation and subsequent hypothermia. A major oil spill(s) or the cumulative effects of many small spills, could have negative population effects for polar bears.	Minor - Disturbance to marine mammals from spill response activities and noise. Also, disturbance from icebreaking barge activities during broken/thin ice conditions may occur even though an oil spill has not.(icebreaking barge activities are not expected to coincide with the fall bowhead migration past the project area).
Abandonment	Once	3 to 6 Months	Island and pipeline area.	Negligible to Minor - To marine mammals from noise disturbance activities, would be similar to construction.	None anticipated.

Notes: km = Kilometers N/A = Not applicable

**TABLE 6.6-1
COMMON PLANT SPECIES OF TUNDRA VEGETATION TYPES
IN THE PROJECT AREA**

Major Type	Community	Common Species	Scientific Name
Dry Tundra	Prostrate shrub/crustose lichen	Entire-leaf avens Curly sedge Black oxytrope	<i>Dryas integrifolia</i> <i>Carex rotundata</i> <i>Oxytropis nigrescens</i>
	Dwarf shrub/crustose lichen (cryoturbation)	Purple braya Shining alkali grass Entire-leaf mountain avens Arctic willow Net-veined willow Purple Mountain Saxifrage	<i>Braya purpurasens</i> <i>Puccinellia andersonii</i> <i>Dryas integrifolia</i> <i>Salix arctica</i> <i>Salix reticulata</i> <i>Saxifraga oppositifolia</i>
	Dry dwarf shrub/forb barrens (sand dunes)	Fescue grass Sea lyme-grass Sweet-flowered rock jasmine Round leaf willow Northern wormwood Fisher's tundra grass	<i>Festuca</i> sp. <i>Elymus arenaria</i> <i>Androsace chamaejasmine</i> <i>Salix ovalifolia</i> <i>Artemisia borealis</i> <i>Dupontia fisheri</i>
	Dry forb /grass barrens (barrier islands)	Sea lyme-grass Creeping alkali grass Oyster leaf Sea beach sandwort	<i>Elymus arenarius</i> <i>Puccinellia phryganodes</i> <i>Honckenya peploides</i> <i>Mertensia maritima</i>
Moist Tundra	Moist sedge/dwarf shrub	Narrowleaf cottongrass Fragile-seed sedge Bigelow's sedge Arctic willow	<i>Eriophorum angustifolium</i> <i>Carex mertensii</i> <i>Carex bigelowii</i> <i>Salix arctica</i>
	Moist tussock sedge/ dwarf shrub	Tussock cottongrass Narrowleaf cottongrass Entire-leaf avens Arctic willow Net-veined willow Laborador tea	<i>Eriophorum vaginatum</i> <i>Eriophorum angustifolium</i> <i>Dryas integrifolia</i> <i>Salix arctica</i> <i>Salix reticularis</i> <i>Ledum decumbens</i>
Wet Tundra	Wet graminoid tundra	Russet sedge Loose-flowered sedge Water sedge Russet's cottongrass Narrowleaf cottongrass Curly sedge	<i>Carex saxatilis</i> <i>Carex rariflora</i> <i>Carex aquatilis</i> <i>Eriophorum russeolum</i> <i>Eriophorum angustifolium</i> <i>Carex rotundata</i>
	Wet saline tundra	Sea-beach sandwort Oysterleaf Hoppner's sedge Creeping alkali grass Bear sedge Low starwort Common scurvy grass	<i>Honkeney peploides</i> <i>Mertensia maritima</i> <i>Carex subspathacea</i> <i>Puccinellia phryganodes</i> <i>Carex ursina</i> <i>Stellaria humifusa</i> <i>Cochlearia officinalis</i>
Aquatic Tundra	Aquatic sedge-grass tundra	Marsh marigold Bladderwort Narrowleaf cottongrass Scheuchzer's cottongrass Water sedge	<i>Caltha palustris</i> <i>Utricularia vulgaris</i> <i>Eriophorum angustifolium</i> <i>Eriophorum scheuchzeri</i> <i>Carex aquatilis</i>
	Aquatic grass tundra	Pendant grass	<i>Arctophila fulva</i>

Source: Walker et al., 1980

**TABLE 6.6-2
IMPACTS OF ALTERNATIVES 2, 3, 4, AND 5 ON COASTAL VEGETATION AND INVERTEBRATES**

Action/Event	Frequency	Duration	Scope	Direct Impacts	Indirect Impacts
Ice Roads - Construction	Once	All winter	Alt. 2 - 262.7 acres (106.3 hectares) Alt. 3 - 235 acres (95.1 hectares) Alt. 4 - 180 acres (72.8 hectares) Alt. 5 - 163 acres (66 hectares)	Minor – To tundra vegetation from delayed snow/ice melt and compressed vegetation for a couple of years after initial construction.	Disturbance of coastal vegetation and invertebrates could affect nesting bird habitat.
Ice Roads - Operations	Annually	All winter	N/A	None anticipated.	None anticipated.
Island - Construction	Once	3 Months	N/A	None anticipated.	None anticipated.
Island - Operation/ Maintenance	Annually	15 years	N/A	None anticipated.	None anticipated.
Offshore Pipeline - Construction	Once	3 Months (Winter)	N/A	None anticipated.	None anticipated.
Offshore Pipeline - Operation/ Maintenance	Rare	15-years	N/A	None anticipated.	None anticipated.
Onshore Pipeline - Construction	Once	6 Months (Winter)	Less than 2 acres (0.8 hectares) of tundra habitat for entire pipeline route.	Minor – To coastal vegetation and invertebrates in project area from placement of VSMs and gravel pads.	Disturbance of coastal vegetation and invertebrates could affect nesting bird habitat.
Onshore Pipeline - Operation/ Maintenance	Weekly	15 years	Depends on required activity.	None – To coastal vegetation and invertebrates from operations or planned inspections and maintenance activities. Minor - To coastal vegetation and invertebrates from offroad vehicles during summer unplanned maintenance and emergency repair activities, if needed.	None anticipated.

**TABLE 6.6-2 (Cont.)
IMPACTS OF ALTERNATIVES 2, 3, 4, AND 5 ON COASTAL VEGETATION AND INVERTEBRATES**

Action/Event	Frequency	Duration	Scope	Direct Impacts	Indirect Impacts
Gravel Mining Construction Operation	Once Occasionally	3 Months (Winter) Unknown	Loss of 35 acres (14 hectares) of sparsely vegetated river bar habitat.	Minor - From the loss of river bar habitat.	None anticipated.
Large Oil Spill	Rare	Unknown	Few hundred yards of tundra for onshore spills; coastline areas contacted by oil for offshore spills - up to 200 miles (322 km) from the release site.	Minor - Damage to tundra/coastal vegetation, with recovery potentially taking up to 5 years. Significant – Mortality of freshwater invertebrates; potential long-term impact to various invertebrate life stages due to contamination of sediments.	Significant – Damage to sensitive coastline vegetation from oil spill response activities.
Abandonment	Once	3 to 6 Months	Alt. 2 - 262.7 acres (106.3 hectares) Alt. 3 - 235 acres (95.1 hectares) Alt. 4 - 180 acres (72.8 hectares) Alt. 5 - 163 acres (66 hectares)	Minor - Similar to ice road and onshore pipeline construction.	None anticipated.

Notes: Alt. = Alternative
 km = Kilometers
 N/A = Not applicable

**TABLE 6.6-3
COMPARISON OF TUNDRA TYPES IMPACTED BY ICE ROAD FOOTPRINTS FOR ALTERNATIVES 2, 3, 4, AND 5**

Tundra Type	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Moist Tundra	82.7 acres (33.5 hectares)	65 acres (26.3 hectares)	45 acres (18.2 hectares)	32 acres (13 hectares)
Wet Tundra	97 acres (39.2 hectares)	109 acres (44.1 hectares)	91 acres (36.8 hectares)	89 acres (36 hectares)
Aquatic Tundra	80 acres (32.3 hectares)	41 acres (16.6 hectares)	32 acres (13 hectares)	32 acres (13 hectares)
Dry Tundra	3 acres (1.2 hectares)	1 acre (0.4 hectares)	1 acre (0.4 hectares)	1 acre (0.4 hectares)
Saline Tundra	None	19 acres (7.7 hectares)	11 acres (4.4 hectares)	9 acres (3.7 hectares)
Total Acreage	262.7 acres (106.3 hectares)	235 acres (95.1 hectares)	180 acres (72.8 hectares)	163 acres (66 hectares)

Note: Width of ice roads is 130 feet (39.6 meters)

**TABLE 6.7-1
BIRDS WHICH COULD OCCUR IN THE PROJECT AREA**

Common Name	Scientific Name	Inupiaq Name¹
Red-throated Loon	<i>Gavia stellata</i>	<i>Qagsraupiagruk</i>
Pacific Loon	<i>Gavia pacifica</i>	<i>Malgik</i>
Yellow-billed Loon	<i>Gavia adamsii</i>	<i>Tuullik</i>
Common Loon	<i>Gavia immer</i>	<i>Malgi</i>
Short-tailed Shearwater	<i>Puffinus tenuirostris</i>	NIR
Pelagic Cormorant	<i>Phalacrocorax pelagicus</i>	NIR
Sandhill Crane	<i>Grus canadensis</i>	<i>Tatinqaq</i>
Northern Shoveler	<i>Anas clypeata</i>	<i>Aluutaq</i>
Tundra Swan	<i>Cygnus columbianus</i>	<i>Qugruk</i>
Greater White-fronted Goose	<i>Anser albifrons</i>	<i>Niglivialuk</i>
Lesser Snow Goose	<i>Chen caerulescens</i>	<i>Kanuq</i>
Pacific Black Brant	<i>Branta bernicla</i>	<i>Niglingaq</i>
Canada Goose	<i>Branta canadensis</i>	<i>Iqsragutilik</i>
Northern Pintail	<i>Anas acuta</i>	<i>Ivugaq</i>
Lesser Scaup	<i>Aythya affinis</i>	<i>Gaqutuug</i>
Common Eider	<i>Somateria mollissima</i>	<i>Amauligruaq</i>
King Eider	<i>Somateria spectabilis</i>	<i>Qinaluk</i>
Spectacled Eider	<i>Somateria fischeri</i>	<i>Tuutalluk</i>
Oldsquaw	<i>Clangula hyemalis</i>	<i>Aaqhaaliq</i>
White-winged Scoter	<i>Melanitta fusca</i>	<i>Uvinnuagayuuk</i>
Surf Scoter	<i>Melanitta perspicillata</i>	<i>Tuungaagruk</i>
Steller's Eider	<i>Polysticta stelleri</i>	<i>Igniqauqtuq</i>
Golden Eagle	<i>Aquila chrysaetos</i>	<i>Tinmiaqpak</i>
Northern Harrier	<i>Circus cyaneus</i>	NIR
Arctic Peregrine Falcon	<i>Falco peregrinus tundrius</i>	<i>Kirgavik</i>
Gyrfalcon	<i>Falco rusticolus</i>	<i>Kirgavik</i>
Short-eared Owl	<i>Asio flammeus</i>	<i>Nipaiuktaq</i>
Snowy Owl	<i>Nyctea scandiaca</i>	<i>Ukpik</i>
Willow Ptarmigan	<i>Lagopus lagopus</i>	<i>Nasaullik</i>
Rock Ptarmigan	<i>Lagopus mutus</i>	<i>Niksaaktuniq</i>
Semi-palmated plover	<i>Charadrius semipalmatus</i>	<i>Kurrakurak</i>
Black-bellied Plover	<i>Pluvialis squatarola</i>	<i>Tulikpak</i>
Lesser-Golden Plover	<i>Pluvialis dominica</i>	<i>Tullik</i>

TABLE 6.7-1 (Cont.)

BIRDS WHICH COULD OCCUR IN THE PROJECT AREA

Common Name	Scientific Name	Inupiaq Name¹
Ruddy Turnstone	<i>Arenaria interpres</i>	<i>Tulligauraq</i>
Semipalmated Sandpiper	<i>Calidris pusilla</i>	<i>Livilivillaqpak</i>
Western Sandpiper	<i>Calidris mauri</i>	NIR
White-rumped Sandpiper	<i>Calidris fuscicollis</i>	NIR
Baird's Sandpiper	<i>Calidris bairdii</i>	<i>Puviaqtuuyaaq</i>
Pectoral Sandpiper	<i>Calidris melanotos</i>	<i>Puviaqtuuq</i>
Dunlin	<i>Calidris alpina</i>	<i>Siyukpaligauraq</i>
Stilt Sandpiper	<i>Calidris himantopus</i>	NIR
Buff-breasted Sandpiper	<i>Tryngites subruficollis</i>	<i>Satqagiilaq</i>
Long-billed Dowitcher	<i>Limnodromus scolopaceus</i>	<i>Siyukpalik</i>
Red-necked Phalarope	<i>Phalaropus lobatus</i>	<i>Auksrauk</i>
Red Phalarope	<i>Phalaropus fulicaria</i>	<i>Auksrauk</i>
Pomarine Jaeger	<i>Stercorarius pomarinus</i>	<i>Isunnagluk</i>
Parasitic Jaeger	<i>Stercorarius parasiticus</i>	<i>Migiaksaayuk</i>
Long-tailed Jaeger	<i>Stercorarius longicaudus</i>	<i>Isunnak</i>
Glaucous Gull	<i>Larus hyperboreus</i>	<i>Nauyak</i>
Glaucous-winged Gull	<i>Larus glaucescens</i>	<i>Nauyak</i>
Ross' Gull	<i>Rhodostethia rosea</i>	<i>Nauyak</i>
Arctic Tern	<i>Sterna paradisaea</i>	<i>Mitqutailaq</i>
Common Murre	<i>Uria aalge</i>	<i>Atpak (Atpa)</i>
Thick-billed murre	<i>Uria lomvia</i>	<i>Atpatuug</i>
Black Guillemot	<i>Cephus grylle</i>	<i>Inagiq</i>
Savannah Sparrow	<i>Passerculus sandwichensis</i>	<i>Akitchiaksraq</i>
Lapland Longspur	<i>Calcarius lapponicus</i>	<i>Putukkiuluk</i>
Hoary Redpoll	<i>Carduelis hornemanni</i>	<i>Saksaknik</i>
Common Raven	<i>Corvus corax</i>	<i>Tulugak</i>
Snow Bunting	<i>Plectrophenax nivalis</i>	<i>Amautligauraq</i>

Notes: 1 = From Webster and Zibell, 1970; SRB&A and ISER, 1993
NIR = No information received

TABLE 6.7-2
NEST AND BREEDING SEASON DENSITIES IN THE POINT MCINTYRE
REFERENCE AREA, 1981 TO 1992

Species	Average Nest Density (Number/km ²)	Average Breeding Season Density (Individuals/km ²)
Red-throated Loon	0.1	0.19
Pacific Loon	1.5	2.35
Greater White-fronted Goose	1.1	3.15
Canada goose	0.1	0.25
Northern Pintail	0.1	2.73
King Eider	1.3	3.31
Spectacled Eider	0.2	0.26
Oldsquaw	1.3	5.25
Willow Ptarmigan	0.1	0.26
Rock Ptarmigan	0.3	1.16
Black-bellied Plover	0.6	1.14
Lesser Golden Plover	2.7	7.48
Ruddy Turnstone	0.1	0.39
Semipalmated Sandpiper	12.5	29.52
Western Sandpiper	0.1	0.13
White-rumped Sandpiper	0.6	2.59
Baird's Sandpiper	0.7	0.91
Pectoral Sandpiper	8.7	30.94
Dunlin	7.5	18.78
Stilt Sandpiper	0.7	1.88
Buff-breasted Sandpiper	0.9	4.71
Long-billed Dowitcher	0.4	4.11
Red-necked Phalarope	0.9	6.87
Red Phalarope	6.8	13.4
Parasitic Jaeger	0.1	2.29
Lapland Longspur	14.8	59.99

Notes: km² = Square kilometer

Source: TERA, 1993b:9, 18

**TABLE 6.7-3
IMPACTS OF ALTERNATIVES 2, 3, 4, AND 5 ON BIRDS**

Action/Event	Frequency	Duration	Scope	Direct Impacts	Indirect Impacts
Ice Roads - Construction	Once	All winter	In the immediate vicinity of onshore ice roads.	Negligible – No/few birds present during winter construction.	Negligible – To non-territorial birds Minor – To territorial birds due to temporary nesting habitat loss caused by slow melting of onshore ice roads covering tundra.
Ice Roads - Operations	Annually	All winter	N/A	None anticipated.	None anticipated.
Island - Construction	Once	3 Months	Area flown over by helicopters between airport and Seal Island.	Negligible – No/few birds present during winter construction; due to helicopter overflight to/from island on most seabirds and seaducks; to seabirds and waterfowl that may have gathered near/on island during installation of facilities, concrete mats/grading of submerged gravel berm, and sealift. Minor – Small boat/barge disturbance of resting, molting, feeding, and staging waterfowl; helicopter overflight disruption of nesting, feeding, molting, intake/storage of energy needed for fall migration, and staging (e.g., brant, king eiders, and surf scoters). Significant – Disturbance to molting oldsquaw and common eiders from helicopter overflights.	None anticipated.
Island - Operation/Maintenance	Annually	15 years	Seal Island area and all areas between island and boat launch or airport.	Negligible – Due to helicopter overflight to/from island on most seabirds and seaducks other than brant, oldsquaw, common eiders, and surf scoters; to seabirds and waterfowl that may have gathered near/on island during repair/maintenance of concrete mats/submerged gravel berm.	Beneficial – Sea ducks and phalaropes (small number) may feed on/near shoreline of island. Minor – Lingering of birds due to possible open water near island in early winter.

TABLE 6.7-3 (Cont.)

IMPACTS OF ALTERNATIVES 2, 3, 4, AND 5 ON BIRDS

Action/Event	Frequency	Duration	Scope	Direct Impacts	Indirect Impacts
Island – Operation/ Maintenance (Cont.)	Annually	15 years	Seal Island area and all areas between island and boat launch or airport.	Negligible to Minor – Potential increase in gull and raven population due to artificial food resources; resulting predation of other bird species. Minor – Small boat/barge disturbance of resting, molting, feeding, and staging waterfowl; helicopter overflight disruption of nesting, feeding, molting, intake/storage of energy needed for fall migration, and staging (e.g., brant, oldsquaw, king and common eiders, and surf scoters); flight and attraction hazard to birds (including during migration) due to island structures, lighting, and gas flare.	None anticipated.
Offshore Pipeline – Construction	Once	3 Months (Winter)	6 to 9 miles (9.7 to 14.5 km) of pipeline route.	Negligible – No birds expected offshore during winter construction.	None anticipated.
Offshore Pipeline - Operation/ Maintenance	Rare	15 years	Short length of pipeline route.	Negligible – No expected disturbance of birds during planned operations/maintenance.	None anticipated.
Onshore Pipeline – Construction	Once	6 Months (Winter)	Less than 2 acres (0.8 hectares) of tundra habitat.	Negligible – No/few birds present during winter construction. Minor – Habitat loss due to shoreline transition gravel pad (Alternatives 2, 3, and 4) and VSMs.	Beneficial impact - nesting opportunities in/near newly disturbed ground close to onshore pipeline/VSMs and on VSM support members.
Onshore Pipeline - Operation/ Maintenance	Weekly	15 years	In the immediate vicinity of onshore ice roads.	Negligible – Normal planned maintenance scheduled to avoid bird interaction. Negligible to Minor – Avoidance of pipeline and gravel pads by some tundra-nesting shorebirds. Minor – Unplanned pipeline maintenance/repair during summertime could result in local disruption of nesting with possible abandonment; due to low altitude helicopter inspection flights over pipeline disrupting nesting (including flushing and chilling/predation of eggs/young).	None anticipated.

TABLE 6.7-3 (Cont.)

IMPACTS OF ALTERNATIVES 2, 3, 4, AND 5 ON BIRDS

Action/Event	Frequency	Duration	Scope	Direct Impacts	Indirect Impacts
Gravel Mining Construction Operation	Once Occasionally	3 Months (Winter) Unknown	35 acres (14 hectares) of gravel bar.	Negligible – No/few birds present during winter mining activities. Minor – To birds from loss of gravel bar habitat.	Negligible – Beneficial use of reclaimed mine site for waterfowl resting and feeding.
Large Oil Spill	Rare	Unknown	Marine waters, lagoons, and tundra areas contacted by oil - up to 200 miles (322 km) from the release site.	Minor - Mortality of waterfowl and shorebirds in onshore aquatic habitats due to direct contact with oil if a spill occurred during the summer. Significant - Mortality of birds in marine waters or lagoon areas due to direct contact with oil if a spill occurred during openwater period.	Minor – Disruption of nesting or staging activities from spill response activities.
Abandonment	Once	3 to 6 Months	Island and pipeline route.	Negligible to Minor - To birds from disturbance similar to island pipeline construction.	None anticipated.

Notes: km = Kilometers
 N/A = Not applicable
 VSM = Vertical support member

TABLE 6.8-1
TERRESTRIAL MAMMALS WHICH COULD OCCUR IN THE PROJECT AREA

Common Name	Scientific Name	Inupiaq Name¹
Barren-ground Shrew	<i>Sorex ugyanak</i>	<i>Ugrugnaq</i>
Tundra Shrew	<i>Sorex tundrensis</i>	<i>Ugrugnaq</i>
Dusky Shrew	<i>Sorex monticolus</i>	<i>Ugraugnaq</i>
Arctic Ground Squirrel	<i>Spermophilus parryii</i>	<i>Siksrik</i>
Brown Lemming	<i>Lemmus trimucronatus</i>	<i>Avannapiaq</i>
Collared Lemming	<i>Dicrostonyx groenlandicus</i>	<i>Qilagmiutaq</i>
Northern Red-backed Vole	<i>Clethrionomys rutilus</i>	<i>Avinnaq Pamiuqturuuq</i>
Tundra Vole	<i>Microtus oeconomus</i>	<i>Avinnaq</i>
Singing Vole	<i>Microtus miurus</i>	<i>Avinnaq</i>
Arctic Hare (Alaska hare)	<i>Lepus othys (othus)</i>	<i>Ukialliq</i>
Gray Wolf	<i>Canis lupus</i>	<i>Amaguq</i>
Coyote	<i>Canis latrans</i>	<i>Amaguuraq</i>
Arctic Fox	<i>Alopex lagopus</i>	<i>Tigiganniaq</i>
Red Fox	<i>Vulpes vulpes</i>	<i>Kayuqtuq</i>
Grizzly Bear	<i>Ursus arctos</i>	<i>Aklak</i>
Ermine/Short-tailed Weasel	<i>Mustela erminea</i>	<i>Itigiaq</i>
Least Weasel	<i>Mustela nivalus</i>	<i>Nauyaluk</i>
Wolverine	<i>Gulo gulo</i>	<i>Qavvik</i>
Caribou	<i>Rangifer tarandus</i>	<i>Tuttu</i>
Moose	<i>Alces alces</i>	<i>Tuttuvak</i>
Muskox	<i>Ovibos moschatus</i>	<i>Uminmaq</i>

Notes: 1 = From Webster and Zibell, 1970

**TABLE 6.8-2
IMPACTS OF ALTERNATIVES 2, 3, 4, AND 5 ON TERRESTRIAL MAMMALS**

Action/Event	Frequency	Duration	Scope	Direct Impacts	Indirect Impacts
Ice Roads - Construction	Once	All winter	In the immediate vicinity of onshore ice roads.	Minor - To Arctic fox behavior from disturbance and attraction to construction activity; to overwintering caribou due to disturbance and displacement from foraging areas.	None anticipated.
Ice Roads - Operations	Annually	All winter	N/A	Minor - To Arctic fox due to increased injury and death from vehicle collisions; to overwintering caribou from disturbance and displacement of foraging areas.	None anticipated.
Island - Construction	Once	3 Months	Area flown over by helicopters between airport and Seal Island.	Minor - To Arctic fox from disturbance and attraction to construction activity.	None anticipated.
Island - Operation/ Maintenance	Annually	15 years	Seal Island area and all areas between island and boat launch or airport.	Negligible - To Arctic fox from attraction to operation and maintenance activities. Minor - To Arctic fox from stranding and attraction to food sources at Seal Island; to Arctic fox, grizzly bear, and caribou as a result of low-elevation helicopter overflights.	None anticipated.
Offshore Pipeline - Construction	Once	3 Months (Winter)	6 to 9 miles (9.7 to 14.5 km) of pipeline route.	Minor - To Arctic fox from attraction to construction areas.	None anticipated.
Offshore Pipeline - Operation/ Maintenance	Rare	15 years	Short length of pipeline route.	Negligible - To Arctic fox attracted to winter operation/maintenance activities.	None anticipated.
Onshore Pipeline - Construction	Once	6 Months (Winter)	Less than 2 acres (0.8 hectares) of tundra habitat.	Minor - To low numbers of overwintering caribou from construction activities, resulting in temporary displacement from foraging areas; to Arctic fox from attraction to construction activities.	None anticipated.

**TABLE 6.8-2 (Cont.)
IMPACTS OF ALTERNATIVES 2, 3, 4, AND 5 ON TERRESTRIAL MAMMALS**

Action/Event	Frequency	Duration	Scope	Direct Impacts	Indirect Impacts
Onshore Pipeline - Operation/ Maintenance	Weekly	15 years	In the immediate vicinity of onshore ice roads.	Minor - To Arctic fox, caribou, and grizzly bear due to repairs and inspections (low-level helicopter overflights) causing temporary displacement; to caribou movement toward insect-relief habitat during summer.	None anticipated.
Gravel Mining Construction Operation	Once Occasionally	3 Months (Winter) Unknown	Loss of 35 acres (14.2 hectares) of habitat.	None - To denning grizzly bears. Minor - To caribou from loss of insect relief habitat; to Arctic fox due to increased injury and death from vehicle collisions; to Arctic foxes and grizzly bears due to habitat loss.	None anticipated.
Large Oil Spill	Rare	Unknown	Tundra or shorelines contacted by oil - up to 200 miles (322 km) from the release site.	Minor - Potential mortality of individual Arctic foxes or grizzly bears from loss of fur insulative value; ingestion of oil during grooming or consumption of oiled carcasses; to individual caribou through absorption and inhalation of vapors.	Negligible - Displacement of animals from hazing or cleanup activities, reduction of prey species, and displacement of caribou from oiled vegetation areas.
Abandonment	Once	3 to 6 Months	Island and pipeline route	Minor - To Arctic fox, caribou, and grizzly bear, similar to construction.	None anticipated.

Notes: km = Kilometers

**TABLE 6.9-1
THREATENED AND ENDANGERED SPECIES,
ALASKAN BEAUFORT SEA/NORTH SLOPE**

Common Name	Scientific Name	Present Status
Bowhead whale	<i>Balaena mysticetus</i>	Endangered
Spectacled eider	<i>Somateria fischeri</i>	Threatened
Steller's eider	<i>Polysticta stelleri</i>	Threatened
Arctic peregrine falcon	<i>Falco peregrinus tundrius</i>	Delisted

**TABLE 6.9-2
IMPACTS OF ALTERNATIVES 2, 3, 4, AND 5 ON THREATENED AND ENDANGERED SPECIES**

Action/Event	Frequency	Duration	Scope	Direct Impacts	Indirect Impacts
Ice Roads - Construction	Once	All winter	N/A	None – Threatened and endangered species not present during the winter.	Minor - To spectacled eiders from delayed availability of potential tundra nest sites.
Ice Roads - Operations	Annually	All winter	N/A	None anticipated.	None anticipated.
Island - Construction	Once	3 Months	Area flown over by helicopters between airport and Seal Island.	None - To bowhead whales if major construction activities are completed by spring migrations. Minor – To bowhead whales from noise and activities from summer construction resulting in migratory path deflection; to spectacled eiders due to helicopter overflights causing displacement of nesting birds resulting in exposure of eggs to chilling and loss of eggs due to predation; disturbance of molting eiders could lead to expenditure of excess energy needed for fall migration; disturbance to staging/ migrating eiders from barge traffic between the mainland and Seal Island.	None anticipated.
Island - Operation/ Maintenance	Annually	15 years	Seal Island area and all areas between island and boat launch or airport.	None - To bowhead whales if maintenance activities completed before migrations. Negligible – To peregrine falcons and Steller’s eiders from helicopter overflights. Minor – To bowhead whales from noise and activities from maintenance activities; to spectacled eiders due to helicopter overflights; disturbance to staging/ migrating eiders from barge traffic between the mainland and Seal Island; from potential collisions with structures on Seal Island.	None anticipated.
Offshore Pipeline - Construction	Once	3 Months (Winter)	N/A	None – Threatened or endangered species not present during the winter construction period.	None anticipated.

**TABLE 6.9-2 (Cont.)
IMPACTS OF ALTERNATIVES 2, 3, 4, AND 5 ON THREATENED AND ENDANGERED SPECIES**

Action/Event	Frequency	Duration	Scope	Direct Impacts	Indirect Impacts
Offshore Pipeline - Operation/ Maintenance	Rare	15 years	Length of offshore pipeline route.	Negligible – To threatened and endangered species from planned maintenance activities; to peregrine falcons and Steller’s eiders from helicopter overflights. Minor – To bowhead whales from noise and activities from vessel traffic; to spectacled eiders from helicopter and boat traffic.	None anticipated.
Onshore Pipeline – Construction	Once	6 Months (Winter)	Less than 2 acres (0.8 hectares) of tundra habitat.	None – Steller’s eiders and Arctic peregrine falcons not present during winter construction or likely to nest in project area. Negligible – To spectacled eiders from loss of nesting and brood-rearing habitat.	Minor – Temporary loss of nesting habitat from delayed ice road melting following construction.
Onshore Pipeline – Operation/ Maintenance	Weekly	15 years	In the immediate vicinity of onshore pipeline.	Negligible – To Steller’s eiders and peregrine falcons from noise disturbance from helicopters. Minor – To spectacled eiders from helicopter overflights; to threatened and endangered species from unplanned, summer maintenance and repair.	None anticipated.
Gravel Mining Construction Operation	Once Occasionally	3 Months (Winter) Unknown	N/A	None – Threatened and endangered species not present during winter activities; no habitat loss expected.	None anticipated.
Large Oil Spill	Rare	Unknown	Marine waters, lagoons, and tundra areas contacted by oil - up to 200 miles (322 km) from the release site.	Minor – To Steller’s eider (few found in project area) from contact with oil or ingestion of oil contaminated food. Significant – Mortality of spectacled eiders from contact with oil along shorelines or in the lagoon areas during migration or from ingestion of oil contaminated food; injury and/or mortality of bowhead whales from an oil spill contacting coincident with migration.	Minor - Disruption of bowhead whale migration from noise and boat traffic related to cleanup, displacement of birds from habitats and disruption of nesting activities from oil spill response.
Abandonment	Once	3 to 6 Months	Island and pipeline route.	Negligible to Minor – Impacts similar to those for construction activities.	None anticipated.

Notes: km = Kilometers
N/A = Not applicable