

APPENDIX V

Supplemental Bird Data Tables for Wildlife Section 3.12

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Table V-1: Description of Avian Surveys, 2005-2013

Survey Name and Dates	Location and Timing	Purpose	Level of Effort	Summary of Results	Reference
Initial Mine Site Avian Surveys 2005	Initial breeding bird surveys and habitat mapping at the mine site	A reconnaissance survey was conducted to document species in the area, understand habitat types and avian use.	Not Available	The avian surveys in 2005 established suitable avian monitoring stations (point-count) within and adjacent to the proposed Project Area, and an initial index of bird use of habitat communities.	ARCADIS 2012d. 2012 Avian Point-Count and Raptor Survey Donlin Gold Project. November 2012.
Comprehensive Mine Site Avian Surveys 2007-2012	Six years of annual (June) breeding bird surveys at the mine site and associated roads.	Comprehensive, habitat-based point-count surveys and raptor nest surveys designed to calculate relative abundance, species richness and diversity. Similar habitat types were surveyed within the facilities and reference areas in order to collect baseline data for monitoring the effects of the Construction and Operations phases of the proposed mine.	150 meter radius fixed point-count surveys were conducted by two observers at each station for a 5 minute observation period. Surveys were conducted between 7AM and 7PM. The number of stations varied by year (from 234 in 2008 to 271 in both 2011 and 2012), but most stations were visited each year.	<u>2007</u> : 865 birds of 37 species <u>2008</u> : 1,397 birds of 46 species <u>2009</u> : 1,671 birds of 39 species <u>2010</u> : 1,870 birds of 40 species <u>2011</u> : 1,796 birds of 45 species <u>2012</u> : 1,285 birds of 32 species	ARCADIS 2012d. 2012 Avian Point-Count and Raptor Survey Donlin Gold Project. November 2012.

Table V-1: Description of Avian Surveys, 2005-2013

Survey Name and Dates	Location and Timing	Purpose	Level of Effort	Summary of Results	Reference
Mine Site Aerial Raptor Surveys 2007 to 2012	Mine site, alternative port sites and associated roads, between June 9th and June 18th.	To identify raptor species and nest activity.	Six years of annual surveys were conducted using a helicopter with two biologists. Polygonal project features (e.g., the alternative port sites and the mine area) were surveyed using parallel transects spaced no more than 0.5 miles (805 meters) apart. Linear features (e.g., access road alternatives) were surveyed by focusing on favorable raptor nesting habitats (e.g., forested riparian areas and cliff faces).	The number of occupied nests located ranged from 15 to 63. Nests of 14 raptor species were identified in the proposed mine site area. The top five most abundant were Harlan's red-tailed hawk (30), peregrine falcon (28), red-tailed hawk (25), osprey (19), and common raven (18).	ARCADIS 2012e. 2012 Aerial Raptor Survey Donlin Gold Natural Gas Pipeline Study. August 2012.
Spring Wildlife Study 2004, 2007, 2008, and 2009 including nocturnal owl survey	Nocturnal owl survey was conducted at the mine site during Feb 2004, June 2007, and March 2008 and 2009	To identify owl species and nest activity	Methods and timing varied by year but all involved visiting survey sites in likely habitat and either silent listening or using broadcasting owl calls and listening for a response.	None of the nocturnal owl surveys detected or observed owls. However, during the raptor nest surveys conducted in June of each year, Great Horned and Great Gray Owls have been identified.	ARCADIS. 2008b. DRAFT 2008 Spring Wildlife Study Donlin Creek Project.
Pipeline Route Raptor Survey 2010-2011-2012	The 2010 and 2011 surveys were conducted along the entire proposed pipeline route. The 2010 survey was conducted from June 1 to June 7. The 2012 survey was conducted only along the Jones Realignment.	Habitat-based raptor nest survey designed to locate nesting raptors; swan nests were also recorded.	The survey area encompassed an area of one mile on each side of the pipeline route. Raptors do not nest randomly in the environment, thus the survey included scanning the vegetation within the study area boundary from a distance in the aircraft, then concentrating survey efforts on suitable nesting habitats.	<u>2010</u> - 45 raptor nests were located; 24 were occupied and 21 were unoccupied. <u>2011</u> - 66 nests were located, 24 of which were occupied and 42 were unoccupied. <u>2012</u> - 3 unoccupied nests were observed (two golden eagle and one common raven nest), and one occupied nest was observed (a common raven nest).	ARCADIS 2012e. 2012 Aerial Raptor Survey Donlin Gold Natural Gas Pipeline Study. August 2012.

Table V-1: Description of Avian Surveys, 2005-2013

Survey Name and Dates	Location and Timing	Purpose	Level of Effort	Summary of Results	Reference
Waterway Transportation Corridor Wildlife Survey 2006-2009	The four years of wildlife and avian surveys were conducted along the Kuskokwim River between late May and late September. One team at Fowler Island and one team at Tuntutuliak.	<p>The original purpose was to obtain site-specific data for the potential proposed floating dock locations 1) in the Fowler Island area, and 2) near Helmick Point and immediately east of the village of Tuntutuliak.</p> <p>Subsequent years of observations were made to continue wildlife observations (i.e., point counts) from two fixed viewing locations in the Fowler Island area and from three fixed locations in the Helmick Point area using the same methods used in 2006 through 2008.</p>	Observations were made for 60 minutes at each of five stations five days a week.	During the 4 years of surveys, 100 species of birds were recorded, including 17 species of waterfowl and 12 species of shorebirds. The surveys documented pulses of birds that moved through the Kuskokwim River delta on an annual basis as a result of nesting, staging and migratory behavior. The total number of birds observed ranged from 27,398 in 2006, to 104,550 seen in 2008.	RWJ Consulting Inc. 2010b. 2009 Wildlife Observations on the Kuskokwim River-- Final Report. Document #DON002-503. Prepared for Donlin Creek LLC, Anchorage, Alaska. 428 pp.

Table V-1: Description of Avian Surveys, 2005-2013

Survey Name and Dates	Location and Timing	Purpose	Level of Effort	Summary of Results	Reference
Stream-nesting Waterbird Surveys 2013	June, Crooked Creek, Getmuna Creek, Jungjuk Creek, and the Kuskokwim River between Crooked Creek and Bethel.	To characterize breeding waterbird use in the stream drainages associated with the proposed mine and access road (Angyaruaq [Jungjuk] Road), and along the proposed supply barging route on the Kuskokwim River	<p><i>Crooked Creek</i> – rafted for two days, approximately 30 river miles from Anaconda Creek to the mouth. By helicopter - from the Flat Creek-Donlin Creek junction to the mouth at the Kuskokwim River.</p> <p><i>Getmuna Creek</i> - 8 air miles.</p> <p><i>Jungjuk Creek</i> - By foot nearly 6 miles from the upper-most Donlin-Jungjuk Road stream crossing down to the Kuskokwim River.</p> <p><i>Kuskokwim River between Crooked Creek and Bethel</i> – two observers by motorboat, 205 miles in two days. Total observation time 13 hours.</p>	<p><i>Crooked Creek</i> - The combined surveys suggest that only one or two pairs each of red-breasted and common mergansers occur along Crooked Creek, and very few pairs of mallards and green-winged teal may be nesting within beaver sloughs.</p> <p><i>Getmuna Creek</i> - One each of mallard, green-winged teal, and Canada goose were recorded.</p> <p><i>Jungjuk Creek</i>- A pair of green-winged teal was observed at a blown-out beaver pond, and two male green-winged teal were flushed from one of the few beaver side-channel sloughs.</p> <p><i>Kuskokwim River between Crooked Creek and Bethel</i> - 1,099 individuals representing 11 species of waterfowl (ducks and geese), seven species of waterbirds (loons, gulls, and terns), three species of shorebirds, and five species of raptors (eagles, osprey, falcons, ravens) were recorded.</p>	Owl Ridge. 2013b. Donlin Gold Waterfowl Surveys 2013 – Crooked Creek, Getmuna Creek, Jungjuk Creek, and Kuskokwim River.

Source: ARCADIS 2012d; RWJ Consulting 2010b; Owl Ridge 2013b

Table V-2: Observed Bird Species Ordered by Abundance, Mine Site and Access Road Surveys (2007-2012), in Conifer Forest, Shrub, and Broadleaf Forest Habitat

Conifer Forest Habitat (417 point counts)		Shrub Habitat (261 point counts)		Broadleaf Forest Habitat (95 point counts)	
Species	Number of birds	Species	Number of birds	Species	Number of Birds
Fox Sparrow	355	Fox Sparrow	395	Fox Sparrow	93
Common Redpoll	303	Common Redpoll	373	Common Redpoll	85
Swainson's Thrush	230	White-crowned Sparrow	204	Yellow-rumped Warbler	71
Ruby-crowned Kinglet	188	Gray-cheeked Thrush	146	Swainson's Thrush	70
White-crowned Sparrow	16	Varied Thrush	131	Ruby-crowned Kinglet	36
American Robin	162	American Robin	100	Golden-crowned Kinglet	29
Dark-eyed Junco	145	Dark-eyed Junco	74	White-crowned Sparrow	28
Gray-cheeked Thrush	126	Swainson's Thrush	60	American Robin	27
Yellow-rumped Warbler	106	Wilson's Warbler	35	Dark-eyed Junco	21
Gray Jay	98	Arctic Warbler	32	Varied Thrush	20
White-winged Crossbill	72	Ruby-crowned Kinglet	31	Unidentified	17
Alder Flycatcher	35	Yellow Warbler	31	Northern Waterthrush	14
Unidentified	35	American Pipit	30	Gray Jay	13
Olive-sided Flycatcher	32	Orange-crowned Warbler	29	Alder Flycatcher	10
Varied Thrush	28	Gray Jay	25	Blackpoll Warbler	9
Northern Waterthrush	20	Unidentified Bird	24	Orange-crowned Warbler	9
Blackpoll Warbler	16	Savannah Sparrow	12	Wilson's Warbler	9
Wilson's Snipe	14	Olive-sided Flycatcher	11	Olive-sided Flycatcher	8
Wilson's Warbler	14	Chipping Sparrow	9	Arctic Warbler	6
Orange-crowned Warbler	12	Alder Flycatcher	7	Wilson's snipe	6
Hermit Thrush	11	Common Raven	7	Boreal Chickadee	5
Bohemian Waxwing	10	Golden-crowned Sparrow	7	Cliff Swallow	4
Black-capped Chickadee	6	Violet-green Swallow	7	Hermit Thrush	4

Table V-2: Observed Bird Species Ordered by Abundance, Mine Site and Access Road Surveys (2007-2012), in Conifer Forest, Shrub, and Broadleaf Forest Habitat

Conifer Forest Habitat (417 point counts)		Shrub Habitat (261 point counts)		Broadleaf Forest Habitat (95 point counts)	
Species	Number of birds	Species	Number of birds	Species	Number of Birds
Pine Grosbeak	5	Hermit Thrush	6	American Pipit	2
Chipping Sparrow	4	Pine Grosbeak	6	Black-capped Chickadee	2
Townsend's Solitaire	4	Boreal Chickadee	5	Pine Grosbeak	2
Three-toed Woodpecker	4	Tree Swallow	5	Tree Swallow	2
Arctic Warbler	3	Horned Lark	3	Chipping Sparrow	1
Boreal Chickadee	3	Song Sparrow	3	Common Raven	1
Yellow Warbler	2	Blackpoll Warbler	2	Golden-crowned Kinglet	1
Tree Swallow	2	Bohemian Waxwing	2	Ovenbird	1
Common Raven	2	Golden Eagle	2	Red-breasted Nuthatch	1
Ovenbird	2	Northern Waterthrush	2	Rock Ptarmigan	1
American Tree Sparrow	1	Yellow Warbler	2	Song Sparrow	1
American Pipit	1	Golden-crowned Kinglet	1	Swainson's Hawk	1
Pine Siskin	1	Ovenbird	1		
Rough-legged Hawk	1	Rock Ptarmigan	1		
Golden-crowned Sparrow	1	Red-tailed Hawk	1		
		Three-toed Woodpecker	1		

Source: ARCADIS 2012d

Table V-3: Observed Bird Species Ordered by Abundance, Mine Site and Access Road Surveys (2007-2012), in Wet and Dry Herbaceous and Mixed Forest Habitats

Wet Herbaceous Habitat (200 point counts)		Dry Herbaceous Habitat (163 point counts)		Mixed Forest Habitat (419 point counts)	
Species	Number of birds	Species	Number of birds	Species	Number of birds
Common Redpoll	126	Common Redpoll	196	Fox Sparrow	373
Fox Sparrow	76	Fox Sparrow	149	Swainson's Thrush	333
White-crowned Sparrow	72	White-crowned Sparrow	69	Ruby-crowned Kinglet	279
Whimbrel	58	American Robin	59	Common Redpoll	234
Tree Swallow	49	American Pipit	44	Yellow Warbler	188
Bank Swallow	45	Swainson's Thrush	33	Varied Thrush	174
American Robin	44	Varied Thrush	27	Dark-eyed Junco	124
Savannah Sparrow	44	Dark-eyed Junco	23	American Robin	103
Wilson's Warbler	26	Gray-cheeked Thrush	19	White-crowned Sparrow	101
Violet-green Swallow	21	Unidentified	18	Gray Jay	82
Lapland Longspur	20	Horned Lark	16	Unidentified	61
Unidentified	19	Ruby-crowned Kinglet	14	Wilson's Warbler	60
Wilson's Snipe	17	Arctic Warbler	7	Alder Flycatcher	47
Swainson's Thrush	16	Yellow-rumped Warbler	7	Olive-sided Flycatcher	45
Cliff Swallow	15	Gray Jay	6	Blackpoll Warbler	42
Dark-eyed Junco	13	Orange-crowned Warbler	6	Orange-crowned Warbler	31
Gray-cheeked Thrush	12	Olive-sided Flycatcher	6	White-winged Crossbill	22
Ruby-crowned Kinglet	12	Pine Grosbeak	5	Northern Waterthrush	17

Table V-3: Observed Bird Species Ordered by Abundance, Mine Site and Access Road Surveys (2007-2012), in Wet and Dry Herbaceous and Mixed Forest Habitats

Wet Herbaceous Habitat (200 point counts)		Dry Herbaceous Habitat (163 point counts)		Mixed Forest Habitat (419 point counts)	
Species	Number of birds	Species	Number of birds	Species	Number of birds
Arctic Warbler	11	Savannah Sparrow	5	Hermit Thrush	15
Gray Jay	11	Wilson's Warbler	5	Song Sparrow	12
Yellow-rumped Warbler	8	Common Raven	4	Arctic Warbler	11
Olive-sided Flycatcher	7	White-winged Crossbill	2	Red-tailed Hawk	10
Alder Flycatcher	6	¹ Canada Goose and Cackling Goose	1	Wilson's Snipe	10
American Golden-Plover	6	Pine Siskin	1	Black-capped Chickadee	9
Blackpoll Warbler	6	Rock Ptarmigan	1	Ovenbird	9
Common Raven	4	Song Sparrow	1	Pine Grosbeak	7
Pacific Golden-Plover	4	Tree Swallow	1	Tree Swallow	7
Rusty Blackbird	4	Violet-green Swallow	1	Bank Swallow	6
Orange-crowned Warbler	3			Golden-crowned Kinglet	5
Parasitic Jaeger	3			Chipping Sparrow	4
Pine Grosbeak	3			Common Raven	4
Hermit Thrush	2			American Tree Sparrow	3
Horned Lark	2			Bohemian Waxwing	3
Northern Waterthrush	2			Savannah Sparrow	3
Rock Ptarmigan	2			Boreal Chickadee	2
White-winged Crossbill	2			American Pipit	1

Table V-3: Observed Bird Species Ordered by Abundance, Mine Site and Access Road Surveys (2007-2012), in Wet and Dry Herbaceous and Mixed Forest Habitats

Wet Herbaceous Habitat (200 point counts)		Dry Herbaceous Habitat (163 point counts)		Mixed Forest Habitat (419 point counts)	
Species	Number of birds	Species	Number of birds	Species	Number of birds
Black –capped Chickadee	1			Glaucous-winged Gull	1
Golden-crowned Sparrow	1			Pacific Loon	1
Merlin	1			Short-billed Dowitcher	1
Northern Harrier	1			Spruce Grouse	1
Osprey	1			Townsend's Solitaire	1
Pacific Loon	1			Townsend's Warbler	1
				Three-toed Woodpecker	1
				Unidentified Woodpecker	1
				Violet-green Swallow	1
				Yellow Warbler	1

Notes:

1 Because these two species are difficult to distinguish they are considered together.

Source: ARCADIS 2012d

Table V-4: Bird Species Observed at Points within 0.5 mile of the BTC Port Road, in Order of Abundance

Species	Number Observed
Common Redpoll	77
Fox Sparrow	76
White-crowned Sparrow	62
American Robin	39
Whimbrel	38
Wilson's Warbler	31
Swainson's Thrush	25
Savannah Sparrow	24

Table V-4: Bird Species Observed at Points within 0.5 mile of the BTC Port Road, in Order of Abundance

Species	Number Observed
Dark-eyed Junco	24
Gray-cheeked Thrush	19
Olive-sided Flycatcher	14
Yellow-rumped Warbler	12
Arctic Warbler	11
Blackpoll Warbler	11
Lapland Longspur	9
Gray Jay	8
Varied Thrush	7
Alder Flycatcher	6
American Golden Plover	6
Cliff Swallow	6
Common Raven	5
Orange-crowned Warbler	4
American Pipit	2
Chipping Sparrow	2
Black-capped Chickadee	1
Glaucous-winged Gull	1
Golden Eagle	1
Hermit Thrush	1
Horned Lark	1
Merlin	1
Northern Waterthrush	1
Pomarine Jaeger	1
Pacific Golden Plover	1
Pacific Loon	1
Pine Grosbeak	1
Ruby-crowned Kinglet	1
Rock Ptarmigan	1
Red-tailed Hawk	1
Three-toed Woodpecker	1
White-winged Crossbill	1

Source: ARCADIS 2010b

Table V-5: Estimated Density of 18 Most Common Birds Observed at the Mine Site and Access Roads by Habitat

Habitat	Species	Estimated Density (birds/acre)
Forested-Deciduous/Mixed	Fox sparrow	0.12
	Common redpoll	0.26
	Swainson's thrush	0.12
	White-crowned sparrow	0.04
	Ruby-crowned kinglet	0.24
	American robin	0.04
	Gray-cheeked thrush	0.03
	Yellow-rumped warbler	0.20
	Dark-eyed junco	0.06
	Varied thrush	0.01
	Gray jay	0.05
	Wilson's warbler	0.02
	Olive-sided flycatcher	0.01
	Alder flycatcher	0.02
	White-winged crossbill	0.01
	Orange-crowned warbler	0.01
	American pipit	0.003
	Blackpoll warbler	0.07
Herbaceous	Fox sparrow	0.03
	Common redpoll	0.26
	Swainson's thrush	0.02
	White-crowned sparrow	0.05
	Ruby-crowned kinglet	0.01
	American robin	0.03
	Gray-cheeked thrush	0.01
	Yellow-rumped warbler	0.01
	Dark-eyed junco	0.02
	Varied thrush	0.02
	Gray jay	0.01
	Wilson's warbler	0.01
	Olive-sided flycatcher	0.01
	Alder flycatcher	0.004
	White-winged crossbill	0.003
	Orange-crowned warbler	0.01
	American pipit	0.0014
	Blackpoll warbler	0.01
Conifer Forest	Fox sparrow	0.08
	Common redpoll	0.30
	Swainson's thrush	0.07
	White-crowned sparrow	0.06
	Ruby-crowned kinglet	0.08
	American robin	0.04
	Gray-cheeked thrush	0.05
	Yellow-rumped warbler	0.08
	Dark-eyed junco	0.06
	Varied thrush	0.003
	Gray jay	0.08
	Wilson's warbler	0.01
	Olive-sided flycatcher	0.005
	Alder flycatcher	0.02
	White-winged crossbill	0.05
	Orange-crowned warbler	0.003
	American pipit	0.0002
	Blackpoll warbler	0.02

Table V-5: Estimated Density of 18 Most Common Birds Observed at the Mine Site and Access Roads by Habitat

Habitat	Species	Estimated Density (birds/acre)
Shrub	Fox sparrow	0.01
	Common redpoll	0.42
	Swainson's thrush	0.03
	White-crowned sparrow	0.09
	Ruby-crowned kinglet	0.02
	American robin	0.05
	Gray-cheeked thrush	0.08
	Yellow-rumped warbler	0.04
	Dark-eyed junco	0.07
	Varied thrush	0.02
	Gray jay	0.03
	Wilson's warbler	0.03
	Olive-sided flycatcher	0.002
	Alder flycatcher	0.01
	White-winged crossbill	0.00
	Orange-crowned warbler	0.02
	American pipit	0.01
	Blackpoll warbler	0.003

Source: Calculated from data collected by ARCADIS 2007-2012e

Table V-6: Landbird Species Recorded during the Waterway Transportation Corridor Wildlife Surveys, 2006-2009

Common Name	Scientific Name	Common Name	Scientific Name
Ptarmigan (unidentified)	<i>Lagopus spp.</i>	American Pipit	<i>Anthus rubescens</i>
Northern Flicker	<i>Colaptes auratus</i>	Northern Shrike	<i>Lanius excubitor</i>
Tree Swallow	<i>Tachycineta bicolor</i>	Orange-crowned Warbler	<i>Oreothlypis celata</i>
Bank Swallow	<i>Riparia riparia</i>	Yellow Warbler	<i>Setophaga petechia</i>
Black-billed Magpie	<i>Pica hudsonia</i>	Wilson's Warbler	<i>Cardellina pusilla</i>
Common Raven	<i>Corvus corax</i>	American Tree Sparrow	<i>Spizella arborea</i>
Black-capped Chickadee	<i>Poecile atricapillus</i>	Savannah Sparrow	<i>Passerculus sandwichensis</i>
Boreal Chickadee	<i>Poecile hudsonica</i>	Dark-eyed Junco	<i>Junco hyemalis</i>
Northern Wheatear	<i>Oenanthe oenanthe</i>	Lapland Longspur	<i>Calcarius lapponicus</i>
Gray-cheeked Thrush	<i>Catharus minimus</i>	Snow Bunting	<i>Plectrophenax nivalis</i>
Swainson's Thrush	<i>Catharus ustulatus</i>	Rusty Blackbird	<i>Euphagus carolinus</i>
Varied Thrush	<i>Ixoreus naevius</i>		

Source: RWJ Consulting, Inc. 2010b

Table V-7: Estimated Density of 16 Bird Species Observed in the Vicinity of the Proposed Pipeline by Habitat

Habitat	Species	Estimated Density (birds/acre)
Forested-Deciduous/Mixed	Fox sparrow	0.24
	Redpoll sp.	0.12
	Swainson's thrush	0.53
	White-crowned sparrow	0.00
	Ruby-crowned kinglet	0.24
	American robin	0.06
	Gray-cheeked thrush	0.03
	Yellow-rumped warbler	0.30
	Dark-eyed junco	0.30
	Varied thrush	0.06
	Gray jay	0.18
	Olive-sided flycatcher	0.18
	Alder flycatcher	0.35
	White-winged crossbill	0.00
	Orange-crowned warbler	0.00
	Blackpoll warbler	0.24
Conifer Forest	Fox sparrow	0.00
	Redpoll sp.	0.03
	Swainson's thrush	0.18
	White-crowned sparrow	0.05
	Ruby-crowned kinglet	0.21
	American robin	0.03
	Gray-cheeked thrush	0.15
	Yellow-rumped warbler	0.30
	Dark-eyed junco	0.17
	Varied thrush	0.13
	Gray jay	0.15
	Olive-sided flycatcher	0.00
	Alder flycatcher	0.00
	White-winged crossbill	0.03
	Orange-crowned warbler	0.00
	Blackpoll warbler	0.00
Shrub	Fox sparrow	0.00
	Redpoll sp.	0.18
	Swainson's thrush	0.08
	White-crowned sparrow	0.40
	Ruby-crowned kinglet	0.00
	American robin	0.03
	Gray-cheeked thrush	0.09
	Yellow-rumped warbler	0.00
	Dark-eyed junco	0.32
	Varied thrush	0.00
	Gray jay	0.00
	Olive-sided flycatcher	0.00
	Alder flycatcher	0.00

Table V-7: Estimated Density of 16 Bird Species Observed in the Vicinity of the Proposed Pipeline by Habitat

Habitat	Species	Estimated Density (birds/acre)
	White-winged crossbill	0.00
	Orange-crowned warbler	0.16
	Blackpoll warbler	0.00

Source: Hinkes and Engels 1989

Table V-8: Raptor Nests Near Mine Site Area and Access Roads, 2007-2012

Year	Occupied	Unoccupied	Total Number of Nests
2007	17 (3 Bald Eagles, 4 Common Ravens, 1 Merlin, 1 Harlan's Hawk, 2 Osprey, 2 Peregrine Falcons, 2 Red-tailed Hawks, and 2 Rough-legged Hawks)	12	29
2008	46 (4 Bald Eagles, 1 Great Gray Owl, 3 Great Horned Owls, 2 Golden Eagles, 1 Merlin, 5 Osprey, 10 Peregrine Falcons, 12 Red-tailed Hawks, and 7 Rough-legged Hawks)	49	95
2009	46 (2 Bald Eagles, 3 Common Ravens, 5 Great Gray Owls, 1 Great Horned Owl, 2 Golden Eagles, 13 Harlan's Hawks, 4 Osprey, 8 Peregrine Falcons, 1 Red-tailed Hawk, 4 Rough-legged Hawks, and 3 unidentified buteos)	67	113
2010	87 (15 Bald Eagles, 5 Golden Eagles, 6 Common Ravens, 9 Great Gray Owls, 4 Great Horned Owls, 14 Harlan's Hawks, 8 Osprey, 8 Peregrine Falcons, 9 Red-tailed Hawks, 4 Rough-legged Hawks, 3 unidentified buteos, 1 Gyrfalcon, and 1 unidentified raptor)	74	161
2011	85 (14 Bald Eagles, 13 Common Ravens, 3 Great Gray Owls, 2 Great Horned Owls, 14 Harlan's Hawks, 3 Merlins, 1 Golden Eagle, 3 Northern Harriers, 6 Osprey, 12 Peregrine Falcons, 8 Red-tailed Hawks, 5 Rough-legged Hawks, and 1 unidentified raptor)	120	205
2012	92 (25 Bald Eagles, 11 Common Ravens, 1 Golden Eagle, 4 Great Gray Owls, 1 Merlin, 2 Golden Eagles, 3 Northern Harriers, 14 Harlan's Hawks, 8 Osprey, 10 Peregrine Falcons, 6 Red-tailed Hawks, 6 Rough-legged Hawks, and 1 unidentified buteo).	119	211

Source: ARCADIS 2012d

Table V-9: Occupied Raptor Nests by Species Near the Mine Site or Access Roads, 2007-2012

Common Name	Scientific Name	Total Number of Occupied Nests*	Range of Nests Found Annually Over 6 Years of Surveys
Bald Eagle	<i>Haliaeetus leucocephalus</i>	63	2-25
Red-tailed Hawk (Harlan's)	<i>Buteo jamaicensis harlani</i>	56	0-14
Peregrine Falcon	<i>Falco peregrines</i>	50	2-10
Red-tailed Hawk	<i>Buteo jamaicensis</i>	38	1-7
Osprey	<i>Pandion haliaetus</i>	33	2-5
Rough-legged Hawk	<i>Buteo lagopus</i>	28	2-6
Great Gray Owl	<i>Strix nebulosa</i>	22	1-9
Great Horned Owl	<i>Bubo virginianus</i>	10	0-5
Northern Harrier	<i>Circus cyaneus</i>	6	0-3
Merlin	<i>Falco columbarius</i>	6	0-3
Unknown Buteo	NA	5	0-2
Unknown	NA	2	0-1
Gyr Falcon	<i>Falco rusticolus</i>	2	0-1

Notes:

*This number represents the total number of nests observed over the 6-year survey period, not the number of nests in the area at any one time. The number may include multiple countings of the same nest.

Source: ARCADIS 2012d.

Table V-10: Raptor Nests Near the Angyaruaq (Jungjuk) Port and Road, 2012

Species	Occupied	Unoccupied	General Location
Red-tailed Hawk		1	Near Getmuna Creek
Harlan's Hawk	1	2	2 near Getmuna Creek, 1 near unidentified Creek
Bald Eagle	1	1	Both near Kuskokwim River
Unidentified		2	1 near Getmuna Creek, 1 near the intersection of the airport road.

Source: ARCADIS 2012a

Table V-11: Raptor Nests Near the Birch Tree Crossing Port and Road, 2012

Species	Occupied	Unoccupied	General Location
Red-tailed Hawk	1		Adjacent to the proposed port road approximately 19 miles northeast of the port site.
Common Raven	2		1 adjacent to the proposed port road approximately 20 miles northeast of the port site, 1 near the port site.
Peregrine Falcon	2		Both near the port site
Golden Eagle		1	Adjacent to the proposed port road approximately 22 miles northeast of the port site
Great Horned Owl		1	Adjacent to the proposed port road approximately 22 miles northeast of the port site
Great Gray Owl		1	Adjacent to the proposed port road approximately 50 miles northeast of the port site
Rough-legged Hawk		1	Near the port site
Unknown raptor		1	Adjacent to the proposed port road approximately 40 miles north of the port site.

Source: ARCADIS 2012e.

Table V-12: Raptor Nests along Pipeline Route by Abundance, 2010-2012

Species	2010		2011		2012		Totals
	Occupied	Unoccupied	Occupied	Unoccupied	Occupied	Unoccupied	
Bald Eagle	5	10	8	10	12	9	54
Unidentified Raptor	0	0	0	21	0	8	29
Harlan's Hawk	5	0	7	0	2	3	17
Common Raven	1	0	2	0	3	11	17
Golden Eagle	4	2	0	3	1	3	13
Osprey	1	0	3	0	4	0	8
Northern Harrier	0	0	3	0	3	0	6
Peregrine Falcon	0	0	0	6	0	0	6
Unidentified Accipiter	0	5	0	0	0	0	5
Great Gray Owl	3	0	0	1	0	1	5

Table V-12: Raptor Nests along Pipeline Route by Abundance, 2010-2012

Species	2010		2011		2012		Totals
	Occupied	Unoccupied	Occupied	Unoccupied	Occupied	Unoccupied	
Unidentified Buteo	0	2	0	1	0	1	4
Merlin	0	0	1	0	1	0	2
Great Horned Owl	1	0	0	0	0	0	1
Totals:	20	19	24	42	26	36	167

Source: ARCADIS 2012e

Table V-13: Raptor Species Recorded During the Waterway Transportation Corridor Wildlife Survey

Common Name	Scientific Name	Common Name	Scientific Name
Osprey	<i>Pandion haliaetus</i>	Golden Eagle	<i>Aquila chrysaetos</i>
Bald Eagle	<i>Haliaeetus leucocephalus</i>	Falcon (unidentified)	NA
Eagle (unidentified)	NA	Merlin	<i>Falco columbarius</i>
Northern Harrier	<i>Circus cyaneus</i>	Peregrine Falcon	<i>Falco peregrinus</i>
Northern Goshawk	<i>Accipiter gentilis</i>	Owl (unidentified)	NA
Red-tailed Hawk	<i>Buteo jamaicensis</i>	Northern Hawk Owl	<i>Surnia ulula</i>
Rough-legged Hawk	<i>Buteo lagopus</i>	Raptor (unidentified)	NA
Hawk (unidentified)	NA		

Source: RWJ Consulting, Inc. 2010b

Table V-14: Waterfowl and Shorebird Species Observed During Avian Surveys in the Mine Site Area

Common Name	Scientific Name	Common Name	Scientific Name
American Golden-plover	<i>Pluvialis dominica</i>	Pacific Loon	<i>Gavia pacifica</i>
Greater-white Fronted Goose	<i>Anser albifrons</i>	Common Merganser	<i>Mergus merganser</i>
American Widgeon	<i>Anas penelope</i>	Parasitic Jaeger	<i>Stercorarius parasiticus</i>

Table V-14: Waterfowl and Shorebird Species Observed During Avian Surveys in the Mine Site Area

Common Name	Scientific Name	Common Name	Scientific Name
Long-tailed Jaeger	<i>Stercorarius longicaudus</i>	Common Snipe	<i>Gallinago gallinago</i>
Blue-winged Teal	<i>Anas discors</i>	Red-breasted Merganser	<i>Mergus serrator</i>
Mallard	<i>Anas platyrhynchos</i>	Glaucous-winged Gull	<i>Larus glaucescens</i>
Bristle-thighed Curlew	<i>Numenius tahitiensis</i>	Short-billed Dowitcher	<i>Limnodromus griseus</i>
Northern Pintail	<i>Anas acuta</i>	Greater Scaup	<i>Aythya marila</i>
Northern Shoveler	<i>Anas clypeata</i>	Tundra Swan	<i>Cygnus columbianus</i>
Bufflehead	<i>Bucephala albeola</i>	Green-winged Teal	<i>Anas crecca</i>
Pacific Golden-plover	<i>Pluvialis fulva</i>	Whimbrel	<i>Numenius phaeopus</i>
Canada Goose	<i>Branta canadensis</i>		

Source: ARCADIS 2010b

Table V-15: 2013 Mine Site and Transportation Facilities Stream-nesting Surveys

Location	Survey Methods	Results
Crooked Creek	Rafting - two days, approximately 30 river miles from Anaconda Creek to the mouth). Helicopter - from the Flat Creek-Donlin Creek junction to the mouth at the Kuskokwim River.	The combined surveys suggest that only one or two pairs each of red-breasted and common mergansers occur along Crooked Creek, and very few pairs of mallards and green-winged teal may be nesting within beaver sloughs.
Getmuna Creek	Helicopter - 8 air miles.	One each of mallard, green-winged teal, and Canada or cackling goose was recorded.
Jungjuk Creek	By foot - nearly 6 miles from the upper-most Donlin-Jungjuk Road stream crossing down to the Kuskokwim River.	A pair of green-winged teal was observed at a blown-out beaver pond, and two male green-winged teal were flushed from one of the few beaver side-channel sloughs. Jungjuk Creek is swift flowing, alder-choked, and provides little wetland breeding habitat for waterbirds.

Source: Owl Ridge 2013b

Table V-16: 2013 Kuskokwim River Waterfowl Survey Results (June 18 and 19, 2013)

Species by Group	Number Observed
Waterfowl	
American Wigeon	136
Northern Pintail	82
Great White-fronted Goose	67
Mallard	66
Red-breasted Merganser	43
Northern Shoveler	41
Green-winged Teal	34
Common goldeneye	23
Canada Goose	19
Unidentified waterfowl	17
White-winged Scoter	3
Long-tailed duck	1
Waterbirds	
Arctic Tern	194
Mew Gull	73
Glaucous Gull	60
Herring Gull	58
Bonaparte's Gull	29
Glaucous-winged Gull	19
Glaucous/Glaucous-winged Gull	9
Red-throated Loon	3
Shorebirds	
Spotted Sandpiper	30
Black Turnstone	14
Semipalmated Plover	12
Raptors	
Common Raven	31
Bald Eagle	20
Osprey	10
Peregrine Falcon	4
Rough-legged Hawk	1

Source: Owl Ridge 2013b

Table V-17: Waterbird Species Recorded During the Waterway Transportation Corridor Wildlife Survey

Common Name	Scientific Name	Common Name	Scientific Name
Red-throated Loon	<i>Gavia stellata</i>	Crane (unidentified)	<i>Grus sp.</i>
Pacific Loon	<i>Gavia pacifica</i>	Black-bellied Plover	<i>Pluvialis squatarola</i>
Common Loon	<i>Gavia immer</i>	American Golden-Plover	<i>Pluvialis dominica</i>
Yellow-billed Loon	<i>Gavia adamsii</i>	Pacific Golden-Plover	<i>Pluvialis fulva</i>
Loon (unidentified)	<i>Gavia spp.</i>	Golden-Plover (unidentified)	<i>Pluvialis spp.</i>
Red-necked Grebe	<i>Podiceps grisegena</i>	Semipalmated Plover	<i>Charadrius semipalmatus</i>
Fork-tailed Storm-Petrel	<i>Oceanodroma furcata</i>	Plover (genus Pluvialis)	<i>Pluvialis spp.</i>
Pelagic Cormorant	<i>Phalacrocorax pelagicus</i>	Greater Yellowlegs	<i>Tringa melanoleuca</i>
Cormorant (unidentified)	<i>Phalacrocorax spp.</i>	Lesser Yellowlegs	<i>Tringa flavipes</i>
Tundra Swan	<i>Cygnus columbianus</i>	Yellowlegs (unidentified)	<i>Tringa spp.</i>
Swan (unidentified)	<i>Cygnus spp.</i>	Wandering Tattler	<i>Tringa incanus</i>
Greater White-fronted Goose	<i>Anser albifrons</i>	Spotted Sandpiper	<i>Actitis macularius</i>
Snow Goose	<i>Chen caerulescens</i>	Whimbrel	<i>Numenius phaeopus</i>
Emperor Goose	<i>Chen canagica</i>	Bristle-thighed Curlew	<i>Numenius tahitiensis</i>
Brant	<i>Brant bernicla</i>	Curlew (unidentified)	<i>Numenius spp.</i>
Canada Goose and Cackling Goose ¹	<i>Branta canadensis and Branta hutchinsii</i>	Hudsonian Godwit	<i>Limosa haemastica</i>
Goose (unidentified)	<i>Anatidae</i>	Bar-tailed Godwit	<i>Limosa lapponica</i>
Green-winged Teal	<i>Anas crecca</i>	Godwit (unidentified)	<i>Limosa spp.</i>
Teal (unidentified)	<i>Anas spp.</i>	Black Turnstone	<i>Arenaria melanocephala</i>
Northern Shoveler	<i>Anas clypeata</i>	Ruddy Turnstone	<i>Arenaria interpres</i>
Gadwall	<i>Anas strepera</i>	Red Knot	<i>Calidris canutus</i>
American Wigeon	<i>Anas Americana</i>	Semipalmated Sandpiper	<i>Calidris pusilla</i>
Wigeon (unidentified)	<i>Anas spp.</i>	Pectoral Sandpiper	<i>Calidris melanotos</i>
Duck (unidentified)	<i>Anatidae</i>	Sharp-tailed Sandpiper	<i>Calidris acuminata</i>
Canvasback	<i>Aythya valisineria</i>	Western Sandpiper	<i>Calidris mauri</i>
Greater Scaup	<i>Aythya marila</i>	Least Sandpiper	<i>Calidris minutilla</i>
Lesser Scaup	<i>Aythya affinis</i>	Calidrid Sandpiper	<i>Calidris spp.</i>
Scaup (unidentified)	<i>Aythya spp.</i>	Rock Sandpiper	<i>Calidris ptilocnemis</i>
Spectacled Eider	<i>Somateria fischeri</i>	Sandpiper (unidentified)	<i>Scolopacidae</i>
Eider (unidentified)	<i>Somateria spp.</i>	Dunlin	<i>Calidris alpina</i>
Harlequin Duck	<i>Histrionicus histrionicus</i>	Short-billed Dowitcher	<i>Limnodromus griseus</i>
Long-tailed Duck	<i>Clangula hyemalis</i>	Wilson's Snipe	<i>Gallinago delicata</i>
Black Scoter	<i>Melanitta Americana</i>	Red-necked Phalarope	<i>Phalaropus lobatus</i>

Table V-17: Waterbird Species Recorded During the Waterway Transportation Corridor Wildlife Survey

Common Name	Scientific Name	Common Name	Scientific Name
Surf Scoter	<i>Melanitta perspicillata</i>	Phalarope (unidentified)	<i>Phalaropus spp.</i>
Scoter (unidentified)	<i>Melanitta spp.</i>	Parasitic Jaeger	<i>Stercorarius parasiticus</i>
White-winged Scoter	<i>Melanitta fusca</i>	Long-tailed Jaeger	<i>Stercorarius longicaudus</i>
Common Goldeneye	<i>Bucephala clangula</i>	Jaeger (unidentified)	<i>Stercorarius spp.</i>
Barrow's Goldeneye	<i>Bucephala islandica</i>	Bonaparte's Gull	<i>Chroicocephalus Philadelphia</i>
Goldeneye (unidentified)	<i>Bucephala spp.</i>	Mew Gull	<i>Larus canus</i>
Bufflehead	<i>Bucephala albeola</i>	Herring Gull	<i>Larus argentatus</i>
Common Merganser	<i>Mergus merganser</i>	Glaucous-winged Gull	<i>Larus glaucescens</i>
Red-breasted Merganser	<i>Mergus serrator</i>	Glaucous Gull	<i>Larus hyperboreus</i>
Merganser (unidentified)	<i>Mergus spp.</i>	Sabine's Gull	<i>Xema sabini</i>
Sandhill Crane	<i>Grus Canadensis</i>	Gull (unidentified)	<i>Laridae</i>
Long-billed Dowitcher	<i>Limnodromus scolopaceus</i>	Arctic Tern	<i>Sterna paradisaea</i>
Dowitcher (unidentified)	<i>Limnodromus spp.</i>	Tern (unidentified)	<i>Laridae spp.</i>

Notes:

1 Due to the difficulty distinguishing these species, they will be considered together.

Source: RWJ Consulting, Inc. 2008c, 2009, 2010b

Table V-18: Special Status Species (non-ESA Listed) Detected in the Project Area

Common Name	Reason for Concern ¹	Mine Site and the Angyaruaq (Jungjuk) Port Road.	BTC Port Site and Road	Kuskokwim River – Below Napaskiak	Kuskokwim River – Above Napaskiak	Pipeline
Waterbirds						
Red-throated Loon	The population in Alaska declined substantially between 1977 and 1993, and has not rebounded. Birds that winter in Southeast Asia may suffer PCB-related reproductive losses.			X	*	
Yellow-billed Loon	Fall subsistence surveys indicate unsustainable levels of harvest.			X		
Emperor Goose	Most of the world population breeds on the Yukon-Kuskokwim Delta, and spends spring and fall staging periods on the Alaska Peninsula. These birds declined from an estimated 139,000 in 1964 to 42,000 in 1986, for reasons that are not well understood. Populations since are stable or increasing.			X		
Spectacled Eider	Federally listed as threatened following declines of more than 90 percent in Western Alaska. For the last decade they have been slowly recovering. Virtually the entire global population winters in Alaska waters; tens of thousands of birds congregate in ice-free waters south of St. Lawrence Island.			X		
Steller's Eider	Federally listed as threatened due to declines of 50 to 75% over the last 25 years. Steller's Eiders previously nested extensively in portions of the Yukon-Kuskokwim Delta, but only an occasional pair has been observed there since 1975. A substantial portion of the threatened population molts in Kuskokwim Bay.			X		
Black Scoter	Surveys of the western population indicate a substantial decline over the last 7–15 years. Reasons for the long-term decline are unknown. Black Scoters molt in large flocks from Cape Romanzof, Angyoyaravak Bay, Kuskokwim Bay, and south in bays to Cape Pierce (Palmer 1976, King and Dau 1981).			X		
Harlequin Duck	Population trends cannot be reliably determined for western Harlequin Ducks because of insufficient geographic coverage and time series data (Sea Duck Joint Ventures 2003). Winter surveys suggest stable numbers in major areas (FWS in Sea Duck Joint Venture 2003).			X		Not detected, but likely to occur

Table V-18: Special Status Species (non-ESA Listed) Detected in the Project Area

Common Name	Reason for Concern ¹	Mine Site and the Angyaruaq (Jungjuk) Port Road.	BTC Port Site and Road	Kuskokwim River – Below Napaskiak	Kuskokwim River – Above Napaskiak	Pipeline
American Golden Plover	Apparently declining, possibly due to habitat loss on wintering grounds in South America and changing agricultural practices on migratory staging grounds in the American Midwest. Declining in North America with estimates based on mark recapture or other systematic efforts (Morrison et al. 2006).	X	X	X		
Solitary Sandpiper	A dispersed nester in boreal woodland forests, this subspecies has a relatively small population. Likely has declined due to habitat loss and alteration of boreal forests and drying and loss of wetlands.			X	*	*
Lesser Yellowlegs	This species is declining rapidly based on Breeding Bird Survey data. Causes may include drying of boreal wetland habitat on its breeding grounds as a result of recent climate change and habitat degradation on wintering grounds in Latin America.			X	*	*
Whimbrel	Drastic reduction of the intertidal mangrove habitat that Whimbrels depend on in Latin America wintering grounds is a concern.	58 birds total, 0.02 birds/acre	X	X	*	Not detected, but likely to occur
Bristle-thighed Curlew	A rare species with a global population estimate of only 10,000 birds. Breeding grounds restricted to two relatively small areas in western Alaska. Populations may be negatively affected by factors on the nonbreeding range.	X		X		
Hudsonian Godwit	This species is a long-distance migrant, moving from a few Arctic breeding sites to a small wintering range in southern South America. The Alaska population is small, genetically distinct, and relatively vulnerable. Greatest threat thought to be gas and oil development in Cook Inlet, which has the majority of the Alaska population.			X	*	*
Bar-tailed Godwit	This subspecies breeds only in Alaska, wintering in Australia and New Zealand. Threats include habitat degradation and hunting at northward migration stopover sites along the Yellow Sea in eastern Asia.			X		
Dunlin	The pacifica subspecies nests in western and northern Alaska. Both subspecies are relatively abundant, but appear to have undergone substantial declines.			X		

Table V-18: Special Status Species (non-ESA Listed) Detected in the Project Area

Common Name	Reason for Concern ¹	Mine Site and the Angyaruaq (Jungjuk) Port Road.	BTC Port Site and Road	Kuskokwim River – Below Napaskiak	Kuskokwim River – Above Napaskiak	Pipeline
Black Turnstone	The entire global population of Black Turnstones breeds only on the coast of western Alaska, 85% on the central Yukon-Kuskokwim Delta.			X		
Red Knot	All of the North American population migrates through Alaska. Conservation concerns include unsustainable hunting on the wintering grounds and low reproductive success on the breeding range.			X		
Western Sandpiper	Conservation concerns include: a tendency to concentrate in a limited number of locations during migration and winter, substantial habitat loss/degradation on wintering grounds, and a restricted breeding range in western Alaska.			X		*
Rock Sandpiper	Restricted distributions of the multiple subspecies that have evolved in the region, two of which breed exclusively in Alaska. Either the entire or majority of the three populations winter in Alaska. None of the three populations is large, ranging in size from 25,000 to 75,000 individuals.			X		*
Short-billed Dowitcher	Pesticide use and the local destruction of migratory habitat, especially in the Midwest, have contributed to the recent decline in Short-billed Dowitchers. The boreal breeding grounds of the Short-billed Dowitcher have been seriously degraded and fragmented in areas where energy and logging companies have commercial access.	0.00004 birds/acre		X	*	*
Arctic Tern	Reduction in numbers in the southern part of their range, much of this is due to lack of food.			X	*	*
Raptors						
Golden Eagle	Loss of undisturbed habitat seems the most serious threat to maintaining healthy populations of golden eagles. They are also particularly susceptible to electrocution from power lines due to their large wingspan, and poisoning from ingesting poisoned food meant for coyotes.	0.0004 birds/acre	X	X	*	X
Gyrfalcon	Degradation of nesting habitat and disturbance due to large-scale development is mostly a localized threat in Alaska, but loss of wintering habitat is more extensive and could pose future difficulties.	0.00007 birds/acre		X		X
Peregrine Falcon	Degradation of nesting habitat and disturbance due to large-scale development is mostly a localized threat in Alaska, but loss of wintering habitat is more extensive and could pose future difficulties.	0.002 birds/acre	X	X	*	X

Table V-18: Special Status Species (non-ESA Listed) Detected in the Project Area

Common Name	Reason for Concern ¹	Mine Site and the Angyaruaq (Jungjuk) Port Road.	BTC Port Site and Road	Kuskokwim River – Below Napaskiak	Kuskokwim River – Above Napaskiak	Pipeline
Short-eared Owl	Development, and the disturbance that accompanies it, does occur within species' range in the state. Reductions in prey abundance and wetland drying adversely affect this species.					X
Landbirds						
Olive-sided Flycatcher	This species has a low reproductive rate for a songbird. Populations are declining 3–3.5% annually in North America. A suspected cause is loss of forested habitat in South American wintering grounds.	0.01 bird/acre detected	X		*	*
Varied Thrush	This species is abundant, but declining by 3%–4% per year. Threats include loss of mature forest due to logging, especially in the southern portion of its range.	0.01 birds/acre detected	X	X	*	*
Gray-cheeked Thrush	A pronounced decline was observed during the 12 year (1991-2003) spring netting period at Creamer's Field Migration Station in Fairbanks.					0.03 birds/acre detected *
Blackpoll Warbler	Alaska population has declined by 54% since 1980 (Sauer et al. 2005). Alaska BBS data from 1980-2007 indicate a substantial population decline of 3.0% per year (P=0.00, n = 56, c=3). Cause of the decline is unknown. Breeding density highest in riparian habitats in western Alaska (McCaffery 1996, Harwood 2002).	0.07 birds/acre detected	X	X	*	*
Rusty Blackbird	The Rusty Blackbird declined from an estimated 13 million birds in 1965 to only 2 million birds today. Loss of wintering habitat plays a role. Other possible factors in the decline are acid rain and mercury accumulation on the breeding grounds, and alterations in boreal forest wetlands associated with climate change.	0.0001 birds/acre		X	*	*
Total Number of Species		12		24	14	16

Table V-18: Special Status Species (non-ESA Listed) Detected in the Project Area

Common Name	Reason for Concern ¹	Mine Site and the Angyaruaq (Jungjuk) Port Road.	BTC Port Site and Road	Kuskokwim River – Below Napaskiak	Kuskokwim River – Above Napaskiak	Pipeline
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Notes:

Shading indicates species with a substantial portion of their population either breeding or migrating through the EIS Analysis Area.

Bolded common names indicate species that are known to breed at higher densities than have been recorded elsewhere in Alaska or are known to concentrate in the Project Area for migration or molting.

X = Species detected from the surveys described in ARCADIS 2012d, e or RWJ Consulting 2009.

* = Species detected based on other surveys or information.

¹ Inclusion on this list is based on evaluations by the Alaska Department of Fish and Game (2006b), Alaska Shorebird Group (2008), Audubon Alaska (Kirchhoff and Padula 2010), AKNHP (2015d), Boreal Partners in Flight (in prep.), or the U.S. Fish and Wildlife Service (2008).

Table V-19: Species Observed in the Project Area Known to Nest Along Shorelines

Black Scoter	Spotted Sandpiper	Northern Waterthrush
Northern Pintail	Arctic Tern	Long-tailed Duck
Red-breasted Merganser	Red-necked Grebe	Canada Goose
Harlequin Duck	Pacific Loon	Greater White-fronted Goose
Mallard	Green-winged Teal	Tundra Swan
Semi-palmated plover	Red-necked Phalarope	Red Phalarope
Mew Gull	Sabine's Gull	Greater Scaup
Solitary Sandpiper	Spotted Sandpiper	Lesser Yellowlegs
Black Turnstone	Greater Yellowlegs	Black-bellied Plover
Bank Swallow		

Source: ARCADIS 2013a and Bowman 2008

Table V-20: Estimated Number of Breeding Bird Pairs Potentially Affected by Habitat Loss or Alteration at the Mine Site and Transportation Facilities under Alternative 2

Habitat	Species	Estimated Density using EDR (birds/acre)	Habitat Lost or Altered (acres)	Estimated Number of Bird Pairs Affected
Forested-Deciduous/Mixed	Fox sparrow	0.12	981.73	118
	Common redpoll	0.26	981.73	255
	Swainson's thrush	0.12	981.73	118
	White-crowned sparrow	0.04	981.73	39
	Ruby-crowned kinglet	0.24	981.73	235
	American robin	0.04	981.73	39
	Gray-cheeked thrush	0.03	981.73	29
	Yellow-rumped warbler	0.20	981.73	197
	Dark-eyed junco	0.06	981.73	58
	Varied thrush	0.01	981.73	10
	Gray jay	0.05	981.73	49
	Wilson's warbler	0.02	981.73	20
	Olive-sided flycatcher	0.01	981.73	10
	Alder flycatcher	0.02	981.73	20
	White-winged crossbill	0.01	981.73	10
	Orange-crowned warbler	0.01	981.73	10
	American pipit	0.003	981.73	3
	Blackpoll warbler	0.07	981.73	69
Herbaceous	Fox sparrow	0.03	199.91	6
	Common redpoll	0.26	199.91	52
	Swainson's thrush	0.02	199.91	4
	White-crowned sparrow	0.05	199.91	10
	Ruby-crowned kinglet	0.01	199.91	2
	American robin	0.03	199.91	6

Table V-20: Estimated Number of Breeding Bird Pairs Potentially Affected by Habitat Loss or Alteration at the Mine Site and Transportation Facilities under Alternative 2

Habitat	Species	Estimated Density using EDR (birds/acre)	Habitat Lost or Altered (acres)	Estimated Number of Bird Pairs Affected
	Gray-cheeked thrush	0.01	199.91	2
	Yellow-rumped warbler	0.01	199.91	2
	Dark-eyed junco	0.02	199.91	4
	Varied thrush	0.02	199.91	4
	Gray jay	0.01	199.91	2
	Wilson's warbler	0.01	199.91	2
	Olive-sided flycatcher	0.01	199.91	2
	Alder flycatcher	0.004	199.91	<1
	White-winged crossbill	0.003	199.91	<1
	Orange-crowned warbler	0.01	199.91	2
	American pipit	0.0014	199.91	<1
	Blackpoll warbler	0.01	199.91	2
Conifer Forest	Fox sparrow	0.08	6,724.60	538
	Common redpoll	0.30	6,724.60	2,017
	Swainson's thrush	0.07	6,724.60	471
	White-crowned sparrow	0.06	6,724.60	403
	Ruby-crowned kinglet	0.08	6,724.60	538
	American robin	0.04	6,724.60	269
	Gray-cheeked thrush	0.05	6,724.60	336
	Yellow-rumped warbler	0.08	6,724.60	538
	Dark-eyed junco	0.06	6,724.60	403
	Varied thrush	0.003	6,724.60	20
	Gray jay	0.08	6,724.60	538
	Wilson's warbler	0.01	6,724.60	67
	Olive-sided flycatcher	0.005	6,724.60	34
	Alder flycatcher	0.02	6,724.60	134
	White-winged crossbill	0.05	6,724.60	336
	Orange-crowned warbler	0.003	6,724.60	20
	American pipit	0.0002	6,724.60	1
	Blackpoll warbler	0.02	6,724.60	134
Shrub	Fox sparrow	0.01	1,821.01	18
	Common redpoll	0.42	1,821.01	765
	Swainson's thrush	0.03	1,821.01	55
	White-crowned sparrow	0.09	1,821.01	164
	Ruby-crowned kinglet	0.02	1,821.01	36
	American robin	0.05	1,821.01	91
	Gray-cheeked thrush	0.08	1,821.01	146
	Yellow-rumped warbler	0.04	1,821.01	73
	Dark-eyed junco	0.07	1,821.01	127
	Varied thrush	0.02	1,821.01	36
	Gray jay	0.03	1,821.01	55
	Wilson's warbler	0.03	1,821.01	55

Table V-20: Estimated Number of Breeding Bird Pairs Potentially Affected by Habitat Loss or Alteration at the Mine Site and Transportation Facilities under Alternative 2

Habitat	Species	Estimated Density using EDR (birds/acre)	Habitat Lost or Altered (acres)	Estimated Number of Bird Pairs Affected
	Olive-sided flycatcher	0.002	1,821.01	5
	Alder flycatcher	0.01	1,821.01	18
	White-winged crossbill	0.00	1,821.01	<1
	Orange-crowned warbler	0.02	1,821.01	36
	American pipit	0.01	1,821.01	18
	Blackpoll warbler	0.003	1,821.01	5
Total:				10,010

Source: Calculations made based on data from ARCADIS 2010b

Table V-21: Estimated Number of Breeding Bird Pairs in the Tanana-Kuskokwim Lowlands Ecoregion Potentially Affected by Habitat Loss or Alteration at the Pipeline under Alternative 2

Habitat	Species	Estimated Density using EDR (birds/acre)	Habitat Lost or Altered (acres)	Estimated Number of Bird Pairs Affected
Forested-Deciduous/Mixed	Fox sparrow	0.24	112.49	27
	Redpoll sp.	0.12	112.49	13
	Swainson's thrush	0.53	112.49	60
	White-crowned sparrow	0.00	112.49	0
	Ruby-crowned kinglet	0.24	112.49	27
	American robin	0.06	112.49	7
	Gray-cheeked thrush	0.03	112.49	3
	Yellow-rumped warbler	0.30	112.49	34
	Dark-eyed junco	0.30	112.49	34
	Varied thrush	0.06	112.49	7
	Gray jay	0.18	112.49	20
	Olive-sided flycatcher	0.18	112.49	20
	Alder flycatcher	0.35	112.49	40
	White-winged crossbill	0.00	112.49	0
	Orange-crowned warbler	0.00	112.49	0
	Blackpoll warbler	0.24	112.49	27
Conifer Forest	Fox sparrow	0.00	488.32	0
	Redpoll sp.	0.03	488.32	15
	Swainson's thrush	0.18	488.32	88
	White-crowned sparrow	0.05	488.32	24
	Ruby-crowned kinglet	0.21	488.32	103
	American robin	0.03	488.32	15
	Gray-cheeked thrush	0.15	488.32	73
	Yellow-rumped warbler	0.30	488.32	147
	Dark-eyed junco	0.17	488.32	83

Table V-21: Estimated Number of Breeding Bird Pairs in the Tanana-Kuskokwim Lowlands Ecoregion Potentially Affected by Habitat Loss or Alteration at the Pipeline under Alternative 2

Habitat	Species	Estimated Density using EDR (birds/acre)	Habitat Lost or Altered (acres)	Estimated Number of Bird Pairs Affected
	Varied thrush	0.13	488.32	63
	Gray jay	0.15	488.32	73
	Olive-sided flycatcher	0.00	488.32	0
	Alder flycatcher	0.00	488.32	0
	White-winged crossbill	0.03	488.32	15
	Orange-crowned warbler	0.00	488.32	0
	Blackpoll warbler	0.00	488.32	0
Shrub	Fox sparrow	0.00	394.11	0
	Redpoll sp.	0.18	394.11	70
	Swainson's thrush	0.08	394.11	31
	White-crowned sparrow	0.40	394.11	158
	Ruby-crowned kinglet	0.00	394.11	0
	American robin	0.03	394.11	11
	Gray-cheeked thrush	0.09	394.11	35
	Yellow-rumped warbler	0.00	394.11	0
	Dark-eyed junco	0.32	394.11	126
	Varied thrush	0.00	394.11	0
	Gray jay	0.00	394.11	0
	Olive-sided flycatcher	0.00	394.11	0
	Alder flycatcher	0.00	394.11	0
	White-winged crossbill	0.00	394.11	0
	Orange-crowned warbler	0.16	394.11	63
	Blackpoll warbler	0.00	394.11	0
Total:				1,512

Source: Hinkes and Engels 1989

Table V-22: Estimated Number of Breeding Bird Pairs Potentially Affected by Habitat Loss or Alteration at the Mine Site and Transportation Facilities under Alternative 4

Habitat	Species	Estimated Density using EDR (birds/acre)	Habitat Lost or Altered (acres)	Estimated Number of Bird Pairs Affected
Forested-Deciduous/Mixed	Fox sparrow	0.12	974.04	117
	Common redpoll	0.26	974.04	253
	Swainson's thrush	0.12	974.04	117
	White-crowned sparrow	0.04	974.04	39
	Ruby-crowned kinglet	0.24	974.04	234
	American robin	0.04	974.04	39
	Gray-cheeked thrush	0.03	974.04	29

Table V-22: Estimated Number of Breeding Bird Pairs Potentially Affected by Habitat Loss or Alteration at the Mine Site and Transportation Facilities under Alternative 4

Habitat	Species	Estimated Density using EDR (birds/acre)	Habitat Lost or Altered (acres)	Estimated Number of Bird Pairs Affected
	Yellow-rumped warbler	0.20	974.04	194
	Dark-eyed junco	0.06	974.04	59
	Varied thrush	0.01	974.04	10
	Gray jay	0.05	974.04	49
	Wilson's warbler	0.02	974.04	20
	Olive-sided flycatcher	0.01	974.04	10
	Alder flycatcher	0.02	974.04	20
	White-winged crossbill	0.01	974.04	10
	Orange-crowned warbler	0.01	974.04	10
	American pipit	0.003	974.04	3
	Blackpoll warbler	0.07	974.04	68
Herbaceous	Fox sparrow	0.03	347.15	10
	Common redpoll	0.26	347.15	90
	Swainson's thrush	0.02	347.15	7
	White-crowned sparrow	0.05	347.15	17
	Ruby-crowned kinglet	0.01	347.15	3
	American robin	0.03	347.15	10
	Gray-cheeked thrush	0.01	347.15	3
	Yellow-rumped warbler	0.01	347.15	3
	Dark-eyed junco	0.02	347.15	7
	Varied thrush	0.02	347.15	7
	Gray jay	0.01	347.15	3
	Wilson's warbler	0.01	347.15	3
	Olive-sided flycatcher	0.01	347.15	3
	Alder flycatcher	0.004	347.15	1
	White-winged crossbill	0.003	347.15	1
	Orange-crowned warbler	0.01	347.15	3
	American pipit	0.001	347.15	<1
	Blackpoll warbler	0.01	347.15	3
Conifer Forest	Fox sparrow	0.08	7,005.20	560
	Common redpoll	0.30	7,005.20	2,101
	Swainson's thrush	0.07	7,005.20	490
	White-crowned sparrow	0.06	7,005.20	520
	Ruby-crowned kinglet	0.08	7,005.20	560
	American robin	0.04	7,005.20	280
	Gray-cheeked thrush	0.05	7,005.20	350
	Yellow-rumped warbler	0.08	7,005.20	560
	Dark-eyed junco	0.06	7,005.20	520
	Varied thrush	0.003	7,005.20	21
	Gray jay	0.08	7,005.20	560
	Wilson's warbler	0.01	7,005.20	70
	Olive-sided flycatcher	0.005	7,005.20	350

Table V-22: Estimated Number of Breeding Bird Pairs Potentially Affected by Habitat Loss or Alteration at the Mine Site and Transportation Facilities under Alternative 4

Habitat	Species	Estimated Density using EDR (birds/acre)	Habitat Lost or Altered (acres)	Estimated Number of Bird Pairs Affected
	Alder flycatcher	0.02	7,005.20	140
	White-winged crossbill	0.05	7,005.20	350
	Orange-crowned warbler	0.003	7,005.20	21
	American pipit	0.0002	7,005.20	1
	Blackpoll warbler	0.02	7,005.20	140
Shrub	Fox sparrow	0.01	2,310.83	23
	Common redpoll	0.42	2,310.83	970
	Swainson's thrush	0.03	2,310.83	70
	White-crowned sparrow	0.09	2,310.83	208
	Ruby-crowned kinglet	0.02	2,310.83	46
	American robin	0.05	2,310.83	115
	Gray-cheeked thrush	0.08	2,310.83	185
	Yellow-rumped warbler	0.04	2,310.83	92
	Dark-eyed junco	0.07	2,310.83	162
	Varied thrush	0.02	2,310.83	46
	Gray jay	0.03	2,310.83	70
	Wilson's warbler	0.03	2,310.83	70
	Olive-sided flycatcher	0.002	2,310.83	4.6
	Alder flycatcher	0.01	2,310.83	23
	White-winged crossbill	0.00	2,310.83	0
	Orange-crowned warbler	0.02	2,310.83	46
	American pipit	0.01	2,310.83	23
	Blackpoll warbler	0.003	2,310.83	7
Total:				10,852

Source: Calculations based on data in ARCADIS 2011b

Table V-23: Estimated Number of Breeding Bird Pairs Potentially Affected by Habitat Loss or Alteration at the Mine Site and Transportation Facilities under Alternative 5A

Habitat	Species	Estimated Density using EDR (birds/acre)	Habitat Lost or Altered (acres)	Estimated Number of Bird Pairs Affected
Forested-Deciduous/Mixed	Fox sparrow	0.12	996.85	125
	Common redpoll	0.26	996.85	267
	Swainson's thrush	0.12	996.85	116
	White-crowned sparrow	0.04	996.85	36
	Ruby-crowned kinglet	0.24	996.85	235
	American robin	0.04	996.85	42
	Gray-cheeked thrush	0.03	996.85	35
	Yellow-rumped warbler	0.20	996.85	200
	Dark-eyed junco	0.06	996.85	64
	Varied thrush	0.01	996.85	13
	Gray jay	0.05	996.85	45
	Wilson's warbler	0.02	996.85	22
	Olive-sided flycatcher	0.01	996.85	7
	Alder flycatcher	0.02	996.85	27
	White-winged crossbill	0.01	996.85	5
	Orange-crowned warbler	0.01	996.85	10
	American pipit	0.0003	996.85	2
	Blackpoll warbler	0.07	996.85	66
Herbaceous	Fox sparrow	0.03	200.17	6
	Common redpoll	0.26	200.17	52
	Swainson's thrush	0.02	200.17	4
	White-crowned sparrow	0.05	200.17	9
	Ruby-crowned kinglet	0.01	200.17	3
	American robin	0.03	200.17	7
	Gray-cheeked thrush	0.01	200.17	3
	Yellow-rumped warbler	0.01	200.17	2
	Dark-eyed junco	0.02	200.17	5
	Varied thrush	0.02	200.17	4
	Gray jay	0.01	200.17	1
	Wilson's warbler	0.01	200.17	2
	Olive-sided flycatcher	0.01	200.17	1
	Alder flycatcher	0.004	200.17	<1
	White-winged crossbill	0.002	200.17	<1
	Orange-crowned warbler	0.01	200.17	2
	American pipit	0.0014	200.17	6
	Blackpoll warbler	0.01	200.17	<1
Conifer Forest	Fox sparrow	0.08	6,544.31	541
	Common redpoll	0.30	6,544.31	1,961
	Swainson's thrush	0.07	6,544.31	481
	White-crowned sparrow	0.06	6,544.31	375
	Ruby-crowned kinglet	0.08	6,544.31	524
	American robin	0.04	6,544.31	251
	Gray-cheeked thrush	0.05	6,544.31	321

Table V-23: Estimated Number of Breeding Bird Pairs Potentially Affected by Habitat Loss or Alteration at the Mine Site and Transportation Facilities under Alternative 5A

Habitat	Species	Estimated Density using EDR (birds/acre)	Habitat Lost or Altered (acres)	Estimated Number of Bird Pairs Affected
	Yellow-rumped warbler	0.08	6,544.31	554
	Dark-eyed junco	0.06	6,544.31	417
	Varied thrush	0.003	6,544.31	18
	Gray jay	0.08	6,544.31	501
	Wilson's warbler	0.01	6,544.31	37
	Olive-sided flycatcher	0.005	6,544.31	31
	Alder flycatcher	0.02	6,544.31	102
	White-winged crossbill	0.05	6,544.31	304
	Orange-crowned warbler	0.003	6,544.31	19
	American pipit	0.0002	6,544.31	1
	Blackpoll warbler	0.02	6,544.31	160
Shrub	Fox sparrow	0.01	1,820.65	131
	Common redpoll	0.42	1,820.65	765
	Swainson's thrush	0.03	1,820.65	58
	White-crowned sparrow	0.09	1,820.65	170
	Ruby-crowned kinglet	0.02	1,820.65	38
	American robin	0.05	1,820.65	83
	Gray-cheeked thrush	0.08	1,820.65	153
	Yellow-rumped warbler	0.04	1,820.65	66
	Dark-eyed junco	0.07	1,820.65	125
	Varied thrush	0.02	1,820.65	40
	Gray jay	0.03	1,820.65	59
	Wilson's warbler	0.03	1,820.65	62
	Olive-sided flycatcher	0.002	1,820.65	4
	Alder flycatcher	0.01	1,820.65	11
	White-winged crossbill	0.00	1,820.65	0
	Orange-crowned warbler	0.02	1,820.65	34
	American pipit	0.01	1,820.65	25
	Blackpoll warbler	0.003	1,820.65	6
Total:				9,848

Source: Calculations based on data in ARCADIS 2011b