



Pre-Permitting Environmental / Socio-Economic Data Report Series

Report Series N- Terrestrial Wildlife and Habitats

Report N-10 Landbird and Shorebird Tables 2004-2007

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Preliminary data. Do not cite or quote.

The Pebble Partnership is providing environmental and socio-economic baseline data collected to inform the development of the Pebble Project to state and federal agencies, project stakeholders and the general public prior to project permitting as part of its commitment to full and open disclosure.

A comprehensive Environmental Baseline Document (EBD) will subsequently be prepared and appended to future project permit applications. The EBD will also be made publicly available when complete.

Collected for the Pebble Partnership by:



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TABLE N-10.1

Number of Point-count Surveys Conducted, Number of Focal Observations, Focal Observations per Count, and Species Richness Recorded in Aggregated Habitat Types during Point-count Surveys for Landbirds and Shorebirds, Mine Study Area, 2004 and 2005

Aggregated Habitat Type	No. of Point-counts	No. of Focal Observations ^a	Focal Observations per Count	Species Richness ^b
Riverine Low Scrub	18	123	6.8	14
Riverine Tall Scrub	35	361	10.3	16
Shallow Lacustrine Water	5	0	0.0	0
Wet Sedge Meadow	44	99	2.3	13
Moist Graminoid Meadow	18	28	1.6	6
Lowland Scrub Bog	12	48	4.0	15
Lowland Low Scrub	31	168	5.4	13
Lowland Tall Scrub	16	162	10.1	14
Lowland Dwarf Scrub	8	7	0.9	4
Open Broadleaf Forest	2	7	3.5	5
Upland Low Scrub	26	145	5.6	15
Upland Tall Scrub	51	394	7.7	15
Upland Dwarf Scrub	119	260	2.2	15
Upland Barrens	8	11	1.4	4

Notes:

- Focal observations are those recorded in the habitat being sampled; observations recorded in adjacent habitats are not shown.
- Species richness was calculated only for focal observations in each habitat.

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TABLE N-10.2

Landbird Species Observed during Point-count Surveys and Incidentally at Point-count Locations^a, Mine Study Area, 2004 and 2005

Avian Group	Common Name	Scientific Name
Grouse & Ptarmigan	Willow Ptarmigan	<i>Lagopus lagopus</i>
	Rock Ptarmigan	<i>Lagopus muta</i>
Corvids	Black-billed Magpie ^b	<i>Pica pica</i>
	Common Raven	<i>Corvus corax</i>
Passerines	Alder Flycatcher	<i>Empidonax alnorum</i>
	Horned Lark	<i>Eremophila alpestris</i>
	Tree Swallow	<i>Tachycineta bicolor</i>
	Bank Swallow	<i>Riparia riparia</i>
	American Dipper ^b	<i>Cinclus mexicanus</i>
	Ruby-crowned Kinglet	<i>Regulus calendula</i>
	Arctic Warbler	<i>Phylloscopus borealis</i>
	Gray-cheeked Thrush	<i>Catharus minimus</i>
	Hermit Thrush	<i>Catharus guttatus</i>
	American Robin	<i>Turdus migratorius</i>
	American Pipit	<i>Anthus rubescens</i>
	Orange-crowned Warbler	<i>Vermivora celata</i>
	Yellow Warbler	<i>Dendroica petechia</i>
	Blackpoll Warbler	<i>Dendroica striata</i>
	Northern Waterthrush	<i>Seiurus noveboracensis</i>
	Wilson's Warbler	<i>Wilsonia pusilla</i>
	American Tree Sparrow	<i>Spizella arborea</i>
	Savannah Sparrow	<i>Passerculus sandwichensis</i>
	Fox Sparrow	<i>Passerella iliaca</i>
	Lincoln's Sparrow	<i>Melospiza lincolni</i>
Golden-crowned Sparrow	<i>Zonotrichia atricapilla</i>	
Lapland Longspur	<i>Calcarius lapponicus</i>	
Snow Bunting	<i>Plectrophenax nivalis</i>	
Common Redpoll	<i>Carduelis flammea</i>	

Notes:

- a. No additional landbird species were observed in transit between point-count locations.
- b. Incidental observations only.

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TABLE N-10.3

Number, Percent of Total Observations, and Average Occurrence of Landbird Species Observed during Point-count Surveys, Mine Study Area, 2004 and 2005

Avian Species	2004			2005		
	No.	%	Avg. Occurrence ^a (<i>n</i> =166)	No.	%	Avg. Occurrence ^a (<i>n</i> =227)
Savannah Sparrow	271	16.9	1.633	366	15.3	1.612
Golden-crowned Sparrow	213	13.3	1.283	330	13.8	1.454
Wilson's Warbler	143	8.9	0.861	333	13.9	1.467
Orange-crowned Warbler	135	8.4	0.813	172	7.2	0.758
Common Redpoll	123	7.7	0.741	123	5.2	0.542
American Tree Sparrow	122	7.6	0.735	160	6.7	0.705
Gray-cheeked Thrush	116	7.2	0.700	251	10.5	1.106
Fox Sparrow	96	6.0	0.578	159	6.7	0.700
Yellow Warbler	93	5.8	0.560	178	7.5	0.784
Northern Waterthrush	57	3.6	0.343	69	2.9	0.304
Lapland Longspur	57	3.6	0.343	41	1.7	0.181
Bank Swallow	40	2.5	0.241	0	0.0	0.000
American Robin	31	1.9	0.187	38	1.6	0.167
American Pipit	26	1.6	0.157	25	1.0	0.110
Blackpoll Warbler	18	1.1	0.108	34	1.4	0.150
Hermit Thrush	15	0.9	0.090	39	1.6	0.172
Horned Lark	13	0.8	0.078	18	0.8	0.079
Snow Bunting	10	0.6	0.060	11	0.5	0.048
Arctic Warbler	6	0.4	0.036	0	0.0	0.000
Willow Ptarmigan	4	0.2	0.024	17	0.7	0.075
Common Raven	4	0.2	0.024	1	<0.1	0.004
Unidentified swallow	4	0.2	0.024	0	0.0	0.000
Tree Swallow	2	0.1	0.012	2	<0.1	0.009
Unidentified warbler	2	0.1	0.012	0	0.0	0.000
Lincoln's Sparrow	1	<0.1	0.006	6	0.3	0.026
Rock Ptarmigan	1	<0.1	0.006	1	<0.1	0.004
Unidentified finch	1	<0.1	0.006	0	0.0	0.000
Alder Flycatcher	0	0.0	0.000	9	0.4	0.040
Unidentified thrush	0	0.0	0.000	2	<0.1	0.009
Unidentified passerine	0	0.0	0.000	2	<0.1	0.009
Ruby-crowned Kinglet	0	0.0	0.000	1	<0.1	0.004

Notes:

a. Average occurrence = number of bird detections divided by *n* (number of point-counts conducted).

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TABLE N-10.4
 Number, Percent of Total Observations, and Average Occurrence of Landbird Species Observed during Eight
 Additional Point-count Surveys Conducted East of the Mine Study Area in the Bristol Bay Drainages, 2005

Avian Species	No.	%	Avg. Occurrence ^a (<i>n</i> =8)
Wilson's Warbler	11	15.1	1.375
Savannah Sparrow	10	13.7	1.250
Orange-crowned Warbler	9	12.3	1.125
American Tree Sparrow	8	11.0	1.000
Northern Waterthrush	7	9.6	0.875
Fox Sparrow	6	8.2	0.750
Golden-crowned Sparrow	6	8.2	0.750
White-crowned Sparrow	5	6.8	0.625
Blackpoll Warbler	4	5.5	0.500
Willow Ptarmigan	2	2.7	0.250
Gray-cheeked Thrush	2	2.7	0.250
Black-capped Chickadee	1	1.4	0.125
Yellow Warbler	1	1.4	0.125
Lapland Longspur	1	1.4	0.125

Notes:

- a. Average occurrence = number of bird detections divided by *n* (number of point-counts conducted).

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TABLE N-10.5

Average Occurrence^a of Landbird Species Observed in the Mine Study Area, 2004 and 2005, and in other Studies in Southwestern Alaska in which Off-road Point-count Surveys Were Conducted

Landbird Species	Mother Goose Lake (<i>n</i> =141) ^b	Becharof Lake (<i>n</i> =99) ^c	Lake Clark NP (<i>n</i> =379) ^d	This study (<i>n</i> =393)
Savannah Sparrow	0.255	1.707	0.182	1.621
Golden-crowned Sparrow	0.915	1.879	0.628	1.382
Wilson's Warbler	3.057	1.808	0.235	1.211
Gray-cheeked Thrush	0.482	0.414	0.032	0.934
Orange-crowned Warbler	0.993	1.091	0.077	0.781
American Tree Sparrow		0.182	0.396	0.718
Yellow Warbler	0.993	0.727	0.029	0.690
Fox Sparrow	0.603	0.394	0.296	0.649
Common Redpoll	1.723	1.182	0.467	0.626
Northern Waterthrush			0.013	0.321
Lapland Longspur		0.182	0.048	0.249
American Robin	0.745	0.152	0.333	0.176
Hermit Thrush	1.589	1.455	0.224	0.137
Blackpoll Warbler			0.003	0.132
American Pipit		0.141	0.364	0.130
Bank Swallow	0.021			0.102
Horned Lark			0.114	0.079
Willow Ptarmigan		0.192	0.164	0.053
Snow Bunting		0.020	0.090	0.053
Alder Flycatcher	0.376	0.030		0.023
Lincoln's Sparrow			0.008	0.018
Arctic Warbler				0.015
Common Raven	0.028		0.048	0.013
Tree Swallow	0.759	0.071	0.024	0.010
Rock Ptarmigan			0.087	0.005
Ruby-crowned Kinglet			0.187	0.003
White-tailed Ptarmigan			0.008	
Downy Woodpecker	0.014			
American Three-toed Woodpecker			0.008	
Olive-sided Flycatcher			0.013	
Say's Phoebe			0.005	
Northern Shrike	0.057	0.020	0.002	
Gray Jay			0.029	
Black-billed Magpie	0.007		0.040	
Violet-green Swallow			0.005	
Black-capped Chickadee	0.064	0.081	0.005	
Boreal Chickadee			0.019	
Golden-crowned Kinglet			0.003	
Northern Wheatear			0.011	
Swainson's Thrush			0.013	
Varied Thrush			0.203	
Bohemian Waxwing			0.013	
Yellow-rumped Warbler			0.385	
White-crowned Sparrow	0.163		0.317	
Dark-eyed Junco			0.406	
Rusty Blackbird			0.008	
Gray-crowned Rosy-Finch			0.005	
Pine Grosbeak	0.170		0.003	
White-winged Crossbill			0.005	
Pine Siskin			0.003	

Notes:

- Average occurrence = number of bird detections divided by *n* (number of point-counts conducted).
- Off-road point-count data collected in 1996 and 2000 at Mother Goose Lake in the Alaska Peninsula National Wildlife Refuge; data were combined from Dewhurst et al. (1996b) and Egan and Adler (2001).
- Off-road point-count data collected in 1996 at Becharof Lake in the Becharof National Wildlife Refuge (Moore and Leeman, 1996).
- Off-road point-count data collected in 2004 in Lake Clark National Park (Ruthrauff et al., 2005).

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TABLE N-10.6

Average Occurrence^a of Landbird Species Observed in Aggregated Habitat Types during Point-count Surveys, Mine Study Area, 2004 and 2005

Avian Species	Riverine Low Scrub	Riverine Tall Scrub	Shallow Lacustrine Water	Wet Sedge Meadow	Moist Graminoid Meadow	Lowland Scrub Bog	Lowland Low Scrub	Lowland Tall Scrub	Lowland Dwarf Scrub	Open Broadleaf Forest	Upland Low Scrub	Upland Tall Scrub	Upland Dwarf Scrub ^b	Upland Barrens ^c
Willow Ptarmigan							0.032				0.038		0.017	
Rock Ptarmigan													0.017	
Alder Flycatcher		0.057						0.125				0.039		
Horned Lark													0.168	
Tree Swallow										1.000				
Arctic Warbler	0.056	0.029									0.077			
Gray-cheeked Thrush	0.444	0.800			0.056		0.452	1.188			0.423	1.078		
Hermit Thrush	0.056	0.171									0.038	0.157		
American Robin	0.056	0.143						0.063		0.500		0.137		
American Pipit													0.235	0.250
Orange-crowned Warbler	0.667	1.086				0.167	0.516	1.375		0.500	0.577	0.765		
Yellow Warbler	0.278	1.686			0.056		0.226	1.438			0.308	0.863		
Blackpoll Warbler	0.111	0.486					0.097	0.250		0.500		0.157		
Northern Waterthrush	0.222	0.657						0.250				0.078		
Wilson's Warbler	1.000	1.571		0.023		0.083	0.839	1.938			0.923	1.392		
American Tree Sparrow	1.222	0.571		0.023	0.167	0.083	0.677	0.875			0.538	0.431	0.017	
Savannah Sparrow	1.556	0.800		0.727	0.944	1.333	1.613	0.625	0.375		1.308	0.765	0.706	
Fox Sparrow	0.500	0.686				0.083	0.194	0.750			0.308	0.784		
Lincoln's Sparrow		0.057									0.038			
Golden-crowned Sparrow	0.611	1.086		0.045		0.083	0.548	1.063	0.125	1.000	0.654	0.980	0.017	
Lapland Longspur				0.023		0.250	0.065		0.125		0.154		0.504	0.250
Snow Bunting													0.092	0.750
Common Redpoll	0.056	0.371					0.129	0.125			0.154	0.059		

Notes:

- Average occurrence = number of bird detections divided by n (number of point-counts conducted). For 2004 and 2005 combined, $n = 393$. Only focal observations in each habitat are included (see Table N-10.1).
- Includes Alpine Dwarf Scrub.
- Includes Alpine Barrens.

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TABLE N-10.7

Shorebird Species Observed during Point-count Surveys^a, Mine Study Area, 2004 and 2005

Common Name	Scientific Name
Black-bellied Plover	<i>Pluvialis squatarola</i>
American Golden-Plover	<i>Pluvialis dominica</i>
Pacific Golden-Plover	<i>Pluvialis fulva</i>
Semipalmated Plover	<i>Charadrius semipalmatus</i>
Greater Yellowlegs	<i>Tringa melanoleuca</i>
Lesser Yellowlegs	<i>Tringa flavipes</i>
Wandering Tattler	<i>Heteroscelus incanus</i>
Whimbrel	<i>Numenius phaeopus</i>
Hudsonian Godwit	<i>Limosa haemastica</i>
Surfbird	<i>Aphriza virgata</i>
Least Sandpiper	<i>Calidris minutilla</i>
Short-billed Dowitcher	<i>Limnodromus griseus</i>
Wilson's Snipe	<i>Gallinago delicata</i>
Red-necked Phalarope	<i>Phalaropus lobatus</i>

Notes:

- a. No additional shorebird species were recorded incidentally at point-count locations or in transit between point-count locations.

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TABLE N-10.8

Number, Percent of Total Observations, and Average Occurrence of Shorebird Species Observed during Point-count Surveys, Mine Study Area, 2004 and 2005

Shorebird Species	2004			2005		
	No.	%	Avg. Occurrence ^a (<i>n</i> =166)	No.	%	Avg. Occurrence ^a (<i>n</i> =227)
Greater Yellowlegs	42	22.1	0.253	60	24.2	0.264
Wilson's Snipe	25	13.2	0.151	52	21.0	0.229
Least Sandpiper	24	12.6	0.145	21	8.5	0.093
Black-bellied Plover	18	9.5	0.108	15	6.0	0.066
Whimbrel	18	9.5	0.108	40	16.1	0.176
American Golden-Plover	16	8.4	0.096	14	5.6	0.062
Red-necked Phalarope	7	3.7	0.042	4	1.6	0.018
Semipalmated Plover	7	3.7	0.042	0	0.0	0.000
Unidentified med. shorebird	7	3.7	0.042	1	0.4	0.004
Pacific Golden-Plover	6	3.2	0.036	6	2.4	0.026
Short-billed Dowitcher	6	3.2	0.036	9	3.6	0.040
Unidentified (<i>Pluvialis</i>) Plover	6	3.2	0.036	11	4.4	0.048
Hudsonian Godwit	4	2.1	0.024	2	0.8	0.009
Surfbird	2	1.1	0.012	8	3.2	0.035
Lesser Yellowlegs	1	0.5	0.006	2	0.8	0.009
Unidentified yellowlegs	0	0.0	0.000	2	0.8	0.009
Wandering Tattler	1	0.5	0.006	0	0.0	0.000
Unidentified small sandpiper	0	0.0	0.000	1	0.4	0.004

Notes:

a. Average occurrence = number of bird detections divided by *n* (number of point-counts conducted).

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TABLE N-10.9

Number, Percent of Total Observations, and Average Occurrence of Shorebird Species Observed during Eight Additional Point-count Surveys Conducted East of the Mine Study Area in the Bristol Bay Drainages, 2005

Avian Species	No.	%	Avg. Occurrence^a (<i>n</i>=8)
Whimbrel	10	58.8	1.250
Greater Yellowlegs	2	11.8	0.250
Wilson's Snipe	2	11.8	0.250
American Golden-Plover	1	5.9	0.125
Pacific Golden-Plover	1	5.9	0.125
Least Sandpiper	1	5.9	0.125

Notes:

- a. Average occurrence = number of bird detections divided by *n* (number of point-counts conducted).

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TABLE N-10.10

Average Occurrence^a of Shorebird Species Observed in the Mine Study Area, 2004 and 2005, and in other Studies in Southwestern Alaska in which Off-road Point-count Surveys Were Conducted

Landbird Species	Mother Goose Lake (<i>n</i> =141) ^b	Becharof Lake (<i>n</i> =99) ^c	Lake Clark NP (<i>n</i> =379) ^d	This study (<i>n</i> =393)
Greater Yellowlegs	0.014	0.374	0.029	0.260
Wilson's Snipe	0.085	0.212	0.079	0.196
Whimbrel			0.005	0.148
Least Sandpiper		0.081	0.024	0.115
Black-bellied Plover		0.061		0.084
American Golden-Plover			0.045	0.076
Short-billed Dowitcher		0.081	0.003	0.038
Pacific Golden-Plover				0.031
Red-necked Phalarope			0.037	0.028
Surfbird			0.016	0.025
Semipalmated Plover	0.007	0.212	0.024	0.018
Hudsonian Godwit				0.015
Lesser Yellowlegs			0.103	0.008
Wandering Tattler			0.016	0.003
Solitary Sandpiper			0.005	
Spotted Sandpiper			0.005	
Western Sandpiper	0.007			
Baird's Sandpiper			0.011	
Rock Sandpiper		0.020		

Notes:

- Average occurrence = number of bird detections divided by *n* (number of point-counts conducted).
- Off-road point-count data collected in 1996 and 2000 at Mother Goose Lake in the Alaska Peninsula National Wildlife Refuge; data were combined from Dewhurst et al. (1996b) and Egan and Adler (2001).
- Off-road point-count data collected in 1996 at Becharof Lake in the Becharof National Wildlife Refuge (Moore and Leeman, 1996).
- Off-road point-count data collected in 2004 in Lake Clark National Park (Ruthrauff et al., 2005).

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TABLE N-10.11

Average Occurrence^a of Shorebird Species Observed in Aggregated Habitat Types during Point-count Surveys, Mine Study Area, 2004 and 2005

Avian Species	Riverine Low Scrub	Riverine Tall Scrub	Shallow Lacustrine Water	Wet Sedge Meadow	Moist Graminoid Meadow	Lowland Scrub Bog	Lowland Low Scrub	Lowland Tall Scrub	Lowland Dwarf Scrub	Open Broadleaf Forest	Upland Low Scrub	Upland Tall Scrub	Upland Dwarf Scrub ^b	Upland Barrens ^c
Black-bellied Plover				0.045					0.250				0.151	
American Golden-Plover						0.167						0.020	0.109	
Pacific Golden-Plover											0.038		0.042	
Unidentified (Pluvialis) plover													0.017	
Greater Yellowlegs				0.205	0.111	0.083	0.032						0.042	
Lesser Yellowlegs						0.167								
Unidentified yellowlegs					0.111									
Whimbrel				0.227		0.333								
Hudsonian Godwit				0.045		0.083								
Surfbird													0.042	
Least Sandpiper				0.364	0.111	0.333							0.008	0.125
Short-billed Dowitcher				0.250										
Wilson's Snipe				0.182		0.417		0.063						
Red-necked Phalarope				0.068		0.333								

Notes:

- Average occurrence = number of bird detections divided by n (number of point-counts conducted). For 2004 and 2005 combined, $n = 393$. Only focal observations in each habitat are included (see Table N-10.1).
- Includes Alpine Dwarf Scrub.
- Includes Alpine Barrens.

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TABLE N-10.12

Number of Point-count Surveys Conducted, Number of Focal Observations, Focal Observations per Count, and Species Richness Recorded in Aggregated Habitat Types during Point-count Surveys for Landbirds and Shorebirds, Transportation-corridor Study Area, Bristol Bay Drainages, 2005

Aggregated Habitat Type	No. of Point-counts	No. of Focal Observations^a	Focal Observations per Count	Species Richness^b
Riverine Low Scrub	2	9	4.5	6
Riverine Tall Scrub	4	5	1.3	3
Riverine Mixed Forest	13	79	6.1	18
Riverine Broadleaf Forest	10	78	7.8	20
Wet Sedge Meadow	8	9	1.1	3
Moist Graminoid Meadow	1	3	3.0	1
Lowland Scrub Bog	7	22	3.1	12
Dwarf Needleleaf Woodland	6	33	5.5	13
Lowland Low Scrub	12	49	4.1	13
Lowland Tall Scrub	2	4	2.0	2
Lowland Dwarf Scrub	6	9	1.5	6
Open Needleleaf Forest	18	118	6.6	22
Open Mixed Forest	37	288	7.8	31
Open Broadleaf Forest	18	104	5.8	19
Upland Low Scrub	3	3	1.0	3
Upland Tall Scrub	5	40	8.0	9
Upland Dwarf Scrub	2	6	3.0	3

Notes:

- a. Focal observations are those recorded in the habitat being sampled; observations recorded in adjacent habitats are not shown.
- b. Species richness calculated only for focal observations in each habitat.

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TABLE N-10.13

Landbird Species Observed during Point-count Surveys and Incidentally at Point-count Locations^a, Transportation-corridor Study Area, Bristol Bay Drainages, 2005

Avian Group	Common Name	Scientific Name
Grouse & Ptarmigan	Spruce Grouse	<i>Falciennis canadensis</i>
	Willow Ptarmigan	<i>Lagopus lagopus</i>
	Rock Ptarmigan	<i>Lagopus muta</i>
Cranes	Sandhill Crane ^b	<i>Grus canadensis</i>
Kingfishers	Belted Kingfisher ^b	<i>Ceryle alcyon</i>
Woodpeckers	Downy Woodpecker	<i>Picoides pubescens</i>
	Hairy Woodpecker	<i>Picoides villosus</i>
	American Three-toed Woodpecker	<i>Picoides dorsalis</i>
	Black-backed Woodpecker ^b	<i>Picoides arcticus</i>
Corvids & Shrikes	Northern Shrike	<i>Lanius excubitor</i>
	Gray Jay	<i>Perisoreus canadensis</i>
	Black-billed Magpie	<i>Pica pica</i>
	Common Raven	<i>Corvus corax</i>
Passerines	Olive-sided Flycatcher	<i>Contopus cooperi</i>
	Alder Flycatcher	<i>Empidonax alnorum</i>
	Tree Swallow	<i>Tachycineta bicolor</i>
	Violet-green Swallow	<i>Tachycineta thalassina</i>
	Black-capped Chickadee	<i>Poecile atricapillus</i>
	Boreal Chickadee	<i>Poecile hudsonicus</i>
	Red-breasted Nuthatch	<i>Sitta canadensis</i>
	Golden-crowned Kinglet	<i>Regulus satrapa</i>
	Ruby-crowned Kinglet	<i>Regulus calendula</i>
	Arctic Warbler	<i>Phylloscopus borealis</i>
	Gray-cheeked Thrush	<i>Catharus minimus</i>
	Swainson's Thrush	<i>Catharus ustulatus</i>
	Hermit Thrush	<i>Catharus guttatus</i>
	American Robin	<i>Turdus migratorius</i>
	Varied Thrush	<i>Ixoreus naevius</i>
	Bohemian Waxwing	<i>Bombycilla garrulus</i>
	Orange-crowned Warbler	<i>Vermivora celata</i>
	Yellow Warbler	<i>Dendroica petechia</i>
	Yellow-rumped Warbler	<i>Dendroica coronata</i>
	Blackpoll Warbler	<i>Dendroica striata</i>
	Northern Waterthrush	<i>Seiurus noveboracensis</i>
	Wilson's Warbler	<i>Wilsonia pusilla</i>
	American Tree Sparrow	<i>Spizella arborea</i>
	Savannah Sparrow	<i>Passerculus sandwichensis</i>
	Fox Sparrow	<i>Passerella iliaca</i>
	Lincoln's Sparrow	<i>Melospiza lincolnii</i>
	White-crowned Sparrow	<i>Zonotrichia leucophrys</i>
	Golden-crowned Sparrow	<i>Zonotrichia atricapilla</i>
	Dark-eyed Junco	<i>Junco hyemalis</i>
	Rusty Blackbird	<i>Euphagus carolinus</i>
Pine Grosbeak ^b	<i>Pinicola enucleator</i>	
White-winged Crossbill	<i>Loxia leucoptera</i>	
Common Redpoll	<i>Carduelis flammea</i>	

Notes:

- No additional landbird species were observed in transit between point-count locations.
- Incidental observations only.

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TABLE N-10.14

Number, Percent of Total Observations, and Average Occurrence of Landbird Species Observed during Point-count Surveys, Transportation-corridor Study Area, Bristol Bay Drainages, 2005

Avian Species	No.	%	Avg. Occurrence^a (n = 154)
Wilson's Warbler	208	11.7	1.351
Orange-crowned Warbler	200	11.2	1.299
Swainson's Thrush	181	10.2	1.175
Yellow-rumped Warbler	132	7.4	0.857
Golden-crowned Sparrow	125	7.0	0.812
Dark-eyed Junco	114	6.4	0.740
Ruby-crowned Kinglet	100	5.6	0.649
American Robin	99	5.6	0.643
Varied Thrush	91	5.1	0.591
Hermit Thrush	72	4.0	0.468
Blackpoll Warbler	52	2.9	0.338
White-crowned Sparrow	43	2.4	0.279
Common Redpoll	42	2.4	0.273
Yellow Warbler	40	2.2	0.260
Fox Sparrow	31	1.7	0.201
Gray-cheeked Thrush	26	1.5	0.169
Savannah Sparrow	26	1.5	0.169
Olive-sided Flycatcher	25	1.4	0.162
White-winged Crossbill	23	1.3	0.149
Northern Waterthrush	21	1.2	0.136
Tree Swallow	16	0.9	0.104
Gray Jay	14	0.8	0.091
Boreal Chickadee	12	0.7	0.078
American Tree Sparrow	12	0.7	0.078
Alder Flycatcher	11	0.6	0.071
Lincoln's Sparrow	10	0.6	0.065
American Three-toed Woodpecker	6	0.3	0.039
Red-breasted Nuthatch	6	0.3	0.039
Unidentified Woodpecker	5	0.3	0.032
Black-capped Chickadee	5	0.3	0.032
Northern Shrike	4	0.2	0.026
Golden-crowned Kinglet	4	0.2	0.026
Violet-green Swallow	3	0.2	0.019
Bohemian Waxwing	3	0.2	0.019
Rusty Blackbird	3	0.2	0.019
Willow Ptarmigan	2	0.1	0.013
Downy Woodpecker	2	0.1	0.013
Hairy Woodpecker	2	0.1	0.013
Black-billed Magpie	2	0.1	0.013
Common Raven	2	0.1	0.013
Unidentified Thrush	2	0.1	0.013
Unidentified Crossbill	2	0.1	0.013
Spruce Grouse	1	<0.1	0.006
Rock Ptarmigan	1	<0.1	0.006
Unidentified Chickadee	1	<0.1	0.006
Arctic Warbler	1	<0.1	0.006

Notes:

a. Average occurrence = number of bird detections divided by *n* (number of point-counts conducted).

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TABLE N-10.15

Average Occurrence^a of Landbird Species Observed in the Transportation-corridor Study Area, Bristol Bay Drainages, 2005, and in other Studies in Southwestern Alaska in which Off-road Point-count Surveys Were Conducted

Landbird Species	Mother Goose Lake (<i>n</i> =141) ^b	Becharof Lake (<i>n</i> =99) ^c	Lake Clark NP (<i>n</i> =379) ^d	This study (<i>n</i> =154)
Wilson's Warbler	3.057	1.808	0.235	1.351
Orange-crowned Warbler	0.993	1.091	0.077	1.299
Swainson's Thrush			0.013	1.175
Yellow-rumped Warbler			0.385	0.857
Golden-crowned Sparrow	0.915	1.879	0.628	0.812
Dark-eyed Junco			0.406	0.740
Ruby-crowned Kinglet			0.187	0.649
American Robin	0.745	0.152	0.333	0.643
Varied Thrush			0.203	0.591
Hermit Thrush	1.589	1.455	0.224	0.468
Blackpoll Warbler			0.003	0.338
White-crowned Sparrow	0.163		0.317	0.279
Common Redpoll	1.723	1.182	0.467	0.273
Yellow Warbler	0.993	0.727	0.029	0.260
Fox Sparrow	0.603	0.394	0.296	0.201
Gray-cheeked Thrush	0.482	0.414	0.032	0.169
Savannah Sparrow	0.255	1.707	0.182	0.169
Olive-sided Flycatcher			0.013	0.162
White-winged Crossbill			0.005	0.149
Northern Waterthrush			0.013	0.136
Tree Swallow	0.759	0.071	0.024	0.104
Gray Jay			0.029	0.091
Boreal Chickadee			0.019	0.078
American Tree Sparrow		0.182	0.396	0.078
Alder Flycatcher	0.376	0.030		0.071
Lincoln's Sparrow			0.008	0.065
American Three-toed Woodpecker			0.008	0.039
Red-breasted Nuthatch				0.039
Black-capped Chickadee	0.064	0.081	0.005	0.032
Northern Shrike	0.057	0.020	0.003	0.026
Golden-crowned Kinglet			0.003	0.026
Violet-green Swallow			0.005	0.019
Bohemian Waxwing			0.013	0.019
Rusty Blackbird			0.008	0.019
Willow Ptarmigan		0.192	0.164	0.013
Downy Woodpecker	0.014			0.013
Hairy Woodpecker				0.013
Black-billed Magpie	0.007		0.040	0.013
Common Raven	0.028		0.048	0.013
Spruce Grouse				0.006
Rock Ptarmigan			0.087	0.006
Arctic Warbler				0.006
White-tailed Ptarmigan			0.008	
Say's Phoebe			0.005	
Horned Lark			0.114	
Bank Swallow	0.021			
Northern Wheatear			0.011	
American Pipit		0.141	0.364	
Lapland Longspur		0.182	0.048	
Snow Bunting		0.020	0.090	
Gray-crowned Rosy-Finch			0.005	
Pine Grosbeak	0.170		0.003	

Notes:

- Average occurrence = number of bird detections divided by *n* (number of point-counts conducted).
- Off-road point-count data collected in 1996 and 2000 at Mother Goose Lake in the Alaska Peninsula National Wildlife Refuge; data were combined from Dewhurst et al. (1996b) and Egan and Adler (2001).
- Off-road point-count data collected in 1996 at Becharof Lake in the Becharof National Wildlife Refuge (Moore and Leeman, 1996).
- Off-road point-count data collected in 2004 in Lake Clark National Park (Ruthrauff et al., 2005).

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TABLE N-10.16

Average Occurrence^a of Landbird Species Observed in Aggregated Habitat Types during Point-count Surveys, Transportation-corridor Study Area, Bristol Bay Drainages, 2005

Avian Species	Riverine Low Scrub	Riverine Tall Scrub	Riverine Mixed Forest	Riverine Broadleaf Forest	Wet Sedge Meadow	Moist Graminoid Meadow	Lowland Scrub Bog	Dwarf Needleleaf Woodland	Lowland Low Scrub	Lowland Tall Scrub	Lowland Dwarf Scrub	Open Needleleaf Forest	Open Mixed Forest	Open Broadleaf Forest	Upland Low Scrub	Upland Tall Scrub	Upland Dwarf Scrub
Spruce Grouse													0.027				
Rock Ptarmigan													0.027				
Downy Woodpecker													0.054				
Hairy Woodpecker				0.200													
American Three-toed Woodpecker	1.500		0.077						0.083				0.027				
Olive-sided Flycatcher												0.167	0.189	0.167			
Alder Flycatcher			0.077	0.600													
Northern Shrike			0.308														
Gray Jay								0.167	0.083			0.167	0.027	0.056			
Black-billed Magpie											0.167						
Common Raven													0.027				
Tree Swallow					0.750		0.429					0.222					
Violet-green Swallow											0.500						
Black-capped Chickadee				0.100									0.081	0.056			
Boreal Chickadee							0.143		0.083			0.111	0.054	0.222			
Red-breasted Nuthatch				0.100									0.027				
Golden-crowned Kinglet				0.100									0.027				
Ruby-crowned Kinglet			0.538	0.400				0.333				0.333	0.622	0.222			
Gray-cheeked Thrush				0.200								0.056				0.600	
Swainson's Thrush			0.615	0.600	0.125		0.143					0.444	1.324	0.556		0.600	
Hermit Thrush			0.231	0.200								0.222	0.243	0.278		0.400	
American Robin	0.500		0.231	0.200			0.286	0.333	0.083		0.167	0.500	0.162	0.389			2.000
Varied Thrush			0.308	0.500								0.278	0.378	0.056		0.400	
Bohemian Waxwing												0.111	0.027				
Orange-crowned Warbler	1.000		0.462	0.500			0.143	0.667	0.583	0.500		1.000	1.000	1.056		1.400	0.500
Yellow Warbler			0.154	0.400					0.167				0.108			1.000	

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Avian Species	Riverine Low Scrub	Riverine Tall Scrub	Riverine Mixed Forest	Riverine Broadleaf Forest	Wet Sedge Meadow	Moist Graminoid Meadow	Lowland Scrub Bog	Dwarf Needleleaf Woodland	Lowland Low Scrub	Lowland Tall Scrub	Lowland Dwarf Scrub	Open Needleleaf Forest	Open Mixed Forest	Open Broadleaf Forest	Upland Low Scrub	Upland Tall Scrub	Upland Dwarf Scrub
Yellow-rumped Warbler			1.077	0.900			0.143	0.833			0.167	0.222	0.946	0.833			
Blackpoll Warbler		0.500	0.462	0.800				0.167	0.083			0.167	0.189	0.222	0.333		
Northern Waterthrush		0.250	0.231	0.100								0.111	0.054				
Wilson's Warbler	0.500	0.500	0.692	0.900			0.429	0.500	1.083	1.000	0.167	0.500	1.027	0.833		1.400	
American Tree Sparrow	0.500							0.167					0.027	0.056			
Savannah Sparrow						3.000	0.143		0.583		0.333		0.054		0.333		
Fox Sparrow			0.077	0.100					0.417			0.167	0.054			0.400	
Lincoln's Sparrow							0.143	0.167				0.056		0.056			
White-crowned Sparrow			0.077					0.333	0.167			0.333	0.135	0.056			
Golden-crowned Sparrow	0.500		0.154	0.700			0.143	0.167	0.583			0.333	0.216	0.056		1.800	
Dark-eyed Junco			0.231	0.200				1.167	0.083			0.944	0.514	0.556	0.333		
White-winged Crossbill													0.081				

Note:

a. Average occurrence = number of bird detections divided by *n* (number of point-counts conducted, which was 154). Only focal observations in each habitat are included (see Table N-10.12).

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TABLE N-10.17

Shorebird Species Observed during Point-count Surveys, Incidentally at Point-count Locations, and In Transit between Point-count Locations, Transportation-corridor Study Area, Bristol Bay Drainages, 2005

Common Name	Scientific Name
American Golden-Plover	<i>Pluvialis dominica</i>
Pacific Golden-Plover	<i>Pluvialis fulva</i>
Greater Yellowlegs	<i>Tringa melanoleuca</i>
Lesser Yellowlegs	<i>Tringa flavipes</i>
Solitary Sandpiper ^a	<i>Tringa solitaria</i>
Spotted Sandpiper ^b	<i>Actitis macularius</i>
Wilson's Snipe	<i>Gallinago delicata</i>

Notes:

- a. One incidental observation only.
- b. One nest recorded in transit between point-count locations.

TABLE N-10.18

Number, Percent of Total Observations, and Average Occurrence of Shorebird Species Observed during Point-count Surveys, Transportation-corridor Study Area, Bristol Bay Drainages, 2005

Shorebird Species	No.	%	Avg. Occurrence ^a (n=154)
Greater Yellowlegs	28	58.3	0.182
Wilson's Snipe	16	33.3	0.104
Lesser Yellowlegs	2	4.2	0.013
American Golden-Plover	1	2.1	0.006
Pacific Golden-Plover	1	2.1	0.006

Notes:

- a. Average occurrence = number of bird detections divided by *n* (number of point-counts conducted).

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TABLE N-10.19

Average Occurrence^a of Shorebird Species Observed in the Transportation-corridor Study Area, Bristol Bay Drainages, 2005, and in other Studies in Southwestern Alaska in which Off-road Point-count Surveys Were Conducted

Landbird Species	Mother Goose Lake (<i>n</i> =141) ^b	Becharof Lake (<i>n</i> =99) ^c	Lake Clark NP (<i>n</i> =379) ^d	This study (<i>n</i> =154)
Greater Yellowlegs	0.014	0.374	0.029	0.182
Wilson's Snipe	0.085	0.212	0.079	0.104
Lesser Yellowlegs			0.103	0.013
American Golden-Plover			0.045	0.006
Pacific Golden-Plover				0.006
Black-bellied Plover		0.061		
Semipalmated Plover	0.007	0.212	0.024	
Solitary Sandpiper			0.005	
Wandering Tattler			0.016	
Spotted Sandpiper			0.005	
Whimbrel			0.005	
Surfbird			0.016	
Western Sandpiper	0.007			
Least Sandpiper		0.081	0.024	
Baird's Sandpiper			0.011	
Rock Sandpiper		0.020		
Short-billed Dowitcher		0.081	0.003	
Red-necked Phalarope			0.037	

Notes:

- Average occurrence = number of bird detections divided by *n* (number of point-counts conducted).
- Off-road point-count data collected in 1996 and 2000 at Mother Goose Lake in the Alaska Peninsula National Wildlife Refuge; data were combined from Dewhurst et al. (1996b) and Egan and Adler (2001).
- Off-road point-count data collected in 1996 at Becharof Lake in the Becharof National Wildlife Refuge (Moore and Leeman, 1996).
- Off-road point-count data collected in 2004 in Lake Clark National Park (Ruthrauff et al., 2005).

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TABLE N-10.20

Average Occurrence^a of Shorebird Species Observed in Aggregated Habitat Types during Point-count Surveys, Transportation-corridor Study Area, Bristol Bay Drainages, 2005

Avian Species	Riverine Low Scrub	Riverine Tall Scrub	Riverine Mixed Forest	Riverine Broadleaf Forest	Wet Sedge Meadow	Moist Graminoid Meadow	Lowland Scrub Bog	Dwarf Needleleaf Woodland	Lowland Low Scrub	Lowland Tall Scrub	Lowland Dwarf Scrub	Open Needleleaf Forest	Open Mixed Forest	Open Broadleaf Forest	Upland Low Scrub	Upland Tall Scrub	Upland Dwarf Scrub	
Pacific Golden-Plover																		0.500
Greater Yellowlegs							0.286					0.111						
Lesser Yellowlegs					0.250													
Wilson's Snipe							0.429											

Note:

- a. Average occurrence = number of bird detections divided by *n* (number of point-counts conducted, which was 154). Only focal observations in each habitat are included (see Table N-10.12).

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TABLE N-10.21

Numbers of Landbirds and Shorebirds Observed Incidentally during Point-count Surveys and In Transit between Point-count Locations, Mine Study Area, 2004 and 2005

Avian Species	2004		2005	
	No. Incidental ^a	No. In Transit ^b	No. Incidental ^a	No. In Transit ^b
LANDBIRDS				
American Pipit	6	4	7	1
Horned Lark	5	5	7	7
American Tree Sparrow	5	0	3	12
Common Redpoll	4	0	11	0
Willow Ptarmigan	3	4	2	1
Gray-cheeked Thrush	3	0	2	1
Lapland Longspur	3	1	4	5
Black-billed Magpie	2	0	2	0
Tree Swallow	2	0	1	0
American Robin	2	0	3	0
Blackpoll Warbler	2	0	3	1
Wilson's Warbler	2	0	4	0
Rock Ptarmigan	1	33	1	0
Hermit Thrush	1	1	1	0
Yellow Warbler	1	0	9	0
Northern Waterthrush	1	0	1	0
Savannah Sparrow	1	12	9	13
Lincoln's Sparrow	1	0	0	0
Common Raven	0	6	4	0
Arctic Warbler	0	2	0	0
Golden-crowned Sparrow	0	0	6	0
Fox Sparrow	0	0	10	0
Orange-crowned Warbler	0	0	4	0
Alder Flycatcher	0	0	2	0
American Dipper	0	0	1	0
Snow Bunting	0	0	1	3
SHOREBIRDS				
Least Sandpiper	13	28	8	1
Black-bellied Plover	10	4	3	8
Greater Yellowlegs	8	12	7	0
American Golden-Plover	5	1	1	0
Wilson's Snipe	4	4	4	0
Unidentified (<i>Pluvialis</i>) plover	2	0	4	0
Semipalmated Plover	2	6	0	2
Pacific Golden-Plover	1	5	2	3
Whimbrel	1	7	5	0
Surfbird	1	0	5	1
Hudsonian Godwit	0	6	2	0
Short-billed Dowitcher	0	6	1	0
Red-necked Phalarope	0	14	4	0

Notes:

- Incidental observations were recorded at point-count locations but not during the count period.
- In-transit observations recorded while moving on foot between point-count locations are primarily observations of less commonly recorded species and/or observations of nests, defensive behavior indicative of the presence of a nest, or fledglings being tended by adults.

TABLE N-10.22

Numbers of Landbirds and Shorebirds Observed Incidentally^a during Eight Additional Point-count Surveys Conducted East of the Mine Study Area (Figure N-4.1) in the Bristol Bay Drainages, 2005

Avian Species	No. Incidental^b
LANDBIRDS	
Wilson's Warbler	2
Blackpoll Warbler	1
Northern Waterthrush	1
Fox Sparrow	1
White-crowned Sparrow	1
White-winged Crossbill	1
SHOREBIRDS	
Pacific Golden-Plover	3

Notes:

- a. No in-transit observations were recorded in this area.
- b. Incidental observations were recorded at point-count locations but not during the count period.

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TABLE N-10.23

Numbers of Landbirds and Shorebirds Observed Incidentally during Point-count Surveys and In Transit between Point-count Locations, Transportation-corridor Study Area, Bristol Bay Drainages, 2005

Avian Species	No. Incidental ^a	No. In Transit ^b
LANDBIRDS		
Blackpoll Warbler	10	0
Boreal Chickadee	9	0
Varied Thrush	9	4
American Robin	7	0
Yellow-rumped Warbler	6	0
Gray Jay	5	0
Red-breasted Nuthatch	5	0
Savannah Sparrow	5	4
Dark-eyed Junco	5	7
Golden-crowned Kinglet	4	0
Orange-crowned Warbler	4	0
Lincoln's Sparrow	4	1
White-crowned Sparrow	4	3
White-winged Crossbill	4	0
American Three-toed Woodpecker	3	10
Hermit Thrush	3	0
Fox Sparrow	3	0
Common Redpoll	3	0
Willow Ptarmigan	2	0
Olive-sided Flycatcher	2	0
Common Raven	2	0
Ruby-crowned Kinglet	2	0
Swainson's Thrush	2	0
Pine Grosbeak	2	0
Spruce Grouse	1	3
Sandhill Crane	1	0
Belted Kingfisher	1	1
Black-backed Woodpecker	1	1
Alder Flycatcher	1	0
Black-billed Magpie	1	0
Black-capped Chickadee	1	0
Arctic Warbler	1	0
Gray-cheeked Thrush	1	0
Bohemian Waxwing	1	0
Yellow Warbler	1	0
Northern Waterthrush	1	0
Wilson's Warbler	1	0
American Tree Sparrow	1	0
Northern Shrike	0	7
SHOREBIRDS		
Lesser Yellowlegs	2	0
Wilson's Snipe	2	0
Greater Yellowlegs	1	0
Solitary Sandpiper	1	0
Spotted Sandpiper	0	1

Notes:

- Incidental observations were recorded at point-count locations but not during the count period.
- In-transit observations recorded while moving on foot between point-count locations are primarily observations of less commonly recorded species and/or observations of nests, defensive behavior indicative of the presence of a nest, or fledglings being tended by adults.

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