

**Rocky Point Bird Observatory
Fall Landbird Migration Monitoring:**

2009 Data Summary



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MIGRATION MONITORING OVERVIEW

In an effort to monitor and better understand landbird populations in North America, as well as contribute to conservation efforts through public education, the Canadian Wildlife Service (CWS) partnered with Bird Studies Canada (BSC) and multiple independent bird banding stations to form the Canadian Migration Monitoring Network (CMMN) in 1998 (Crewe et al. 2008). Rocky Point Bird Observatory (RPBO), located in southwestern British Columbia serves as the only Pacific coastal data contributor to this effort. RPBO was initiated in 1994 as a pilot project by CWS, and has since become a non-profit society with landbird monitoring efforts occurring year round. RPBO operates almost entirely as a volunteer organization, with the bander in charge (BIC) and an intern provided through Environment Canada's Science Horizons Youth Internship program currently being the only paid staff.

On 18 October 2009, RPBO completed its 15th 90-day sampling period of autumnal landbird migration monitoring on Department of National Defense (DND) lands. Objectives of the fall sampling effort include the collection of data that will allow:

- a) The estimation of annual abundance and productivity indices,
- b) The study of migration ecology of landbirds using Rocky Point, and
- c) RPBO to contribute these data to national efforts to monitor landbird populations (CMMN).

These objectives are met through mist netting and observer surveys during the 90-day survey season. RPBO meets a fourth objective, raising public awareness regarding conservation issues facing migrant landbirds through public education and outreach. Public (volunteer) involvement has been a key component of RPBO's data collection efforts over the past 15 years.

METHODS

Field Sites

RPBO's primary landbird migration monitoring efforts were conducted on Canadian Forces Ammunitions Depot (CFAD) Department of National Defense (DND) lands to the southwest of Victoria, B.C., on the Strait of Juan de Fuca (10 U 0459443, 5352102 UTM; NAD83). The dominant vegetation community at this field site was second- growth Douglas-fir/Garry oak woodland, with segments of riparian woodland, emergent wetland vegetation and open grassland. The dominant tree species were Garry oak (*Quercus garryana*), Douglas-fir (*Pseudotsuga menziesii*), grand fir (*Abies grandis*), red alder (*Alnus rubra*), Scouler (*Salix scouleriana*) and Pacific willow (*Salix lucida*) and the understory was composed mainly of trailing blackberry (*Rubis ursinus*), oceanspray (*Holodiscus discolor*), gorse (*Ulex europaeus*) and Scotch broom (*Cytisus scoparius*). Net locations are summarized in Appendix I.

We also conducted several days of fall banding at our *RRUN* Monitoring Avian Productivity and Survivorship (MAPS) station located on the campus of Royal Roads University (10 U 0464342, 5363923; NAD83) when access to DND land was restricted due to military exercises. The dominant vegetation community at the field site was second-growth Douglas-fir forest, with segments of riparian woodland, emergent wetland vegetation and open grassland. The dominant tree species were Douglas-fir, grand fir, red alder, Scouler and Pacific willow and the understory was composed mainly of trailing blackberry, oceanspray and Scotch broom. Net locations for this pilot effort are summarized in Appendix I.

Permits for Operation

Site access: Access to the CFAD DND land is granted through the Environmental Science Advisory Committee (ESAC), permit number P003-09. Access is limited to those personnel included on the permit.

Banding: Banding is conducted under Canadian Bird Banding Lab master permit #10781, held by Rocky Point Bird Observatory, c/o David Allinson. This permit allows the capture and banding of birds protected by the Migratory Birds Convention Act (1994). Provincially regulated birds are captured and banded under the terms of BC Wildlife Act Permit NA09-53783.

Constant Effort Mist Netting

We conducted constant effort mist net sampling for the fall migration period from 21 July 2009 – 18 October 2009, in accordance with RPBO protocol (RPBO 2008). Daily banding effort consisted of the 6 hour operation of 13 mist nets (SpiderTech Inc., 12 x 3 meters, 30 mm mesh, 110 denier/2 ply) set in a linear array adjacent to Derbyshire Creek (Appendix II). Nets were opened 30 minutes before sunrise, and checked every 20 to 30 minutes, and were closed for wind and/or rain. Birds extracted from mist nets were processed and released at a central banding station, where *species*, *age* and *sex* (when possible), *body condition* (fat score), *wing chord* (mm) and *weight* (g) were recorded for each individual. Previously banded birds were processed in similar fashion, excepting birds recaptured on the same day.

Census and General Observations

We conducted transect sampling (census) for the fall migration period from 21 July 2009 – 18 October 2009, in accordance with RPBO protocol (RPBO 2008). Census effort consisted of a 90-minute area constrained walking survey, initiated 1 hour after sunrise, and conducted daily. The census route is shown in Appendix II and GPS coordinates are summarized in Appendix III. General observations of bird species and numbers encountered at the field site during the standardized surveys were incorporated in the estimation of daily totals (ET) for each species.

RESULTS AND DISCUSSION

The season was characterized by generally consistent and warm weather conditions. We detected a total of 170 species using various habitats within and adjacent to the RPBO and RRUN study sites through constant effort mist netting, census surveys and general observations. Capture totals derived from mist netting efforts were lower than in previous years (David 2008, Murray 2006). Analysis and interpretation of these data will be carried out in more detail in our 2009 annual report. The results presented below are intended to meet the RPBO's reporting requirements to the CWS.

Constant Effort Mist Netting

RPBO: We captured a total of 3,165 birds of 59 species during 4692.70 net hours of operation at RPBO study site (Appendix IV). The most frequently captured migrant species were (in descending order): Wilson's Warbler (*Wilsonia pusilla*), Fox Sparrow (*Passerella iliaca*), Pacific-slope Flycatcher (*Empidonax difficilis*), Orange-crowned Warbler (*Vermivora celata*) and Song Sparrow (*Melospiza melodia*). Total captures by species and ages are presented in Appendix V. Mist netting effort lost due to inclement weather was limited to 2 days (156 net hours). Military operations on CFAD DND land prevented station operation on 22 days (1716 net hours) throughout the sampling period. In total, lost effort amounted to 24 days (1872 net hours) or 26.5% of the annual standard banding effort (Appendix VIII).

Banding totals were the sixth highest since the initiation of monitoring in 1994. When mist net effort is taken into account, the 2009 capture rate (.675 birds per net hour) was slightly lower than the previous year's rate of .7 birds per net hour. Access restrictions due to military activity during the sampling period led to the loss of 1716 net-hours, 390 of which corresponded with the peak migratory time period (Leckie 2008). Sampling effort lost during the study period contributed significantly to the reduced season total and capture rates.

A new highest banding record was set by Purple Finch (*Carpodacus purpureus*) in 2009, with 38 individuals banded. Two species had their second highest banding records during the 2009 season: American Goldfinch (*Carduelis tristis*) and Fox Sparrow (*Passerella iliaca*), with 156 and 237 new birds banded respectively. Lincoln Sparrow (*Melospiza lincolnii*) had its lowest year on record, with only 80 individuals banded. This marks the first year this species' numbers fell below 100 birds.

On 19 August and 28 August, two Alder Flycatchers (*Empidonax alnorum*) were identified by morphological measurements and banded. The species breeds in northern B.C., Yukon and Alaska, however typically migrates east of the Rocky Mountains (Ehrlich et al. 1988). These individuals are the first to be banded at

RPBO, however, identification is confounded with Willow Flycatcher (*Empidonax traillii*) for many individuals.

On 15 August 2009 an adult Yellow Warbler (*Dendroica petechia*) banded on 29 August 2007 in Big Sur, California was captured at the RPBO mist net station. The species employs a long distance migration strategy, breeding north to Alaska, Yukon and Northwest Territories and wintering south to Central America, Peru and Bolivia (Ehrlich et al. 1988). Western populations of the species are showing declines on breeding sites (Shuford and Gardali 2008). The multiple captures of this bird indicate that it uses coastal habitats on its south bound migration.

RRUN: We captured a total of 69 birds of 19 species during 132.00 net hours of pilot operation at the RRUN study site (Appendix VI). The most frequently captured migrant species were (in descending order): Song Sparrow, Spotted Towhee (*Pipilo maculatus*), and Orange-crowned Warbler. Increased effort and more coverage during the migratory sampling period will increase the species richness and likely influence the most frequently captured species at this site. Our limited effort at RRUN indicates that capture rates of passerine species in mid-September may be similar (53.27 birds/100 net hours at RRUN vs. the fall season rate of 67.50 birds/100 net hours at RPBO) to the RPBO field site. Future expansion of mist netting efforts to sites with similar vegetation communities will allow greater inference in regard to investigating migratory stopover ecology of migrant landbirds (Fisher 1926, Hulbert 1984).

Census and General Observations

Observer surveys were conducted on 67 days between 21 July and 18 October 2009. We surveyed for a total of 100.50 census hours, and tallied a total of 2078.50 observer hours. Through census surveys and general observations, we documented the presence of 142 and 156 species respectively. Total detections and birds/observer hour are summarized in Appendix VII. Lost survey effort due to weather and military operations is summarized in Appendix VIII. Weather and military activity caused a loss of 25.6% of our standard annual census effort. We have also included summary statistics (daily maximum count and season total) for species encountered through census surveys and general observations (Appendix IX).

Recommendations

Bird Studies Canada has identified the northern Pacific coastal rainforest (Bird Conservation Region 5) as a region of high research interest due to the large number of range-limited species and sub-species that occur there (Crewe et al. 2008). RPBO maintains historic datasets and currently collects information on 38 of 54 priority landbird species within a vegetation community of critical conservation concern (PIF BC/Yukon 2006). These data are invaluable in

assessing the historic and current population status of coastal migrant landbird species as RPBO operates the only Pacific coastal migration monitoring effort in Canada (Crewe et al. 2008)

With the high regional conservation responsibility in mind, RPBO recommends the funding, design and implementation of a study investigating the origin and destination of migratory landbirds using southern Vancouver Island (RBPO, RRUN) as a stopover site. Not only would a study of this nature fill gaps in a growing body of information on migratory connectivity for western landbird species (Carlisle 2009), but also it would add necessary context to the interpretation of abundance and productivity trends derived from mist netting and census efforts conducted to date. In order to assess management actions and climatic effects within Bird Conservation Regions, an understanding of the breeding locations of migrant birds moving through southern Vancouver Island is needed (Dunn et al. 2006).

We also recommend the replication of current survey efforts within similar vegetation community types on southern Vancouver Island, which would improve the understanding of landbird stopover ecology within Douglas-fir/Garry oak woodland, a vegetation community of critical conservation concern. Current employment of mist netting and census methods limits inference to site-specific interpretation. In addition to replication within current vegetation communities, we recommend the investigation of other vegetation communities on southern Vancouver Island in order to evaluate the importance of these to Pacific coastal migrant landbirds moving south in autumn.

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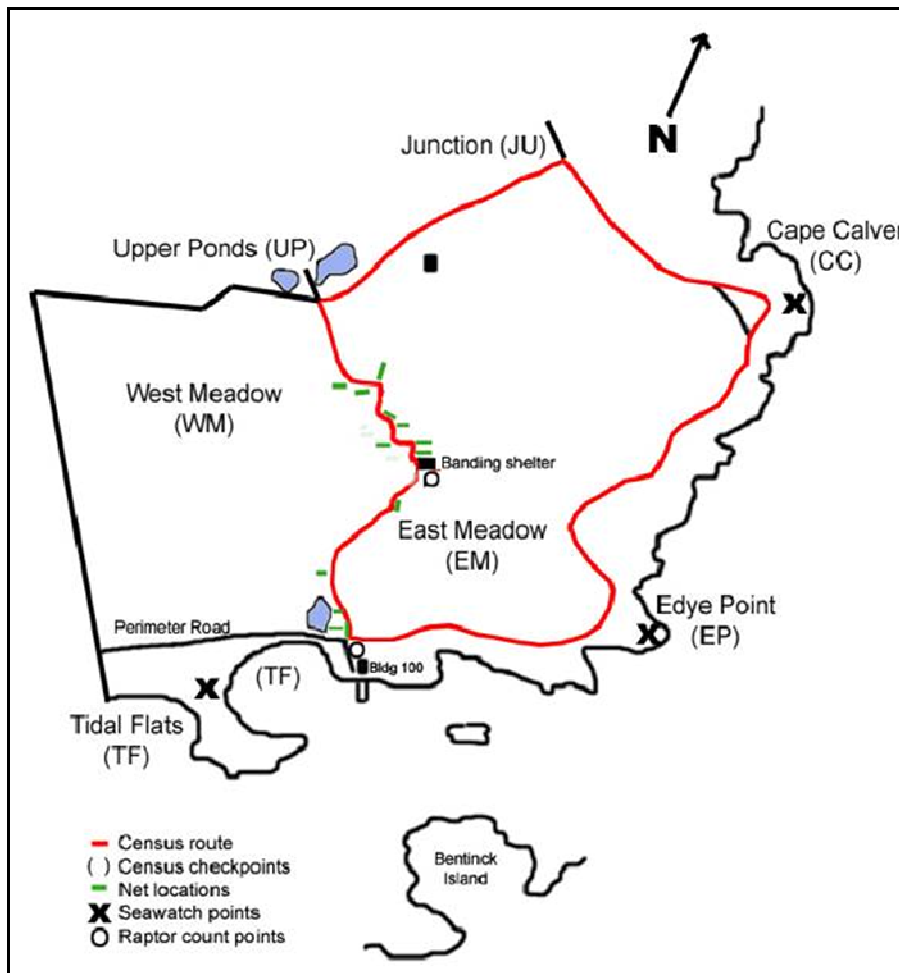
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APPENDICES

APPENDIX I. Mist net locations at Rocky Point Bird Observatory (RPBO) and Royal Roads University (RRUN). Coordinates were recorded in UTM UPS, NAD83 with Garmin GPS 60.

Site	Net	Zone	Latitude Band	Easting	Northing
RPBO	1	10	U	459494	5351889
	2	10	U	459475	5351885
	3	10	U	459465	5351914
	4	10	U	459435	5351955
	5	10	U	459450	5352039
	6	10	U	459443	5352102
	7	10	U	459440	5352108
	8	10	U	459416	5352120
	9	10	U	459420	5352135
	10	10	U	459406	5352144
	11	10	U	459410	5352266
	12	10	U	459395	5352233
	13	10	U	459366	5352242
RRUN	1	10	U	464342	5363923
	2	10	U	464343	5363996
	3	10	U	464400	5363967
	4	10	U	464384	5364011
	5	10	U	464418	5364004
	6	10	U	464438	5364029
	7	10	U	464631	5364002
	8	10	U	464575	5363942
	9	10	U	464610	5363907
	10	10	U	464503	5363741
	11	10	U	464413	5363834
	12	10	U	464377	5363851

APPENDIX II. Map of Census survey route (red) and constant effort mist net array (green) at Rocky Point Bird Observatory (RPBO) field site.



APPENDIX III. Census route location at Rocky Point Bird Observatory (RPBO) in zone 10, latitude band U. Coordinates were recorded as a "track" in UTM UPS, NAD83 with Garmin GPS 60.

Easting	Northing	Easting	Northing	Easting	Northing	Easting	Northing
459443	5352075	459826	5352245	459435	5352079	459789	5352159
459447	5352071	459798	5352228	459443	5352075	459799	5352135
459450	5352078	459777	5352174	459440	5352074	459832	5352091
459445	5352105	459789	5352159	459436	5352075	459847	5352051
459425	5352112	459824	5352113	459447	5352071	459866	5352025
459446	5352107	459832	5352091	459445	5352105	459850	5352023
459401	5352180	459866	5352025	459425	5352112	459802	5351998
459422	5352219	459827	5352005	459446	5352107	459763	5351972
459426	5352224	459763	5351972	459401	5352180	459743	5351963
459410	5352223	459756	5351969	459422	5352219	459740	5351961
459413	5352257	459740	5351961	459426	5352224	459717	5351951
459365	5352247	459733	5351954	459413	5352257	459706	5351948
459342	5352272	459706	5351948	459393	5352246	459693	5351948
459337	5352279	459702	5351949	459342	5352272	459689	5351949
459314	5352297	459689	5351949	459337	5352279	459671	5351946
459307	5352317	459684	5351945	459314	5352297	459642	5351940
459297	5352323	459642	5351940	459307	5352317	459619	5351942
459289	5352329	459633	5351940	459289	5352329	459600	5351944
459274	5352339	459600	5351944	459274	5352339	459566	5351919
459250	5352351	459576	5351929	459249	5352352	459550	5351906
459249	5352352	459550	5351906	459246	5352360	459516	5351886
459246	5352360	459542	5351901	459246	5352386	459503	5351878
459246	5352367	459503	5351878	459262	5352388	459497	5351874
459262	5352388	459503	5351879	459283	5352414	459489	5351864
459270	5352401	459489	5351864	459302	5352433	459469	5351863
459283	5352414	459486	5351864	459326	5352456	459450	5351861
459302	5352433	459450	5351861	459327	5352457	459443	5351867
459327	5352457	459442	5351867	459350	5352472	459498	5351826
459350	5352472	459479	5351873	459357	5352479	459498	5351830
459357	5352479	459498	5351826	459371	5352498	459496	5351861
459360	5352486	459507	5351839	459379	5352505	459488	5351878
459371	5352498	459496	5351861	459412	5352539	459477	5351903
459379	5352505	459482	5351897	459428	5352556	459463	5351917
459385	5352513	459477	5351903	459479	5352600	459442	5351949
459428	5352556	459447	5351943	459653	5352607	459445	5351956
459479	5352600	459442	5351949	459912	5352510	459443	5351993
459594	5352660	459445	5351961	459855	5352303	459445	5352014
459653	5352607	459443	5351993	459860	5352282	459436	5352052
459896	5352395	459446	5352013	459798	5352228	459442	5352065
459855	5352303	459436	5352052	459758	5352204	459437	5352077

APPENDIX IV. Summary of Constant effort mist netting during fall migration monitoring (21 July - 18 October 2009) at Rocky Point (RPBO) and Royal Roads University (RRUN).

Station	Total birds captured	Net hours	Birds/100 net hours	Number new birds banded	Number birds recaptured	Species richness
RPBO	3165	4692.70	67.50	2801	364	59
RRUN	69	132.00	52.27	65	4	19
All Sites	3234	4824.70	67.05	2866	368	60

APPENDIX V. Summary of constant effort mist net captures at RPBO field site by species, band status and age. AHY (birds in at least their 2nd calendar year) and HY (birds in their 1st calendar year) are based on initial annual captures only.

Species	Total number of birds captured	Number of new birds banded	Number of individuals recaptured	AHY	HY
Alder Flycatcher	3	2	1		2
American Goldfinch	163	156	7	34	123
American Robin	24	23	1	7	16
Barn Swallow	2	2			2
Barred Owl	1	1		1	
Bewick's Wren	55	30	25	3	30
Brown-headed Cowbird	9	9			9
Black-headed Grosbeak	1	1			1
Brown-creeper	14	12	2	1	12
Black-throated Grey Warbler	2	2		1	1
Bushtit	16	15	1		15
Chestnut-backed Chickadee	74	41	33	8	38
Cedar Waxwing	4	4		2	2
Chipping Sparrow	11	10	1	1	9
Common Yellowthroat	96	63	34	3	61
Dark-eyed Junco	73	72	1	7	65
Downy Woodpecker	2	2			2
Dusky Flycatcher	1	1			1
Fox Sparrow	256	237	19	45	197
Golden-crowned Kinglet	92	80	12	9	68
Golden-crowned Sparrow	68	63	5	13	50
Hammond's Flycatcher	17	17			17
Hermit Thrush	134	127	7	18	109
House Wren	6	6			6
Hutton's Vireo	1	1			1
Lincoln's Sparrow	82	80	2	7	73
Marsh Wren	4	3	1		3
Merlin	1	1			1
MacGillivray's Warbler	53	47	6	1	46
Northern Flicker	1	1		1	
Northern Pygmy Owl	1	1			1
Northern Waterthrush	2	2			2
N. Rough-winged Swallow	1	1			1
Orange-crowned Warbler	193	183	10	52	129
Pine Siskin	7	7		2	5
Pacific-slope Flycatcher	223	220	3	19	202
Purple Finch	38	38		13	25
Red-breasted Nuthatch	4	4			4

APPENDIX V CONTINUED. Summary of constant effort mist net captures at RPBO field site by species, band status and age. AHY (birds in at least their 2nd calendar year) and HY (birds in their 1st calendar year) are based on initial annual captures only.

Species	Total number of birds captured	Number of new birds banded	Number of individuals recaptured	AHY	HY
Ruby-crowned Kinglet	147	145	2	34	102
Rufous Hummingbird	6	6			6
Red-winged Blackbird	7	5	2	2	4
Savannah Sparrow	54	53	1	11	42
Sora	1	1		1	
Song Sparrow	185	109	76	23	99
Spotted Towhee	156	142	14	14	130
Sharp-shinned Hawk	7	7			7
Swamp Sparrow	2	2			2
Swainson's Thrush	94	84	10	5	80
Townsend's Warbler	6	6			6
Trail's Flycatcher	1	1			1
Varied Thrush	2	2			2
Violet-green Swallow	4	4			4
Warbling Vireo	8	8		2	6
White-crowned Sparrow	163	110	53	11	107
Willow Flycatcher	58	56	2	7	49
Wilson's Warbler	263	245	18	14	235
Winter Wren	84	75	9	15	63
White-throated Sparrow	6	4	2	1	3
Yellow-rumped Warbler	26	26		3	23
Yellow Warbler	151	147	4	41	107
	3165	2801	364	432	2407

APPENDIX VI. Summary of constant effort mist net captures at RRUN field site by species, band status and age. AHY (birds in at least their 2nd calendar year) and HY (birds in their 1st calendar year) are based on initial annual captures only.

Species	Total number of birds captured	Number of new birds banded	Number of individuals recaptured	AHY	HY
American Robin	1	1			1
Anna's Hummingbird	1	1		1	
Bewick's Wren	5	4	1		4
Bushtit	4	4			3
Common Yellowthroat	2	2			2
Fox Sparrow	3	3			3
Golden-crowned Sparrow	5	5			5
Hutton's Vireo	1	1			1
Lincoln's Sparrow	5	5			5
Orange-crowned Warbler	6	6			6
Ruby-crowned Kinglet	1	1			1
Rufous Hummingbird	1	1			1
Song Sparrow	10	8	2	1	8
Spotted Towhee	8	7	1	2	6
Swainson's Thrush	2	2			2
White-crowned Sparrow	4	4			4
Wilson's Warbler	5	5			5
Winter Wren	2	2			2
Yellow Warbler	3	3			3
	69	65	4	4	62

APPENDIX VII. Summary of census and general observation effort, total detections and species richness.

Method	Total birds detected	Survey Hours	Birds/survey hours	Species richness
Census	76220	100.50	758.41	143
General Obs	41062	2078.50	19.76	156

APPENDIX VIII. Constant effort mist net (B) and census effort (C) lost due to inclement weather and military closure of the field site.

MONTH	DAY	WEATHER	MILITARY CLOSURE
July	27		B, C
	28		B, C
	29		B, C
	30		B, C
	31		B, C
August	4		B, C
	9	B	
	10		B, C
	11		B, C
	20		B, C
	27		B, C
	31		B, C
September	1		B, C
	10		B, C
	11		B, C
	14		B, C
	15		B, C
	18		B, C
October	2		B, C
	8		B, C
	14		B, C
	15		B, C
	16		B, C
	17	B, C	
Banding	24	2 (156 hrs)	22 (1716 net hrs)
Census	23	1	22

APPENDIX IX. Summary of daily Census Surveys and General Observations conducted during fall migration monitoring at RPBO Field Site 21 July-18 October 2009. Species are presented with maximum daily count and total detections over the 90 day sampling period.

Species	Census Surveys		General Observations	
	Maximum Count	Season Total	Maximum Count	Season Total
American Green-winged Teal	12	70	16	109
American Goldfinch	97	751	80	754
American Kestrel	2	4	1	5
American Pipit	14	40	40	102
American Redstart			1	1
American Robin	176	1489	60	498
American Wigeon	8	19	3	5
Anna's Hummingbird	1	1	1	6
Bald Eagle	5	51	6	81
Barn Swallow	30	195	20	149
Black and White Warbler	1	1		
Barred Owl	2	7	2	12
Belted Kingfisher	3	69	4	98
Bewick's Wren	9	217	5	89
Brown-headed Cowbird	8	25	6	44
Black-headed Grosbeak	1	5	2	21
Black Oystercatcher	8	59	12	127
Black Swift			1	1
Black Turnstone			4	9
Bonaparte's Gull	110	846	90	157
Brandt's Cormorant	22	75	35	236
Brewer's Blackbird	2	3	13	25
Brown Creeper	23	501	10	173
Band-tailed Pigeon	180	781	249	2358
Black-throated Grey Warbler	3	25	2	5
Bushtit	36	236	24	177
Bufflehead			1	1
Broad-winged Hawk	2	5	1	1
Canada Goose	23	216	36	660
California Gull	2200	19255	900	6476
California Quail	21	238	70	485
Caspian Tern			1	3
Cassin's Vireo	5	37	2	12
Chestnut-backed Chickadee	109	1948	23	462
Cedar Waxwing	61	424	45	452
Chipping Sparrow	22	51	15	95
Cliff Swallow			1	1
Cooper's Hawk	2	13	5	78
Common Loon	3	10	3	8
Common Merganser	1	1	1	2
Common Murre	838	1807	745	2336

APPENDIX IX. Summary of daily Census Surveys and General Observations conducted during fall migration monitoring at RPBO Field Site 21 July-18 October 2009. Species are presented with maximum daily count and total detections over the 90 day sampling period.

Species	Census Surveys		General Observations	
	Maximum Count	Season Total	Maximum Count	Season Total
Common Nighthawk			3	13
Common Raven	13	125	20	143
Wilson's Snipe	2	4	1	5
Common Yellowthroat	8	168	5	79
Double-crested Cormorant	40	179	46	216
Dark-eyed Junco	82	444	10	61
Downy Woodpecker	8	143	4	90
European Starling	40	314	70	507
Evening Grosbeak	4	15	6	19
Fox Sparrow	10	93	18	135
Great-blue Heron	3	79	4	84
Golden-crowned Kinglet	175	1094	50	261
Golden-crowned Sparrow	13	93	12	95
Great Horned Owl	2	17	3	49
Golden Eagle	1	1		
Greater Yellowlegs	3	22	5	33
Greater White-fronted Goose	4	26	9	28
Glaucous-winged Gull	700	4993	500	3093
Hammond's Flycatcher	10	34	2	13
Harlequin Duck	8	17	8	22
Hairy Woodpecker	5	84	4	55
Heerman's Gull	400	1623	250	1937
Hermit Thrush	16	57	10	72
House Finch	20	165	10	36
Hooded Merganser	4	5	1	1
House Wren	9	96	6	57
Hutton's Vireo	2	6	1	5
Killdeer	2	18	9	84
Long-billed Dowitcher	1	2	9	13
Least Sandpiper	23	57	16	115
Lesser Yellowlegs			1	2
Lincoln's Sparrow	21	137	15	83
Lesser Snow Goose	10	10	85	110
Mallard	22	264	17	331
Marbled Murrelet	1	1	7	17
Marsh Wren	2	33	3	32
Mew Gull	65	624	80	565
Merlin	1	3	2	19
MacGillivray's Warbler	9	31	9	22
Mourning Dove	1	1		
Mute Swan	3	3		
Northwestern Crow	9	19	25	81
Northern Flicker	15	263	9	140

APPENDIX IX. Summary of daily Census Surveys and General Observations conducted during fall migration monitoring at RPBO Field Site 21 July-18 October 2009. Species are presented with maximum daily count and total detections over the 90 day sampling period.

Species	Census Surveys		General Observations	
	Maximum Count	Season Total	Maximum Count	Season Total
Northern Goshawk			1	4
Northern Harrier	1	5	1	15
Northern Pintail	4	8	3	12
Northern Pygmy Owl	1	2	1	2
N. Rough-winged Swallow	31	70	10	57
Northern Shoveler	2	4		
Northern Shrike	1	1	1	1
Northern Saw-whet Owl	1	1		
Orange-crowned Warbler	32	247	30	261
Olive-sided Flycatcher	6	60	6	48
Osprey			1	2
Parasitic Jaeger			1	1
Pacific Loon			18	18
Pelagic Cormorant	6	11	10	43
Peregrine Falcon	1	7	2	13
Pectoral Sandpiper			1	1
Pink-footed Shearwater	2	2	5	5
Pigeon Guillemot	10	29	7	28
Pine Siskin	223	462	12	130
Pileated Woodpecker	1	9	3	32
Pacific-slope Flycatcher	28	208	10	108
Purple Finch	53	361	15	177
Purple Martin	2	5	25	58
Ring-billed Gull	1	1	1	1
Red-breasted Merganser			3	3
Red-breasted Nuthatch	60	1084	20	192
Red-breasted Sapsucker	1	1	1	1
Ruby-crowned Kinglet	77	334	25	127
Red Crossbill	77	1523	30	439
Red-eyed Vireo	1	2		
Rhinoceros Auklet	500	2038	200	740
Ring-necked Duck	2	4	1	1
Red-necked Phalarope	250	507	200	681
Red-shouldered Hawk			1	1
Rock Dove			6	6
Ross' Goose	3	3		
Red-tailed Hawk	11	37	20	129
Rufous Hummingbird	2	11	3	25
Red-winged Blackbird	44	329	85	385
Sandhill Crane	4	4	10	14
Savannah Sparrow	41	243	10	94
Short-billed Dowitcher	1	1	1	6
Semipalmated Plover	2	2	4	13

APPENDIX IX. Summary of daily Census Surveys and General Observations conducted during fall migration monitoring at RPBO Field Site 21 July-18 October 2009. Species are presented with maximum daily count and total detections over the 90 day sampling period.

Species	Census Surveys		General Observations	
	Maximum Count	Season Total	Maximum Count	Season Total
Semipalmated Sandpiper			2	2
Sora	1	3	1	4
Sooty Shearwater	40	84	1500	2533
Song Sparrow	34	345	9	105
Spotted Sandpiper	2	5	1	2
Spotted Towhee	25	304	14	132
Sharp-shinned Hawk	8	57	15	144
Steller's Jay	6	45	6	35
Surfbird	35	35	10	10
Surf Scoter	9	22	25	96
Swainson's Hawk			1	1
Swainson's Thrush	3	26	3	50
Swamp Sparrow	1	1		
Thayer's Gull	2	3	300	310
Townsend's Warbler	13	72	4	21
Tree Swallow	1	1	2	5
Turkey Vulture	600	2475	450	2795
Unknown Gull spp	5000	21530	1000	3770
Vaux's Swift	70	118	50	110
Varied Thrush	5	37	5	32
Violet Green Swallow	210	470	60	367
Virginia Rail			1	4
Warbling Vireo	5	41	12	51
White-crowned Sparrow	45	522	40	496
Western Grebe			4	9
Western Gull	20	20	5	5
Western Kingbird			1	1
Western Meadowlark			2	2
Western Sandpiper	193	227	20	131
Western Tanager	1	5	6	33
Western Wood-Pewee	6	7	2	5
Willow Flycatcher	4	26	12	32
Wilson's Warbler	43	237	18	188
Winter Wren	26	297	10	120
White-throated Sparrow	1	1	1	1
White-winged Scoter			4	5
Yellow-rumped Warbler	66	505	40	291
Yellow Warbler	32	169	50	253