

Migration Monitoring at the Rocky Point Bird Observatory:

Fall 2008



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ABSTRACT

2008 marked the 14th passerine migration monitoring season at Rocky Point Bird Observatory, located on southern Vancouver Island, British Columbia. The fall migration monitoring period was conducted from July 21 to October 18, 2008. Within that period, 3,213 birds of 56 species and forms were banded. Out of the 90 day banding season 24 days were lost due to military activity (unprecedented) and only two days to heavy rains. The five most frequently banded species were Orange-crowned Warbler (403—record season total), Ruby-crowned Kinglet (387), Wilson's Warbler (301), Pacific-slope Flycatcher (242), and Yellow Warbler (168). Northern Saw-whet Owl (*Aegolius acadicus*) migration monitoring at RPBO was also continued for the 6th year, from September 15 to October 31. During this period, 636 Northern Saw-whet Owls and 15 Barred Owls (*Strix varia*) were banded.

1.0 INTRODUCTION

The Rocky Point Bird Observatory is located at the southernmost tip of Vancouver Island, British Columbia on the Canadian Forces Ammunition Depot (CFAD) at Rocky Point. Migration monitoring typically takes place within the ninety-day period from July 21st until October 18th, in order to maximize coverage during the peak migration season for the majority of neotropical passerine species migrating through the southern part of the island. Specific background information regarding the ecological context at Rocky Point and the methods used to monitor birds is covered in both the final report for 2006 (Murray 2006) and the RPBO protocol (RPBO 2008), to which readers are referred for more information.

Despite major interruptions in coverage due to military training in 2008, the RPBO crew captured and processed a total of 3,213 new individuals of 56 species and forms; the employment of both observational and mist-netting techniques resulted in a total of 159 species of 47, 487 individuals detected throughout the 90-day period. A total of 1,236.1 volunteer-hours were contributed by 31 people, while two full-time contractors, a Bander-In-Charge (Gabriel David) and a Banding Intern (Kelsey Low), completed a total of 772.7 person-hours.

Northern Saw-whet Owl (*Aegolius acadicus*) migration monitoring was continued in 2008, within the period of September 15 to October 31. In 2007 the original site which had been used to monitor owls had been made inaccessible due to numerous tree-falls within a mixed stand of Grand Firs (*Abies grandis*) and Shore Pine (*Pinus contorta*). The owl site was relocated to the south of the banding shack in the riparian corridor. The netting array was significantly modified, and a total of 8 nets were used rather than 6. A total of 1700 net-hours were achieved on 36 days, yielding a record total of 636 Northern Saw-whet Owls and 15 Barred Owls banded. Volunteers contributed 377.8 hours to the project, while staff committed a total of 284.6 hours.

On days when access to Rocky Point was denied, bird extraction and banding training sessions for existing and new volunteers were offered at Terry Sterling's property on Leefield Road in Metchosin. Training sessions occurred on a total of 9 days from July 28 to September 21. Seven to ten nets were employed for a cumulative total of 305.4 net-hours and 179 individual birds were banded.

Rocky Point continued its participation in the collection of ticks for a study being conducted by John Scott of Fergus, Ontario. All of the ticks that were identified were avian ticks, *Ixodes auritulus*. This tick species is indigenous along the West Coast, and is common on passerines.

Louse flies were also collected on eight different species of raptors and songbirds for submission to the Royal British Columbia Museum, with the intention of identifying them to genera or species if possible, and to determine whether different species parasitize distinct avian taxa.

In addition, data was collected on all birds undergoing molt of their remiges in order to document the timing, intensity and sequence of replacement within the flight feathers (primaries, secondaries, and tertials). This data will be used in a study of the possible causes for differentiation of sequence and relative timing of replacement of secondary feathers in relation to phylogeny within the Passeriformes.

2.0 RESULTS

2.1 COVERAGE

Out of the 90 day banding season, 26 days were lost due to military activity or heavy rains. July 28-31, August 1, 7, 16-24, September 8, 11, 12, 15, 20, 21, October 9, 15, 16, and 18 were lost to military activity. August 28 and September 25 were the only two days of the season completely lost due to inclement weather. This represents the highest number of days that RPBO has been unable to monitor during a season. The lower banding totals of 2008 were certainly influenced by this situation.

2.2 FALL 2008 BANDING TOTALS

In total, 3211 individuals of 56 species and forms (including the two subspecies of Yellow-rumped Warbler, *Dendroica coronata audubonii* and *D. c. coronata*, and one unidentified subspecies of Yellow-rumped Warbler) were banded at RPBO in the fall of 2008 (Table 1).

Table 1. Total number of birds banded at RPBO in 2008, by species

Species	Banded	Species	Banded
Sharp-shinned Hawk	3	Nashville Warbler	1
Barred Owl	3	Yellow Warbler	168
Hairy Woodpecker	1	Audubon's Warbler	3
Red-shafted Flicker	1	Myrtle Warbler	6
Rufous Hummingbird	24	Unidentified Yellow-rumped Warbler	2
Olive-sided Flycatcher	1	Black-throated Gray Warbler	9
Willow Flycatcher	24	Townsend's Warbler	8
Hammond's Flycatcher	28	Northern Waterthrush	1
Pacific-slope Flycatcher	242	MacGillivray's Warbler	44
Hutton's Vireo	7	Common Yellowthroat	52
Warbling Vireo	16	Wilson's Warbler	296
Steller's Jay	5	Western Tanager	1
Violet-green Swallow	1	Spotted Towhee	101
Chestnut-backed Chickadee	60	Chipping Sparrow	20
Bushtit	59	Savannah Sparrow	34
Red-breasted Nuthatch	3	Fox Sparrow	124
Brown Creeper	15	Song Sparrow	140
Bewick's Wren	38	Lincoln's Sparrow	119
House Wren	20	White-throated Sparrow	4
Winter Wren	143	Puget Sound White-crowned Sparrow	61
Marsh Wren	6	Golden-crowned Sparrow	82
Golden-crowned Kinglet	110	Oregon Junco	67
Ruby-crowned Kinglet	387	Red-winged Blackbird	7
Swainson's Thrush	72	Brown-headed Cowbird	19
Hermit Thrush	90	Purple Finch	8
American Robin	18	Pine Siskin	5
Varied Thrush	1	American Goldfinch	42
Cedar Waxwing	6	Total Banded	3211
Orange-crowned Warbler	403	Species & Forms	56

Bold --- season-high banding total for species since 1994

Banding totals were the 4th highest since 1994, but when relative mist-netting effort is taken in account, 2008 was one of the most productive years for passerine species migrating through Rocky Point, with a capture rate of 0.7 birds per net-hour, vs. a record of 0.73 birds per net-hour in 2005 (Table 2). Six days resulted in more than 90 birds being banded: 1 September (100), 2 September (92), 3 September (95), 22 September (97), 8 October (102), and 14 October (98). Days missed due to military activity around these peaks, which could possibly have reported similarities in abundance, include: September 20th and 21st, and October 9th, 15th, and 16th. The remaining days varied between 5 and 88 individuals captured, with a mean of 46.1 birds/day and median of 42.4 birds/day.

Table 2. Coverage effort at RPBO in 2008 compared to previous years

Year	Coverage period	Days	Banded	Species	Net Hours	Birds/net hour
2008	July 21-Oct 17	64	3211	56	4604	0.7
2006	July 21-Oct 18	78	3068	60	5383	0.57
2005	July 21-Oct 18	88	4619	58	6377	0.73
2004	July 21-Oct 18	90	4001	57	6286	0.66
2003	July 20-Oct 18	91	3716	61	6689	0.56
2002	July 20-Oct 21	90	3153	56	6501	0.49
2001	July 23-Oct 7	75	2576	54	4296	0.6
2000	July 21-Oct 21	90	2723	57	5113	0.53

A new highest banding record was set by two species in 2008: Orange-crowned Warbler (403) and Black-throated Gray Warbler (9). An Olive-sided Flycatcher was captured and banded on the August 3rd and a Nashville Warbler on October 8th – these represent the 7th and 10th banding records of these species at RPBO, respectively.

Several species had lower capture totals in 2008 when compared to previous years, especially when compared to 2005 and 2004, as well as to the seven-year average from 2000 to 2006. However, it is apparent that it could have been a peak year for Wilson’s Warbler (301 banded, second highest season total), had migration monitoring been permitted from the period of August 16th to 24th, within the height of migration for this species at RPBO. Another early neotropical migrant is the MacGillivray’s Warbler, for which August includes the main window of their movement at RPBO, and for which we could have possibly detected one of the highest years in abundance, given the number detected despite this gap in sampling (44 banded).

The most productive period (9-days) for mist-netting effort in 2008 was October 6-17 (0.93 birds/net-hour; Table 3), during which Ruby-crowned Kinglet comprised the bulk of the individuals captured. The season peak for this species saw 35 banded on October 8th. The average season peak for Ruby-crowned Kinglet during the years 1999 to 2006 was also within this period, as shown by Leckie (2008). The 14-day period with the highest average capture rate (1.1 birds/net-hour) for all species at RPBO typically occurs from September 11 to September 24, during which time we missed coverage on 5 days.

Table 3. Banding totals, net hours, and birds/net hour at RPBO in 2008, by date.

Period	Banded	Net Hours	Birds/Net Hours
July 21-27	301	481	0.63
August 2-8	240	462	0.52
August 9-15	301	518	0.58
August 25-Sept 1	452	512	0.88
September 2-9	445	536	0.83

September 10-19	263	526	0.5
September 22-28	340	414.6	0.82
Sept 29-October 5	259	498	0.52
October 6-17	610	656	0.93
Total	3211	4603.6	0.69

2.3 RECAPTURES

In total there were 491 recaptures of previously banded birds, although many of these were originally banded in 2008 and subsequently recaptured a few days later. Some site-residents continued to be recaptured multiple times throughout the season. For example, two Chesnut-backed Chickadees were each recaptured six times from July 22 to October 6 and July 24 to October 10, respectively. One resident Bewick's Wren, originally banded as a hatch-year bird in 2004, was recaptured four times from July 21 to October 11, for a total of 11 times in 2004, 2005, and 2008. Among the resident breeding neotropical migrants, a second-year female Wilson's Warbler was recaptured on three occasions between July 24 to September 3, during which time it remained in the riparian area at Rocky Point to complete its prebasic molt before migrating south.

Some non-breeding migrants use Rocky Point as an important stop-over habitat during migration, as is apparent by the original capture of an after-hatch-year Golden-crowned Sparrow on September 16 and its recapture on September 24. A Fox Sparrow recaptured on October 2 was likely a returning winter resident, originally banded as a hatch-year bird on 15 September, 2006.

2.5 ESTIMATED TOTALS (ET) OBSERVATIONS

This summary is divided into seven-day segments, except for August 2-8 (6 days) and the last period of October 6-17 describing the remaining nine days of mist-netting effort. A total of 159 species were observed over the fall 2008 season (Appendix A). The season-high Estimated Totals (ET's) for select species observed in 2008 are compared to their season highs from 2000 to 2006 in Table 4.

Table 4. Season-high Estimated Totals (ET's) for select species in 2008 compared to season high ET's from 2000 to 2006, including date.

Species	2008	Date	2006	Date	2005	Date	2004	Date	2003	Date	2002	Date	2001	Date	2000	Date
Vaux's Swift	60	2-Sep	200	4-Sep	300	7-Sep	250	7-Sep	140	21-Sep	53	21-Sep	55	8-Sep	450	9-Sep
Rufous Hummingbird	8	22-Jul	6	24-Jul	10	7-Aug	9	20-Jul	16	2-Aug	18	22-Jul	18	24-Jul	22	21-Jul
Northern Flicker	20	16-Sep	26	11-Oct	20	20-Sep	25	6-Oct	20	28-Sep	20	20-Sep	15	3-Oct	14	5-Oct
Pacific-sl. Flycatcher	34	9-Aug	30	12-Aug	40	11-Aug	38	17-Aug	45	4-Aug	29	6-Aug	57	2-Sep	40	17-Aug
Warbling Vireo	8	26-Aug	12	16-Aug	13	27-Aug	14	14-Sep	11	13-Aug	7	21-Aug	6	25-Jul	13	3-Sep
Steller's Jay	42	7-Sep	162	31-Aug	56	20-Sep	75	6-Oct	25	24-Sep	93	28-Sep	40	30-Sep	35	14-Sep
Purple Martin	4	29-Aug	14	18-Aug	6	9-Aug	16	27-Aug	8	26-Aug	8	18-Aug	4	5-Aug	11	24-Aug
Violet-green Swallow	18	3-Aug	30	27-Jul	62	10-Aug	52	4-Aug	100	22-Jul	120	22-Jul	220	2-Aug	320	28-Jul
N. Rough-w. Swallow	4	26-Jul	12	23-Jul	36	23-Jul	26	1-Aug	18	24-Jul	28	5-Aug	60	2-Aug	120	28-Jul
Barn Swallow	30	3-Aug	60	27-Jul	28	10-Aug	32	4-Aug	30	22-Jul	50	23-Jul	19	29-Jul	48	29-Jul
Winter Wren	56	14-Oct	50	13-Oct	103	20-Sep	38	5-Oct	48	22-Sep	39	18-Oct	45	7-Oct	85	1-Aug
Golden-c. Kinglet	97	17-Oct	173	6-Oct	113	16-Oct	150	5-Oct	200	24-Sep	71	28-Sep	110	7-Oct	85	19-Sep
Ruby-c. Kinglet	73	12-Oct	80	6-Oct	453	20-Sep	110	4-Oct	105	15-Oct	123	1-Oct	70	7-Oct	90	1-Oct
Hermit Thrush	30	14-Oct	20	21-Sep	28	20-Sep	15	6-Sep	35	13-Oct	10	30-Sep	9	6-Oct	15	2-Oct
American Robin	328	30-Sep	227	9-Oct	325	9-Oct	360	10-Oct	380	28-Sep	290	21-Oct	300	3-Oct	160	26-Sep
Varied Thrush	8	18-Sep	27	16-Oct	25	30-Sep	90	16-Oct	35	24-Sep	10	30-Sep	8	17-Sep	10	28-Sep
American Pipit	46	26-Sep	86	23-Sep	44	10-Sep	85	26-Sep	150	29-Sep	45	17-Sep	88	3-Oct	35	23-Sep
Orange-c. Warbler	66	1-Sep	17	19-Sep	86	10-Sep	110	26-Aug	50	20-Sep	26	7-Sep	32	2-Sep	67	27-Aug
Yellow Warbler	31	4-Sep	42	19-Sep	45	9-Sep	70	26-Aug	110	20-Sep	47	7-Sep	17	13-Aug	80	27-Aug
Yellow-r. Warbler	63	29-Sep	300	24-Sep	100	4-Oct	180	28-Sep	580	24-Sep	134	23-Sep	85	30-Sep	80	27-Sep
Townsend's Warbler	8	30-Aug	15	4-Aug	17	10-Aug	17	5-Aug	20	16-Aug	8	7-Aug	11	7-Sep	16	1-Aug
MacGillivray's W.	7	25-Aug	9	13-Aug	12	12-Aug	8	1-Sep	10	29-Jul	14	6-Aug	10	6-Aug	8	11-Aug
Wilson's Warbler	33	8-Aug	30	28-Jul	35	25-Jul	29	5-Aug	35	10-Aug	29	7-Aug	40	7-Aug	20	11-Aug
Spotted Towhee	16	5-Oct	25	22-Sep	80	20-Sep	33	29-Sep	35	24-Sep	23	22-Sep	16	2-Oct	20	23-Sep
Savannah Sparrow	38	3-Sep	57	24-Sep	115	5-Sep	60	26-Sep	100	16-Sep	59	11-Sep	40	15-Sep	40	19-Sep
Fox Sparrow	26	10-Oct	27	14-Sep	48	10-Sep	35	5-Oct	80	20-Sep	20	17-Sep	15	2-Oct	25	1-Oct
Song Sparrow	25	16-Sep	27	24-Sep	46	20-Sep	22	16-Sep	32	29-Jul	34	28-Sep	31	30-Sep	25	12-Oct
Lincoln's Sparrow	45	4-Sep	40	16-Sep	53	10-Sep	50	10-Sep	44	16-Sep	28	12-Sep	32	2-Sep	65	1-Sep
White-cr. Sparrow	39	4-Sep	120	28-Jul	65	28-Jul	80	4-Aug	65	29-Jul	59	5-Aug	75	28-Aug	50	1-Sep
Golden-cr. Sparrow	130	10-Oct	70	7-Oct	67	21-Sep	139	19-Sep	66	17-Sep	26	30-Sep	35	30-Sep	16	10-Sep
Oregon Junco	28	12-Oct	60	24-Sep	60	20-Sep	57	3-Aug	46	27-Sep	30	4-Oct	50	30-Sep	70	10-Oct
Pine Siskin	222	14-Oct	272	11-Oct	15	27-Sep	425	3-Oct	220	15-Oct	54	2-Oct	650	5-Oct	160	10-Oct

Bold --- indicates season-high ET total for species since the year 2000

July 21-27, 2008

The first week of migration monitoring in late July began with predominantly overcast skies, low visibility due to fog, and relatively cool noon temperatures ranging from 15 to 18 degrees Celsius, contrary to the sunny and clear weather usually experienced at this time of year. This was also accompanied by typically strong westerly breezes, averaging 20 km per hour and causing the two most exposed “front nets” in the array, 01 and 02, to be either closed early or not opened at all during every day of this period; consequently, the highest single day total for net-hours of mist-netting effort achieved was 76.7 net-hours on July 24th.

Banding totals for the season began with a usual high total on the first day (69 banded [B]), due to the many dispersing birds from local breeding territories and not actually representing a movement of migrants. These were mainly comprised of mixed flocks of hatch-year Orange-crowned Warblers (16B) and Chestnut-backed Chickadees (14B; the season high). Many hatch-year birds of these two species were encountered in either complete juvenal plumage or just beginning their preformative moult. Some adults were also found to be in the midst of their complete prebasic moult, while most still presented a developed cloacal protuberance or brood patch, apparently completing the year’s first or subsequent nesting attempt within our netting area. Pacific-slope Flycatchers appeared to be undergoing a typically early departure, as they do not perform their fall moults until arriving on the wintering grounds in Mexico and thus are able to leave earlier than many other species. Their strategy of avoiding moulting on their summer grounds could be in part due to insufficient resources to sustain their insectivorous diet during energy-costly feather replacement. Their migration at Rocky Point during this period is evidenced by a relatively high proportion of second-year and after-second year birds being captured, 18 (40%) out of 44 total, with only two birds exhibiting brood patches while the remaining 16 showed no sign of breeding condition. This latter total included a few more females which had already replaced the abdominal feathers lost during vascularization. Since sufficient time had passed to complete this limited body moult, birds appearing in this condition in such relatively large concentrations at Rocky Point are likely to be in the process of staging and migration. Some adult Parulids were still encountered actively breeding, such as a local female Yellow Warbler with a fully developed brood patch captured in net 04, within her territory on the edge of Glover Pond. Other adult birds such as Chestnut-backed Chickadees were nearing completion of their definitive prebasic moult, while House Wrens, American Robins, and Orange-crowned and Wilson’s Warblers showed signs of just beginning this moult; as they still demonstrated traces of a receding breeding condition. A dispersing hatch-year MacGillivray’s Warbler, a species which begins its preformative moult while still in the nestling phase, was the first captured for the fall on July 26th. Wilson’s Warblers also attain their formative plumage early, and several hatch-year birds in fresh fall plumage, probably already migrating, were among 11 banded on July 27.

Banding and observational highlights included two Townsend's Warblers banded, a season's sole **Black Swift** observed on the 21st, the season's only Western Tanager banded on July 22nd, the first Cassin's Vireo on the 23rd, one solitary Vaux's Swift and a Long-billed Dowitcher observed on the 24th, and up to two Common Nighthawks seen on the lower and upper meadow throughout the week. Large flocks of Chipping Sparrows were observed staging for migration, with a high of 31 ET on July 25, as were groups of juvenile Brown-headed Cowbirds, with 12 ET on the 25th and 5 banded and the 26th. A high of two Anna's Hummingbirds, an uncommon wanderer to Rocky Point, were observed on the 26th, while a high of 8 Rufous Hummingbirds were counted on July 22. 303 birds were banded during the week, with a capture rate of .63 birds per net-hour, and 89 species observed (the lowest for the season).

August 2-8, 2008

When migration monitoring was resumed after a 5-day interruption on August 2, meteorological conditions were found to be the same as the previous seven-day period, with mostly overcast skies and fog close offshore, although the westerly winds had died down to a light breeze, allowing all nets to be open for the full six-hour period from the 2nd to 6th.

During the first part of the week migrants definitely were on the move, as good numbers of Wilson's Warblers (11B) and Chipping Sparrows (5B) were noted among the 66 birds captured of 22 species (season-high number of species banded in a day) on the 2nd, as well as the first banded Willow and Hammond's Flycatcher, and first observed Western Wood-Pewee of the season. On the 3rd a similar abundance of migrants was noticed, with a larger mixed flock of warblers (Orange-crowned 15ET, of which many breeding adults were encountered beginning their prebasic molts during the week, Yellow 4ET, and Wilson's Warbler 22ET) observed foraging in the alders around net 05. Chipping Sparrow flocks were still observed along the census route, with 15ET, and a season-high of 30ET Barn Swallows was recorded. The highlight of the day was Rocky Point's 7th Olive-sided Flycatcher banded, an after-second-year female exhibiting a well-developed brood patch. Since it now possessed a shiny band on the right leg, we were able to confirm that this was indeed the same individual observed feeding a juvenile *Contopus cooperi* on the 8th. On the 4th it was apparent that some of the migrants may have left with the onset of clear skies, particularly the Pacific-slope Flycatchers, of which only one individual was seen, while a season-high of 30ET Red-breasted Nuthatches was recorded. On the 5th and 6th the high-pressure system prevailed, with clear and calm weather, and migrants were coincidentally fewer in the nets, although the number of detected Orange-crowned Warblers peaked at 23ET for the week on the 6th. Also, Olive-sided Flycatcher peaked at 9ET for the season, probably including a mix of hatch-year birds along with adult birds still holding on to their summer territories until the very day of their departure. On the 8th migrants reappeared with the very strong westerly winds and overcast skies, with a period-high of 20B/33ET Wilson's Warblers. As usual shorebird migration is never strongly represented at Rocky Point, but this year Least Sandpipers appeared particularly underrepresented with a season high of 10ET on the 5th, accompanied by one

of only 2 Lesser Yellowlegs of the fall. 240 birds were banded during the 6 days, with a lower capture rate of .52 birds per net-hour—probably a correlation with the clearer weather being less conducive for migrants to stop over—and 92 species observed.

August 9-15, 2008

A low pressure-system at the beginning of the week interrupted the clear weather experienced during the previous period, bringing with it some rain in the afternoon and evening of the 9th and 10th.

Accordingly, many migrants were forced to stopover at the riparian strip where we conduct the mist-netting, with 75 birds banded of 13 species. 64% of the captures comprised the most ubiquitous neotropical migrants found in August: the early-departing Wilson's Warbler (24B/33ET; both season-highs) and Pacific-slope Flycatcher (24B/34ET; both season-highs). Other stopover and/or dispersing migratory species encountered in mixed flocks on the 9th included Orange-crowned, Yellow (6ET), and Townsend's Warblers (1B, 4ET). Many individuals were found to be carrying relatively larger amounts of fat (score of 2-5) than the previous week, which supports a theory that most of the migrants we witnessed during this period were dispersing birds from the broader surrounding region. As they wandered south, they found and exploited the increased food availability in the riparian corridor along Derbyshire Creek as a molting and staging ground, before initiating a true migratory flight. On the 10th another overcast and humid morning produced more mixed species flocks, for a daily total of 66B, captured in nets 04 and 11, along with a season-high of 18 Bushtits, mostly captured in net 01. A season-high on the 12th of 40 mostly juvenile American Goldfinches could be seen foraging in the thistle fields in the meadow to the north of Bldg. 100, along with a high banding total of 14 on the 13th.

On the 11th, a very light noon breeze came from due east, the calm and clear weather persisting until the 14th, accompanied by a correspondingly significant decrease in migratory songbird abundance. However, a welcomed change in diversity occurred with the capture of a Black-throated Gray Warbler and a **Northern Waterthrush** in net 06, the earliest record for this uncommon species at Rocky Point coinciding with a capture on the same date in 1994. On the 12th, all seven species of common Parulid warblers were recorded, along with Cassin's, Hutton's and Warbling Vireos. Two Rufous Hummingbirds were visually recorded as they migrated across the calm Juan de Fuca Strait. A season-peak of 46ET for Western Sandpiper was witnessed on the 11th, although overall shorebird diversity was highest on the 14th, despite the apparent lull in songbird activity. Season-high observations were recorded for Long-billed (6ET) and Short-billed (2ET) Dowitchers, as well as the fall's only detected Black-bellied Plover and Solitary Sandpiper, the latter heard calling and seen flying from the upper ponds towards Bentinck Island. Weather changed to strong gusting westerly winds and partially overcast skies on the 15th, bringing a small influx of migrants (although very few were captured), with a daily low of 24 birds banded during this period.

Other observational highlights during the week included season-highs for Mourning Dove (4ET) and Red Crossbill (16ET) on the 9th, and for Caspian Tern (4ET) and Cedar Waxwing (45 ET) on the 11th. The only Pacific Loon and Red-breasted Merganser for the fall were detected on the 9th and 11th, respectively. 301 birds were banded during the week, with a capture rate of .58 birds per net-hour (both the lowest for the season), and 100 species of birds observed.

August 25-1 September, 2008

After a 9-day hiatus, migration monitoring activities were permitted to resume at Rocky Point on the 25th. A low-pressure system brought precipitation and wind for many days during the last half of August, an unusual occurrence which was nonetheless conducive to the detection of a large volume of neotropical migrants. Had access been permitted during our 9-day absence, there could have been a significant abundance of migrants to monitor, as several days experienced unsettled conditions. Variable weather and the apparently strong link in occurrence between such meteorological patterns and large movements of migratory songbirds emphasizes the point that migration monitoring must be conducted every day possible within the 90-day period, in order to adequately sample the populations in need of conservation. Visibility was good throughout the week, with partial cloud cover for most days, bringing rain on the 28th and impeding all monitoring activities on this particular date.

On the 25th we experienced a significant movement of neotropical migrants, including the highest daily total for birds banded in August 2008, with 83 individuals of 17 species, despite only 11 nets being operated due to strong gusts of westerly wind affecting the safe operation of nets 01 and 02 on part or all of every morning until the 31st. Apart from the high captures, evidence of fall migration was indicated by the migratory flight calls of Swainson's Thrushes heard in the twilight before dawn, as well as higher diversity and abundance of flycatchers and warblers; Hammond's (4B/ET), Willow (3B/4ET—tie for season-high) and Pacific-slope Flycatchers (11B/ET); Orange-crowned (17B/21ET), Yellow (4B/ET), Wilson's (16B/17ET) Warblers, and a season-high for both banded and ET for MacGillivray's Warbler (6B/7ET) and Swainson's Thrush (7B/11ET).

A comparison of the large ratio of banded birds to the maximum ET for both species clearly demonstrates the importance and efficiency of mist-nets as a tool for monitoring the populations of elusive and skulking species. On the 26th, captures decreased, with 68 banded, however many Orange-crowned and Wilson's Warblers were still present. The day set a high 8ET for Warbling Vireo, and Oregon Juncos began appearing in the mist-netting captures. Another indication that migration was well underway was that the ratio of young to adults captured had changed noticeably since the dispersing juvenile flocks of early August, with approximately 40% of the warblers captured being adults. Most local hatch-year birds and after-hatch years had completed their respective fall moults, except for late brooders such as Oregon Juncos and Song Sparrows, of which many hatch-year birds were still captured in their juvenal plumage. A gradual increase of migrating Common Yellowthroats was noticed during the week, beginning with 6B/12ET

on the 26th; clearly these were not resident birds, as they were all encountered away from the ponds in the Nootka Rose and Salmonberry between net 06 to 09.

A low-pressure system, which appeared on the 27th and cleared up on the 29th, briefly interrupted banding operations with light showers. A larger than usual number of migrant Yellow, Orange-crowned, and Wilson's Warblers banded over the previous few days were recaptured, apparently impeded from continuing their migration until conditions improved, and in the meantime storing up their fat reserves. A warm night prior to the 29th may have allowed most of the stopover migrants to continue south, as only 23 birds were banded, although a season-high for Common Yellowthroat (15ET) was recorded. A new influx of migrants (including a high of 4B Willow Flycatchers on the 31st) were recorded during the last three days of the period, with 60B and 78B on the 30th and 31st of August, respectively, though the clear and calm weather (although with offshore fog) was conducive to nocturnal migration. On the 1st 100 individuals were banded of 17 species. This was the highest banding total for the month of September when we might have expected higher totals. Access to Rocky Point was denied on 6 crucial dates in September during the historical peak for migration; from the 8th to the 21st. Thirty-five of the birds banded on the 1st of September were Orange-crowned Warblers, the season-high captured and observed (66ET) for this species. Large numbers of Yellow (13B/25ET) and Wilson's Warblers (19B/26ET) were also recorded, along with fall's only high-flying Horned Lark. Sparrows had begun to arrive, with the first Lincoln's, Savannah, and Fox Sparrows banded on August 30th, 31st, and September 1st, respectively.

Other highlights during the period included a Sharp-shinned Hawk banded on the 25th, a **Brown Pelican** on the distant rocks west of Bentinck Island and also two (season-high) Black-throated Gray Warblers banded on the 27th. Small flocks of Band-tailed Pigeons had been seen gathering in numbers throughout the month, but the peak for August was 80ET on the 30th. 452 birds were banded during the period (the highest number within a 7-day window), with a capture rate of .88 bird per net-hour (also the highest for the season), and 101 species of birds observed.

2-9 September, 2008

A high banding average of 91 birds per day from the 2nd to the 4th dropped abruptly to an average of 43 birds per day for the 5th to 9th, without any apparent change in the weather except for a stronger westerly wind picking up on the 5th. A light westerly breeze prevailed from the 2nd to 4th, and by the 6th to 9th a high-pressure system had brought clear skies and a near absence of wind. This ambiguity in the effect of meteorological conditions on migratory songbird abundance further illustrates the point that in order to witness the highest movements of migrants through the area (and thus adequately monitor their respective populations), it is beneficial to conduct monitoring efforts on every day of the migration season.

One day in the period, September 8th, was lost due to military activities. This was the strongest week of the fall for migrating warblers, with a cumulative 7-day total of

103B/189ET for Orange-crowned Warbler, 52B/111ET for Yellow Warbler, and 57B/97ET for Wilson's Warbler. On the 2nd these three species consisted of 61% of the 92 birds banded, with Yellow Warbler reaching a season high of 19 banded. Higher numbers of Vaux's Swifts were observed preceding the raptor migration with a high of 60ET. This is a very low total compared to a peak-high of 450ET in both 2000 and 1999 and a mean high of 275 ET for the years 1999 to 2005 (not including 2002), although another low peak of 55ET in 2001 implies that populations of Vaux's Swifts are probably cyclical and/or that the specific location of their staging area varies enough at Rocky Point for them to go unnoticed from the vicinity of the census route and mist-netting corridor.

Among 95 individuals banded on the 3rd was the second highest total for Pacific-slope Flycatcher (18B/22ET), possibly indicating a second wave from more distant breeding populations. Also prominent were Savannah Sparrows, with a season-high of 12B/38ET. On this date the previous record of 271 for number of banded Orange-crowned Warblers had already been surpassed by one bird at 272. The new high for the entire fall season, since monitoring began at Rocky Point in 1994, surpassed the previous record by nearly 70% at 403 individuals. The 4th was a good day for sparrow abundance, including the first Golden-crowned Sparrow banded for the fall, as well as a season peak for Lincoln's Sparrow (45ET) and Puget Sound White-crowned Sparrow (39ET), along with Savannah Sparrows (24ET) although they did not make up the majority of the 86 birds banded. A high ET was also observed for Yellow Warbler (12B/31ET), the majority of the observed birds being detected by their diagnostic flight calls as they were seen flying high overhead before and for a few hours after dawn. Non-passerine highlights on the 4th were 3 Sandhill Cranes observed at very close range along the road and on the rocks in the bay next to Bldg. 100, a gradually increasing number of staging Turkey Vultures, and the second largest flock of Vaux's Swifts (45ET).

On the 5th strong gusts from the west kept us from opening nets 01 and 02, and so an overall decrease in birds banded (54) may have been due to a combination of wind and diminished netting effort, since sparrows in particular, which are often captured in the front nets, were significantly less prominent. However, there was still a modest movement of warblers, and an ever increasing total for the recently appeared Fox (8ET) and Savannah Sparrows (16ET). Weather for the remaining three days of period was clear and calm, which accordingly lowered the overall abundance of neotropical migrants at Rocky Point, although we had the highest count for Chestnut-back Chickadee (80ET) on the 6th. This was possibly the result of a gradual accumulation over the past month of post-breeding adults and hatch-year birds from the broader surrounding region within and beyond Rocky Point. On the 6th and 9th a high of 13 Lincoln's Sparrows were banded.

The 7th was without a doubt the peak day for seabirds during the fall, although without the usual accompaniment of strong winds (only a light breeze from 1 to 7 miles per hour), producing highs for the following species: California Gull 1000 ET, Glaucous-winged Gull 156 ET, Marbled Murrelet 5ET, Rhinoceros Auklet 23ET, Red-necked Phalarope 71ET, **Sooty Shearwater** 76ET, and Surf Scoter 33ET. These observations were entirely the result of our volunteer Mike McGrenere's 2-hour effort to document seabird

movements on this particular day. It is important to note that waterbird observations at Rocky Point are non-standardized, and therefore likely do not reflect actual peak movements of each species found in the region. Waterbird movements and abundance are considerably under-sampled by migration monitoring personnel at Rocky Point, since the main occupying focus is songbirds. Access to prime seabird watching areas such as Edey Point are a fair distance from the banding area, and therefore not practical for consistent visits during the mist-netting period. Clearly Rocky Point is of great importance for waterbirds, and it would be best to focus separate, concentrated efforts in monitoring this group.

The 7th was also the month's peak for Steller's Jay (42ET). By the 9th the number of individuals had dropped to only 33, with the first of four Steller's Jays for the year being captured, although staging diurnal migrants such as Turkey Vultures and Band-tailed Pigeon had increased to 51ET and 250ET, respectively. Other highlights during the period included a banded Violet-green Swallow and a Sharp-shinned Hawk on the 2nd, and a non-standard boat trip after migration monitoring from Pedder Bay to the vicinity of Race Rocks area produced close views of a **Cassin's Auklet** and approximately 50 Red-necked Phalaropes. 445 birds were banded during the period, with a capture rate of .83 birds per net-hour, and 100 species of birds observed.

10-19 September, 2008

The 11th, 12th, and 15th were not monitored due to military requirements. The lowest overall cloud cover and average wind speeds were experienced neither in July nor August as in previous fall seasons, but for a prolonged period from September 6th to 14th. This week-long period of calms was likely a boon for several migratory passerine species during the height of their passage through the southern part of Vancouver Island. Although it was beneficial to the nocturnal migration of thousands of individuals, it was not particularly conducive to their observation or capture, despite the lack of wind permitting the achievement of maximum possible daily mist-netting effort.

The weather proved, however, beneficial to bird and observer when referring to diurnal migrants, such as Turkey Vulture (38ET), Sandhill Crane (2ET), 130ET Band-tailed Pigeons, and both Pandionine (Osprey) and Accipitrine raptors, such as Northern Harrier, Sharp-shinned Hawk (7ET), Cooper's Hawk, and Red-tailed Hawk, all of which were present in moderate abundance and diversity on the 10th. The highlight species of the day and indeed of the entire fall monitoring period was undoubtedly a **Lewis' Woodpecker**, sighted briefly as it flew directly overhead the banding shack towards the upper meadow. This 3rd sighting for RPBO coincides in timing with the previous record from September 6th, 2005.

Also recorded was the first of two detections of Northern Pygmy Owl on census, and this crepuscular species was noted as being particularly vocal and/or abundant this fall throughout numerous locations in Metchosin, including the gatehouse at CFAD Rocky Point, the Pedder Bay Marina, Sooke Rd. at Kangaroo Rd., and Leefield Rd. (where two

individuals were heard emitting an interactive call similar to a duet, albeit at an inappropriate time of year for the latter).

The 13th brought some interesting captures, including the first Hermit Thrush and Ruby-crowned Kinglet of the season, but also an “unusually” large, pale Savannah Sparrow, which upon comparison of collected mensural data to the subspecies ranges provided in Pyle (1997), it was determined to fall well within the range of the nominal *Passerculus sandwichensis sandwichensis*, which breeds in the Aleutian Islands but normally winters on the coast of southwestern British Columbia. The fact that few of this subspecies are encountered within the migration monitoring period may indicate that they are generally a later migrant (possibly as a result of their remote breeding grounds), the majority of which arrive in the region after mid-October. The bulk of the Savannah Sparrows captured at Rocky Point are, according to mensural data and plumage criteria, of the *P. s. brooksi* subspecies, which breeds on the coast of southwestern B.C. to northwestern California, and winters along the southwestern Californian coast (Pyle 1997).

Isotopic analysis of feathers replaced on the breeding grounds for the many differing individuals of various species suspected to present more than a single population at RPBO, could identify links between the various breeding populations and their respective migration routes and wintering grounds. This information is of particular importance for conservation efforts of target species (such as Savannah Sparrow, which was reported to be in decline at Rocky Point by Christie (2004)), and as of yet has not been thoroughly documented for many species on the west coast of Canada.

September 14th was notable for the lowest total for abundance and diversity captured for the entire season, despite full attainment of the 78 net-hour potential of effort, with only 18 individuals banded of 9 species. The unusual occurrence of such a low capture-rate within the peak migration window was probably strongly correlated with the unusual weather for this time of year. The clear and calm skies were nonetheless productive for raptors, with an ever-increasing number of Turkey Vultures (135ET) and diversity of Falconiformes, including 11 Sharp-shinned Hawks, 7 Cooper’s Hawks, 1 Peregrine Falcon, and a season-high of 3 American Kestrels. The only Semipalmated Plover of the fall was heard as it flew by Bldg. 100 on this day.

At noon on the 16th east-south-easterly winds brought a barrier which interrupted the continuance of southward migration for some birds, accompanied by a small increase in captures reaching 36 birds, but of a significantly higher 19 species, among which were the first 4 Ruby-crowned Kinglets banded for the season, and 2 more Golden-crowned Sparrows. For the remaining three days of the period strong, sporadic gusts of wind originated from the westward all morning, with fog being pushed close to shore by the wind and subsequently receding many times during the mornings, but despite the limited use of the front nets capture totals increased to a 3-day high of 63B on the 18th.

The change in weather brought an addition to the fall’s bird diversity, including the first of only two **Broad-winged Hawks** of the season, soaring among the low clouds above the banding shack, and a season-high of 13 Northern Pintail. Also noted was an increase

in warbler abundance and diversity, the most numerous of which were Yellow-rumped Warblers (13ET) and Yellow Warblers (11ET). The movements of the Yellow Warbler are clearly comprised of differing populations passing through Rocky Point throughout the fall, as this species tends to have a lower abundance spread out within a broader temporal period, compared to the relatively more concentrated movements of Orange-crowned Warblers in late August and early September.

An influx of “later” migrant species was recorded on the 18th, for Ruby-crowned Kinglet (5B/9ET), Hermit Thrush (5B/7ET), Golden-crowned Sparrow (3B/9ET) and a season-high for Hammond’s Flycatcher (8B/11ET). The largest flock of Cedar Waxwings since August 11 (41ET) and a high for Varied Thrush (8ET) were also noted. Four Violet-green Swallows on the fully overcast morning of the 19th was the last record of this species for the fall, after an appearance of two birds on the 6th. Also present on this date was a large group of American Robins (60ET), and another Northern Pygmy Owl observed on census, near net 12. 263 birds were banded during the period, with a capture rate of .5 birds per net-hour, and 100 species of birds observed.

22-28 September, 2008

The 20th and 21st were not monitored due to military activities. These are coincidentally the least desirable days that the Canadian Migration Monitoring Network would recommend omitting from monitoring efforts. As Leckie (2008) reported, they have been statistically proven as the central part of the peak of the average migration movement at Rocky Point, and are also individually two dates which are among the highest for number of birds captured per net-hour.

Although the week began on the 22nd with typical strong gusts from the west, allowing the use of only 11 nets, 97 birds were nevertheless captured and banded. For the remainder of the week there was a shift to predominantly southeasterly winds, bringing rain which interrupted part of the morning on the 24th and fully impeded banding activities on the 25th.

The bulk of the individuals captured on the 22nd were Ruby-crowned Kinglets (27B/36ET), along with Hermit Thrushes (14B/16ET), the majority of which were after-hatch-year birds. Also prominent were Fox Sparrows (9B/13ET) and Orange-crowned Warblers (10B/17ET). Exactly “according to schedule”, the peak day in the season was observed for many diurnally migrating species: Turkey Vulture 650ET, Sharp-shinned Hawk 19ET, Red-tailed Hawk 22ET, and Band-tailed Pigeon 425ET.

A 100ET high was also recorded for Heermann’s Gull, repeated on the 2nd of October. These peak observations were largely achieved by the perseverant observations of our volunteer Ian Cruickshank, while the rest of the monitoring crew was occupied with the mist-netting effort. Ian also detected the season’s sole Pectoral Sandpiper for the season. The first dawn frost of the month (low 4 degrees Celsius at dawn) brought a continued abundance of neotropical migrants on the 23rd, with 75B, 20 of which were Ruby-

crowned Kinglets. The first of three **White-throated Sparrows** for the fall was banded and two Virginia Rails in Glover Pond were the daily highlights.

Strong winds and heavy rain by 10 a.m. on the 24th cut the morning's effort in half to only 41.5 net-hours (out of a maximum potential of 78 net-hours), although 42 birds were still captured and processed. A daily trickle of dispersing Winter Wrens had increased to 6B, and Yellow-rumped Warblers reached 16ET, mostly frequenting the alders near the banding shack. A season-high of 8 Sandhill Cranes was noted. A persistent drizzle on the 25th did not permit any mist-netting effort, and personnel were required to leave the site before census could be completed due to military activities.

Calm and overcast weather on September 26th allowed a coverage code of 5 to be achieved, including the completion of a full census and all 78 net-hours, producing 45 captured birds. The highlight was to be found in the sky, however, as a first-cycle Golden Eagle flew low over Bldg. 100, as well as a season-peak for American Wigeon (5ET), Northern Shoveler (3ET), and American Pipit (46ET). A slight influx of Winter Wrens (5B/21ET) and Spotted Towhee (7B/15ET) were noted on the 27th, while Ruby-crowned Kinglets (15B/35ET) provided the bulk of the captures as per usual. The latest Barn Swallow of the season was also observed on this date, and 10ET Herring Gulls and one Western Meadowlark were the only individuals of their species identified during the entire fall at RPBO. The period concluded with fog offshore on the 28th, and a spike in numbers of 500ET Turkey Vultures was witnessed. A season-high for both Red-winged Blackbird (85ET) and Common Raven (32ET) was noted. A second White-throated Sparrow and the first of three Barred Owls of the fall passerine migration monitoring season were captured; the latter species, along with Cooper's Hawks and a Northern Harrier, proving to be a particular nuisance as they collectively managed to predate twelve different birds in nets 04 to 13 during the season, despite persistent vigilance by personnel and temporary closure of the affected nets. 340 birds were banded during the period, with a capture rate of .82 birds per net-hour, and 101 species of birds observed.

29 September-5 October, 2008

Wind and cloud cover were variable during this period, ranging from complete calm to strong gusts alternating between the west and southeast on different days and even different parts of the morning. Precipitation restricted efforts on the 2nd to 5th, therefore limiting the potential of detection by capture through reduced net-hours.

Diurnal-migrant abundance continued to be relatively well represented on the 29th; Turkey Vulture abundance remained comparable at 465ET, Sharp-shinned Hawk 12ET, Red-tailed Hawk 7ET, and Sandhill Crane 6ET; two Soras were also heard from Glover Pond. As to be expected later in the fall, gregarious Passeriformes were particularly abundant on this date, large flocks being noted for American Robin (60ET), American Pipit (32ET), and season-peaks for both Yellow-rumped Warbler (67ET; 4 Myrtle Warblers banded) and Purple Finch (23ET). Diurnally flocking passerines were once again abundant on the 30th; American Pipit (44ET), Cedar Waxwing (32ET), and season highs for American Robin (328ET). The identity of many closely observed Yellow-

rumped Warblers (39ET) revealed the highest total of positively identified Myrtle Warblers (22ET) for the fall. Later migrants such as Golden-crowned Kinglets (7B/45ET), and Winter Wrens (5B/24ET) surpassed Ruby-crowned Kinglets (6B/18ET) on this particular day. The apparent disproportion between these banding and ET totals continues to demonstrate that observational data plays a critical role in accurately representing abundance and composition of forest species during migration.

The 30th also experienced the peak ET for American Green-winged Teal (9ET) and one of many for Spotted Towhee (16ET—September 30, October 1, 5, 6, and 8). The weekly peak of 59B on the 1st of October was shared with the 5th. Most notable was a fresh wave of Yellow Warblers (9B/12ET), all of which were after-hatch-year (AHY) females save one AHY male. Yellow Warblers were particularly silent on this day, thus reducing their potential to be located aurally, and reinforcing the value of mist-netting as a tool for detection of songbird abundance. The complimentary methods of standardized mist-netting and observation yield more accurate results than either technique individually. The interesting aforementioned Yellow Warbler age/sex ratio points to possible temporal differences in the demography of migration occurring between and within meta-populations. The ecological factors determining such apparent demographic stratification during post-breeding movements, even of such ubiquitous forms like *Dendroica petechia* are still poorly understood. Yellow-rumped Warblers were still present in high numbers (47ET) and a third **White-throated Sparrow** was banded. A fall-peak of 8 Western Grebes were recorded off of Edye Point. Captures slowed to 38B, among which were the fall's only pair of biometrically-processed Audubon's Warblers. Mist-netting was limited by drizzle for 30 minutes during the monitoring period. Winter Wrens presented a continued abundance with 8B/25ET.

Although monitoring operations were concluded early at 10 a.m. on the 3rd, it was nonetheless apparent that few migrants were present, as two thirds of captures were recaptures of probable winter-resident individuals (Chestnut-backed Chickadee, Bewick's Wren, and Fox Sparrow), and other species (Golden-crowned and Ruby-crowned Kinglets, Orange-crowned and Yellow Warblers) were probably obliged by inclement weather to continue their stopover. A Red-shafted Flicker was a new species banded for the season, while Savannah Sparrows reached their peak with 12B. The highlight Anseriforme movement of the season was undoubtedly the arrival of 75ET Greater White-fronted Geese, some of which remained at Rocky Point into the following period. Despite only three nets being closed for 30 minutes due to a brief shower on the 4th, migratory songbird abundance was recorded at a mere 17 individuals of 9 species by our mist-nets. In addition the 75 Greater White-fronted Geese recorded the day before, a few migrating flocks of ten to twenty-five high-flying geese were also noted, totaling a season-peak of 152ET for the day. Despite starts and stops in mist-netting effort on the 5th, a significant resurgence in passerine captures (59B of 17 species) was welcomed by personnel. The movement was primarily composed of Ruby-crowned Kinglets (15B/38ET) and a new wave of Hermit Thrushes (11B/14ET), as well as a season-high capture for Spotted Towhee (8B/16ET). 259 birds were banded, with a capture rate of .52 birds per net-hour, and 91 species of birds observed.

6-17 October, 2008

This nine-day period encompasses the last segment of Passeriforme-focused migration monitoring conducted at Rocky Point during the fall of 2008. On the 9th, 15th, 16th, and 18th of October, CFAD at Rocky Point was inaccessible due to continued military training. Prevailing strong westerly gusts and passing rain showers continued to characterize the late autumn weather on southern Vancouver Island until the 8th of October, reducing coverage on all three days.

Seventy-five Greater White-fronted Geese (likely the group from the previous week prolonging its stay in order to rest and refuel before crossing the Strait of Juan de Fuca) were recorded on the 6th. Falconiformes had decreased noticeably in abundance since the last week of September, as did Turkey Vultures (38ET), likely a response to the increased precipitation reducing favourable conditions for soaring. American Robins (92ET), Spotted Towhees (7B/16ET), and Golden-crowned Sparrows (9B/25ET) all remained fairly numerous, while Pine Siskins were seen in larger groups (24ET). In all, 57 birds of 15 species were banded on the 6th. Although captures dropped considerably to 20 birds of 8 species on the 7th, partly caused by drizzle at net-opening and closing, the capture rate had also dropped significantly lower in comparison to the previous day from .75 birds/net-hour to .34 birds/net-hour. Among the highlights recorded on this “slow” day were another first-cycle Golden Eagle, one Spotted Sandpiper, three Hooded Mergansers in Glover Pond, and a resurgence in Band-tailed Pigeon numbers reaching 160ET. In stark contrast to the lower neotropical migrant abundance during the previous week, the fall record of 102 birds banded on a single day (14 species) occurred on the 8th, along with a comparatively low recapture rate of only five individuals. The maximum season total occurring in October may have been the result of incomplete efforts during the statistically-confirmed peak from September 11th to 20th. Notwithstanding this bias in coverage, the significant increase of captures around the 8th of October coincides well with an average high capture-rate in the previous years of 1999-2006. Further examples of correlation in temporal synchronicity of abundance between historical data and the present year is well represented by the high captures of Ruby-crowned Kinglets (35B/63ET), which correspond with the distinct, multiple-year repetition of a second, higher peak in abundance (the first around September 20th, not covered in 2008) for this species at RPBO around October 7th, as illustrated by Leckie (2008) with a five-day moving average of capture-rate by date. Other prominent species of the day, in order of descending total captures, were: Fox Sparrow (14B/20ET), Golden-crowned Sparrow (8B/19ET), Golden-crowned Kinglet (7B/41ET), Hermit Thrush (7B/7ET), Orange-crowned Warbler (7B/10ET—of which 6B were after-hatch-year birds), and Oregon Junco (6B/22ET). The most uncommon songbird of the day and also of the season was RPBO’s 10th banding record of a **Nashville Warbler**; a hatch-year male. Offshore was a high of 3 Red-necked Grebes, shared also with the 12th.

On the 10th and 11th, dawn temperature dropped to 0 degrees Celsius, causing the delayed opening of some of the mist-nets due to heavy frost freezing them shut, and clear skies with high visibility were accompanied by a light southeasterly breeze at noon. 74 and 55 birds were banded on the 10th and 11th respectively. A formidable movement of Golden-

crowned Sparrows was witnessed on the 10th, with a season-peak of 14B/130ET, accompanied by a high for Fox Sparrows (16B/26ET), and the only Varied Thrush of the fall captured. Non-passerine highlights were comprised of the fall's only flock of high-flying 75 Snow Geese overhead, plus season-highs for White-winged Scoter (7ET), Black Oystercatcher (19ET), and Thayer's Gull (5ET).

Netting effort on the 11th was plagued by the presence of Barred Owls, causing some nets to be either closed temporarily or monitored closely by personnel. A steady flow of songbirds was experienced throughout the day, the majority consisting of more Ruby-crowned Kinglets (13B/39ET), Golden-crowned Sparrows (9B/17ET), and Fox Sparrows (7B/13ET), while a late Wilson's Warbler (an after hatch-year female), the first recorded since September 26th and the only individual banded for October, appeared to be infested with 2-3 botfly larvae in the abdominal cavity. Since 1997, this is the 13th October banding record for a Wilson's Warbler. Two later records were obtained in 2006 on the 13th and 14th of October, both of which were also after hatch-year females. A relatively late abundance of raptors and vultures was also noted, with 48ET Turkey Vultures, 17ET Red-tailed Hawks, and a season-high of 4 first-cycle Golden Eagles, however small movements of the latter species is generally known to occur more frequently in October on southern Vancouver Island. Bonaparte's Gulls (35ET) were beginning to amass off of Edye Point, while 220ET was an October high for California Gull. A return to a westerly breeze and mostly overcast skies brought another jump in songbird abundance on the 12th, along with the season maximum for number of banded Golden-crowned (12B/36ET), and banded/ET Ruby-crowned Kinglets (41B/71ET), consisting of 60% of all 88 individuals banded. Although none were captured, a season high was also recorded for Oregon Junco (28ET), while a hatch-year Hammond's Flycatcher was both the fall's latest banded and observed individual of its species. This is the latest banding record for this species since RPBO's inception in 1994, and is only shared with another hatch-year bird captured on the same date in 1997. The last three days of the season's mist-netting and observational efforts were completed to 100% of their potential, aided by the relatively calm, overcast conditions, with the breeze shifting again to southeasterly on the 13th and 14th. Captures remained high on the 13th, 14th and 17th, reaching 65B, 98B, and 51B respectively, with Ruby-crowned Kinglets continuing to provide 40-60% of these totals. Highlights for the 13th included a juvenile **Northern Goshawk** perched by the banding shack, 2 **Cassin's Auklets** on census, an October high of 77ET Heermann's Gulls, and a season-high of 36ET Double-crested Cormorants and 11ET Audubon's Warblers. On the 14th, a typically late season-peak for Winter Wren (13B/56ET) and Hermit Thrush (23B/30ET) was observed, as well as for several other species: Bonaparte's Gull (510ET), Brandt's Cormorant (19ET), Mew Gull (125ET), **White-throated Sparrow** (2ET), Pine Siskin (222ET), and Evening Grosbeak (14ET). Winter Wrens (3B/43ET) continued to be abundant on the 17th, although this was surpassed considerably by the peak presence of Golden-crowned Kinglets (3B/97ET). Waterfowl were also particularly numerous, including season-highs for Mallard (40ET), Harlequin Duck (7ET), and Common Merganser (5ET). The conclusion of fall migration monitoring in 2008 was celebrated with the sighting of an uncommon first-cycle **Rough-legged Hawk**. 610 birds were banded during this extended 9-day period, with a capture rate of .93 birds per net-hour, and 101 species of birds observed.

3.0 NORTHERN SAW-WHET OWL MONITORING

3.1 METHODS

A new location for owl monitoring was established to the south-west of the banding shack, in the riparian corridor comprised mainly of alders and willows. A square of four joined 12-meter-long x 2.6 meter-high mist-nets was created, from the centre of which was played an audio-lure, as recommended by <http://www.projectowl.net.org> . Four single passive nets were also employed, one to the south-west (P2), one to the north-west (P1), and two to the east of the owl-square (P3 and M5), respectively. M5 corresponds to net 05 used during diurnal passerine migration monitoring, and since it was relatively near to the audio-lure and proved productive in its capture of owls, we continued its use throughout the season. We also experimented on a few nights with the use of the more distant migration nets 06-09, located to the north of the banding shack, but these did not succeed in capturing any owls. Since our supply of nets with “thrush” mesh-size (61mm) was limited, we could only use this more effective type for the main owl square and one of the passive nets. Originally, we had used the 5th thrush-net for P1, but given that higher numbers of owls were being caught in P3, we exchanged the passerine mesh-size (30 mm) for the thrush-net at P3 and subsequently used the passerine-net at P1, beginning on October 6.

The audio-lure and eight mist-nets were operated for six hours beginning 30 minutes after sunset, weather permitting. Mist-nets were checked no less frequently than every twenty minutes, but on several nights where Barred Owls threatened to predate the birds already captured, personnel were obliged to stand near the nets and remove birds as soon as they were entangled. Data collected included age, sex, eye colour, foot colour, exposed culmen, wing chord, fat deposit, body molt, tail length, weight, as well as remex molt, which was recorded on a separate spreadsheet; this data often aided in determining the age of the bird. Age was determined using a normal fluorescent light, but contrasts in the flight feathers were rendered more apparent by employing an ultra-violet light. Sex was determined by a combination of wing chord and weight values determined from a statistically tested data-set with an estimated error rate of 5% or less (Brinker 2000). However, these values were determined using data from owls in eastern North America and as such the western coastal population could vary significantly; more study is needed in order to create criteria of wing/weight combinations by running statistical tests on a sizeable data-set once it has been accumulated in the future or by obtaining data from known-sex individuals (through genetic analysis) from the Pacific Northwest. More specific details regarding methods followed during the 2008 owl monitoring project can be found in Levesque (2002) and at <http://www.projectowl.net.org> .

Owl monitoring was also attempted at Witty’s Lagoon, Metchosin on October 16, 17, and 18, when access to Rocky Point had been restricted. A similar 4-net square was created

from two songbird nets and two thrush nets, with an audio-lure placed in the middle of the square.

3.2 COVERAGE

Out of the 47 day banding season, from September 15 until October 31, 11 nights were lost due to military activity or heavy rains. September 15, 19, 20, 21, October 9, 15, 16, 17, 18, and 22 were lost to military activity. Monitoring on September 17 was not possible because of lack of personnel. Only October 3 was completely lost to inclement weather, although coverage was also partial on other nights due to weather or military training during the period.

3.3 RESULTS

In total, 636 Northern Saw-whet Owls were captured on 36 nights of effort, or 1700 net-hours, achieving detection of a total of 0.37 owls/net-hour, including nets M6-M9, which had no owl captures throughout the season. By eliminating these nets, the capture rate for the owl-square and all 4 standard passive nets is 0.39 owls/net-hour. Meaningful comparisons cannot be made with previous years of owl monitoring due to significant changes in number and location of mist-nets. A record number of five nights resulted in more than 40 saw-whet owls being banded: 29 September (47), 5 October (49), 8 October (49), 10 October (42), and 14 October (54; highest number ever captured in a single night). The high captures recorded from October 5th to 14th coincide with the season-peak recorded from October 11th to 13th in 2002. October 15th to 18th were days missed due to military activity near this peak, and which could have possibly reported similarities in abundance. The remaining days of the season in 2008 varied between 0 and 37 individuals captured, with a mean of 12.7 owls/day and median of 11 owls/day.

76% of all saw-whet owls were captured in the four nets forming the “owl-square” (Table 6). The only net with a complete lack of under-story was O4, and coincidentally this net accounted for the highest number of captures of any net (30% of all captures). The net with the largest amount of undergrowth nearby (primarily Salmonberry, *Rubus spectabilis*) captured the lowest number of birds within the square (13% of all birds). Despite the use of a thrush-net to help increase captures at passive nets P1 and P3 for part of their operation during the season, the songbird net M5 proved the most productive of all passive nets, contributing a total of 51 owls to the effort, or 34% of all captures from passive nets. P1, along a path among alders but also near salmonberry thickets, produced the least birds of any net, with 0.02% of all owls.

Table 6. Captures of Northern Saw-whet Owls by Net and Effort

Net	Net-Hours	Owls	Bird/Net Hours
O1	206.7	80	0.39
O2	206.7	86	0.42
O3	206.7	131	0.63
O4	206.7	189	0.91
P1	203.4	14	0.07
P2	202.4	42	0.21
P3	195.9	42	0.21
M5	190.7	51	0.27
Unknown		1	
Total	1619.2	636	0.39

In 2008, of 635 owls in which age determination was attempted, 505(79.53%) of all saw-whet owls captured were hatch-year (HY) birds, 75(11.79%) were second-year (SY) birds, 52(8.18%) were after-second-year (ASY) birds, and 3(0.05%) were after-hatch-year (AHY). Ratios of age classes were comparable to results from 2002: (72%) were aged as HY, (21%) were aged as SY and (7%) were aged as ASY (Levesque 2002).

As in 2002, the majority of saw-whet owls captured were females (52% in 2008, vs. 44% in 2002), while males comprised 19.5% of the total. In using the wing chord and weight values proposed by Brinker (2000), 28.5% of all birds captured were found to be in the overlap zone and were thus sexed Unknown. The sex ratio of male to female to unknown sex in 2008 was 1: 2.3: 1.5 vs. 1: 2.9: 2.6 in 2002 (Levesque 2002). These sex ratios remained similar within the age groups HY (1: 2.4: 1.4) and SY (1: 2.3: 1.1), but not within ASY (1:12.3:2.1).

Six Northern Saw-whet Owls banded at RPBO in 2008 were recaptured during the same monitoring season (Table 7), although none were recaptured during the same evening, as had occurred with all seven recaptures in 2002, with a mean stopover time of 3 hr. 2 min. ($SD \pm 3$ hr. 50 min.) (Levesque 2002). In 2008, the time between capture and recapture ranged from 1 to 29 days and the mean stopover time between capture/recapture was 8 days ($SD \pm 10.8$ days). The arbitrary distinction between days used here is a new monitoring effort begun on a different date, meaning a capture/recapture between two adjacent dates could occur within a period ranging from 24 hours to nearly 48 hours. All of the same-season recaptures were of hatch-year birds.

Table 7. Recaptures of Northern Saw-whet Owls in 2008

Band Number	Date Originally Banded	Date Recaptured	Days Between Captures	Age	Sex
1014-00892	27-Sep-08	28-Sep-08	1	Hatch Year	Female
1014-07951	11-Oct-08	13-Oct-08	2	Hatch Year	Female
1014-07919	10-Oct-08	14-Oct-08	4	Hatch Year	Female
1014-07888	10-Oct-08	20-Oct-08	10	Hatch Year	Male
1583-84261	12-Oct-06	23-Oct-08	720	After Second Year	Unknown
1333-30295	23-Oct-08	25-Oct-08	2	Hatch Year	Male
1014-00904	27-Sep-08	26-Oct-08	29	Hatch Year	Female

One Northern Saw-whet Owl (1014-07830) originally banded on the 8th of October was recovered on Bainbridge Island, Washington on the 10th of October. This is our 3rd saw-whet owl which has been recaptured by the Bainbridge Island monitoring effort. The owl had reached its point of recapture in less than 48 hours, representing the shortest time-period elapsed between original banding at Rocky Point and subsequent recapture on Bainbridge Island.

The 3rd between-year recapture of an owl at RPBO was a Northern Saw-whet Owl (1583-84261) originally banded on October 12, 2006 and recaptured as an after-second-year bird on October 23, 2008. Of note, all three between-year recaptures were originally banded as hatch-years and recaptured two years later (the other two owls were recaptured in 2004).

The highest abundance of Barred Owls (*Strix varia*) was also recorded during the fall 2008 season, with a total of 15 being banded at RPBO during nocturnal monitoring, all of which were determined to be hatch-year birds. 47% were sexed as males and 47% as unknown, while only one bird was determined to be female. The maximum number of Barred Owls captured in a single night was three on October 13, while two owls were captured on October 1, 9, and 25. Barred Owls were captured in all four owl-square nets as well as P3 and M5, with 67% of all captures in nets O3 and O4. These two net-locations are the closest to the saw-whet owl audio-lure with very little or no under-story nearby, thus allowing these large birds easier access as they investigate the lure and other captured owls as potential prey items. As a result, on nights where Barred Owls were detected constant vigilance of all mist-nets was required to prevent the predation of recently captured saw-whet owls. A total of up to eight different Barred Owls were observed in a single night at Rocky Point.

Owl monitoring was also conducted at Witty's Lagoon, Metchosin, for a total of 16.1 net-hours on the nights of October 16, 17, and 18, near the peak movement for owls at RPBO. A total of 13 Northern Saw-whet Owls were processed, 9 of which were captured on the 18th. This represents a mean capture rate of 0.2 owls/net-hour, although due to the

brevity of the pilot-project and a strong breeze limiting audibility of the lure on two of the nights, meaningful comparisons cannot be made with the effort at RPBO. 69% of the captures were hatch-year birds 31% were second-year individuals. One after-hatch-year male Barred Owl was also banded on October 18.

4.0 CONCLUSION

Coverage in the fall of 2008 was interrupted significantly more than in preceding years by military training, which greatly reduced our overall monitoring strength, limiting RPBO's capacity to collect monitoring data of critical conservation value for a large portion of the standardized 90-day fall period, including the statistically-delineated window for peak-migration within the month of September (Leckie 2008). This in turn lessened the amount of data RPBO was able to provide to the national Canadian Migration Monitoring Network (CMMN), as well as the internationally designated LaMMNA (Landbird Migration Monitoring Network of the Americas) and RAAHO (Red de Anillamiento de Aves del Hemisferio Occidental—Bird Banding Network of the Western Hemisphere). As migrant songbirds are greatly dependent on day-to-day weather patterns to continue or suspend their movements, so is their probability of detection by field ornithologists. Thus, daily monitoring during the migration season is paramount in order to ensure adequate detection of large numbers of individuals. Large sample numbers are required to perform statistical analyses of population trends within the high level of precision needed to implement sufficiently informed land-management decisions and conservation efforts for a given species, in particular uncommon species with limited ranges that are most vulnerable to extinction and thus more difficult to monitor in adequate numbers (Christie 2004, Ehrlich et al. 1988).

The number of individuals banded during passerine migration monitoring formed the 4th highest season banding total in 14 years, but when taking into consideration the limited amount of effort achieved to capture birds, the capture rate was second only to the highest banding total ever witnessed at RPBO, with 0.7 birds/net-hour in 2008 vs. 0.73 birds/net-hour in 2005 (with 4,619 birds banded). The songbird migration during the fall of 2008 may have been nearly as significant as in 2005, and despite limited coverage it was apparent by the high totals for certain species that it had likely been a breeding season of above-average productivity.

In future years, a continued attempt at constant-effort monitoring on more days within both the passerine and owl migration monitoring periods will increase the precision and usefulness of population indices.

5.0 ACKNOWLEDGEMENTS

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Volunteer Hours during Passerine Migration Monitoring

More than 170 hours: Rick Schortinghuis

100 hours: Florence Bovay

60-80 hours: Agnes Lynn, Mary Robichaud, Ian Cruickshank, Cheryl Mackie, Margie Shepherd

40-60 hours: Ed Pellizon, Mike McGrenere, Tracy Anderson, Ann Nightingale, Barb McGrenere, Robb Paterson, Belen Paredes

20-40 hours: Megan Lyden, Darren Copley, Gordon Usipiuk, Chris Harris, Michael Simmons, Marilyn Lambert, Barry Lancaster

20 hours and under: Dannie Carsen, Donna Murray, Dominique Lejour, Karen Barry, Eric Demers, Christine Carrieres, Amy Medve, Cindy Munro, Robin Robinson, Donna Ross, Chris Chutter

Volunteer Hours during Owl Migration Monitoring

More than 90 hours: Ann Nightingale

30-40 hours: Colin Jennings

20-30 hours: Agnes Lynn, Rick Schortinghuis

10-20 hours: Christine Carrieres, Chris Chutter, Barry Lancaster, Donna Murray, Margie Shepherd, Michael Simmons

10 hours and under: Karen Barry, Mike Chutter, Eric Demers, Chris Harris, Kristen Harrison, Marilyn Lambert, Emma Lansdowne, Helen Lansdowne, Dominique Lejour, Cheryl Mackie, Christian McCarty, Katie McCreesh, Barb McGrenere, Mike McGrenere, Belen Paredes, Ed Pellizon, Mary Robichaud

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APPENDIX 1 --- SPECIES RECORDED AT RPBO IN 2008

Species recorded at Rocky Point from July 21 --- October 18, 2008; by month

Species	Jul	Aug	Sep	Oct	Species	Jul	Aug	Sep	Oct
Greater White-fronted Goose				*	Sora		*	*	*
Snow Goose				*	Sandhill Crane			*	*
Canada Goose	*	*	*	*	Black-bellied Plover		*		
American Wigeon			*	*	Semipalmated Plover				*
Mallard		*	*	*	Killdeer	*	*	*	*

Northern Shoveler			*	*	Black Oystercatcher	*	*	*	
Northern Pintail		*	*	*	Spotted Sandpiper		*		*
American Green-winged Teal		*	*	*	Solitary Sandpiper		*		
Harlequin Duck		*	*	*	Greater Yellowlegs	*	*	*	*
Surf Scoter			*	*	Lesser Yellowlegs	*	*		
White-winged Scoter			*	*	Black Turnstone	*	*		
Bufflehead				*	Semipalmated Sandpiper		*		
Hooded Merganser			*	*	Western Sandpiper		*	*	*
Common Merganser			*	*	Least Sandpiper	*	*	*	
Red-breasted Merganser		*			Pectoral Sandpiper			*	
California Quail	*	*	*	*	Short-billed Dowitcher		*		
Pacific Loon		*			Long-billed Dowitcher	*	*	*	
Common Loon			*	*	Wilson's Snipe			*	*
Red-necked Grebe		*	*	*	Red-necked Phalarope		*	*	
Western Grebe			*	*	Bonaparte's Gull		*	*	*
Sooty Shearwater			*		Heermann's Gull	*	*	*	*
Brown Pelican		*			Mew Gull		*	*	*
Brandt's Cormorant			*	*	California Gull	*	*	*	*
Double-crested Cormorant		*	*	*	Herring Gull			*	
Pelagic Cormorant	*	*	*	*	Thayer's Gull				*
Great Blue Heron	*	*	*	*	Western Gull			*	
Turkey Vulture	*	*	*	*	Glaucous-winged Gull	*	*	*	*
Osprey			*		Caspian Tern		*		
Bald Eagle	*	*	*	*	Common Murre	*	*	*	*
Northern Harrier	*	*	*	*	Pigeon Guillemot	*	*	*	*
Sharp-shinned Hawk		*	*	*	Marbled Murrelet			*	*
Cooper's Hawk	*	*	*	*	Cassin's Auklet				*
Northern Goshawk				*	Rhinoceros Auklet	*	*	*	*
Broad-winged Hawk			*		Band-tailed Pigeon	*	*	*	*
Red-tailed Hawk	*	*	*	*	Mourning Dove	*	*	*	*
Rough-legged Hawk				*	Barn Owl				*
Golden Eagle			*	*	Great Horned Owl		*	*	*
American Kestrel			*	*	Northern Pygmy-Owl			*	
Merlin	*	*	*	*	Barred Owl	*		*	*
Peregrine Falcon		*	*	*	Northern Saw-whet Owl			*	*
Virginia Rail			*	*	Common Nighthawk	*	*		
Black Swift	*				Cedar Waxwing	*	*	*	*
Vaux's Swift	*	*	*		Orange-crowned Warbler	*	*	*	*
Anna's Hummingbird	*	*	*		Nashville Warbler				*
Rufous Hummingbird	*	*	*		Yellow Warbler	*	*	*	*
Belted Kingfisher	*	*	*	*	Yellow-rumped Warbler	*	*	*	*
Lewis's Woodpecker			*		Black-throated Gray Warbler		*	*	*
Red-breasted Sapsucker			*		Townsend's Warbler	*	*	*	

Species	Jul	Aug	Sep	Oct	Species	Jul	Aug	Sep	Oct
Downy Woodpecker	*	*	*	*	Northern Waterthrush		*		
Hairy Woodpecker		*	*	*	MacGillivray's Warbler	*	*	*	
Northern Flicker	*	*	*	*	Common Yellowthroat	*	*	*	*
Pileated Woodpecker	*	*	*	*	Wilson's Warbler	*	*	*	
Olive-sided Flycatcher	*	*			Western Tanager	*	*	*	
Western Wood-Pewee		*	*		Spotted Towhee	*	*	*	*
Willow Flycatcher	*	*	*		Chipping Sparrow	*	*		
Hammond's Flycatcher	*	*	*	*	Savannah Sparrow	*	*	*	*
Pacific-slope Flycatcher	*	*	*	*	Fox Sparrow			*	*
Cassin's Vireo	*	*	*		Song Sparrow	*	*	*	*
Hutton's Vireo	*	*	*	*	Lincoln's Sparrow		*	*	*
Warbling Vireo	*	*	*	*	White-throated Sparrow			*	*
Steller's Jay	*	*	*	*	White-crowned Sparrow	*	*	*	*
Northwestern Crow	*	*	*	*	Golden-crowned Sparrow			*	*
Common Raven	*	*	*	*	Dark-eyed Junco	*	*	*	*
Horned Lark			*		Black-headed Grosbeak	*	*	*	
Purple Martin		*	*		Red-winged Blackbird	*	*	*	*
Violet-green Swallow	*	*	*		Western Meadowlark			*	
Northern Rough-winged Swallow	*	*	*		Brewer's Blackbird				*
Cliff Swallow	*	*			Brown-headed Cowbird	*	*		
Barn Swallow	*	*	*		Purple Finch	*	*	*	*
Chestnut-backed Chickadee	*	*	*	*	House Finch	*	*	*	*
Bushtit	*	*	*	*	Red Crossbill	*	*	*	*
Red-breasted Nuthatch	*	*	*	*	Pine Siskin	*	*	*	*
Brown Creeper	*	*	*	*	American Goldfinch	*	*	*	*
Bewick's Wren	*	*	*	*	Evening Grosbeak	*	*	*	*
House Wren	*	*	*	*	Total Species -- 159				
Winter Wren	*	*	*	*	Total Species/Month	87	114	130	111
Marsh Wren	*	*	*	*					
Golden-crowned Kinglet	*	*	*	*					
Ruby-crowned Kinglet	*	*	*	*					
Swainson's Thrush	*	*	*						
Hermit Thrush			*	*					
American Robin	*	*	*	*					
Varied Thrush	*	*	*	*					
European Starling	*	*	*	*					
American Pipit			*	*					

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