

EAST LIMESTONE ISLAND FIELD STATION
FIELD SEASON REPORT 2014



Bald Eagle Chick on Lost Island (Photo: LBCS)

SUMMARY

This was the Laskeek Bay Conservation Society's 25th field season on East Limestone Island, Laskeek Bay, Haida Gwaii and ran from May 1st to July 11th, bringing 19 volunteers and 104 visitors to the island. Project Limestone brought 34 students and 12 teachers/chaperones to the island. Ancient Murrelet chick departures at Cabin Cove were slightly lower than last season, but comparable to the two previous years. No raccoons were detected on the island and the remote camera monitoring program was expanded to include a survey for raccoon presence on other islands in Laskeek Bay. Black Oystercatcher surveys were conducted in both Laskeek Bay and in Gwaii Haanas. We censused Glaucous-winged Gull colonies in Laskeek Bay and found 280 active nests at three colonies. Pigeon Guillemots used 18 of the 27 nest boxes at Lookout Point. There were 7 Cassin's Auklet chicks that were banded in nest boxes and 5 chicks had fledged by July 11th. Three near-shore sea surveys were completed and Marbled Murrelet counts were much lower than 2013, but similar to 2012. Three Hecate Strait sea surveys were completed. Marine mammal sightings this season included 347 Humpbacks, 3 Minke whales, 31 Harbour porpoises and 5 sightings of small groups of Killer whales. 15 wildlife trees were active: 9 with Red-breasted Sapsuckers, 2 with Chestnut-backed Chickadees, 2 with Hairy Woodpeckers, 1 with Northern Flickers, and 1 with both a Red-breasted Nuthatch and sapsucker nest. A Common Raven nest and 2 Bald Eagle nests were active, but the Peregrine Falcon nest was not active.



Prepared by Amy Greenwood and Vivian Pattison
Reviewed and Edited by Laskeek Bay Conservation Society
Box 867, Queen Charlotte, BC, V0T 1S0

TABLE OF CONTENTS

EDUCATION AND INTERPRETATION PROGRAM	2
Project Limestone	3
Volunteers	3
Visitors.....	3
Staff.....	4
Student Intern.....	4
RGIS	4
RESEARCH AND MONITORING PROGRAMS.....	4
Ancient Murrelets <i>Synthliboramphus antiquus</i>	4
Black Oystercatchers <i>Haematopus bachmani</i>	9
Glaucous-winged Gulls <i>Larus glaucescens</i>	12
Pigeon Guillemots <i>Cephus columba</i>	13
Cassin’s Auklets and Fork-tailed Storm Petrels.....	144
Sea Surveys.....	15
Marine Mammals	165
Wildlife Trees.....	176
NATURAL HISTORY	187
Daily Bird Checklist	187
Raptors and Corvids	18
Plants	198
Introduced Species.....	209
CONCLUSION	221
ACKNOWLEDGEMENTS	232

INTRODUCTION

Laskeek Bay Conservation Society (LBCS) is a non-profit organization committed to increasing the appreciation and understanding of the natural environment through biological research, interpretive programs and public involvement. The field station at East Limestone Island has been in operation for 25 consecutive field seasons and over this period LBCS has developed diverse long-term monitoring projects in Laskeek Bay. Volunteers assist researchers with data collection in order to study the abundance, distribution, and life history of wildlife in Laskeek Bay. This information helps us understand the fluctuations in marine and terrestrial ecosystems and gives a baseline against which we can describe changes in the future due to introduced species, marine pollution, global climate change, extreme weather events, and other threats to coastal ecosystems.

EDUCATION AND INTERPRETATION PROGRAM

LBCS provides opportunities for public involvement in research and monitoring activities through Project Limestone, our volunteer program, and interpretive tours. Students, volunteers and visitors come to our field camp and participate in the projects that are occurring throughout the season. By bringing people to our camp and encouraging participation in research activities, we hope to increase public awareness of local conservation issues, and increase public knowledge of the natural history of Laskeek Bay.

Project Limestone

Project Limestone brings local students to Limestone Island to learn about natural history and participate in Ancient Murrelet research. The students are lead on an interpretive tour, which crosses the island and ends at Lookout Point. They learn about the natural history and geography of the area, and are introduced to the various projects that we run. They then assist with the Ancient Murrelet capture work from 10:30 pm to 2:30 am. The students learn about Ancient Murrelet life history as they help to capture, weigh, and release chicks. This year 4 groups camped on Louise Island opposite West Limestone Island, spending only one night on the island and returning to their camp the next morning. One group stayed on the island for a full 24 hr visit. Along with participating in Ancient Murrelet night work, these students had time to observe and learn about the birds and introduced species on Limestone Island, scan Laskeek Bay for marine mammals, and help to check Cassin's Auklet nest boxes for activity.



Staff and volunteers with students from QCSS (Photo: LBCS)

This year five student groups visited Limestone Island. There were a total of 34 students from grades 3 to 12, and 12 teachers / chaperones. Two groups of students came from Queen Charlotte Secondary School, on May 14th and 16th. The Living and Learning School (Queen Charlotte) arrived on May 18th, and Agnes L. Mathers on May 19th and 20th. Project Limestone began in 1991, and to date 666 students have visited the island as part of this program.

Volunteers



Volunteer counting BLOY prey (Photo: LBCS)

Volunteers play an important role in the operation of the field camp on Limestone Island. They generally stay for one week, and help staff with research and monitoring projects, camp maintenance, and daily chores. Volunteer contributions of time and energy are essential to keep the field camp going and to continue long-term data collection. LBCS provides a unique opportunity for the general public to be involved in long-term research in a remote field camp.

This year we had 19 volunteers who contributed 131 volunteer days to projects on Limestone, in other areas of Laskeek Bay and in Gwaii Haanas. Most volunteers stayed one week, except one who stayed for 5 days. Four volunteers had visited or volunteered on the island previously. Volunteers were all from North America this year, and most were Canadians: 7 were from Haida Gwaii, 9 from other parts of BC, 2 from Ontario, and 1 from Seattle.

Visitors

The LBCS visitor program provides an opportunity for tour groups to visit Limestone Island and receive an interpretive tour of the island from a staff member. While visitors walk across the island, they are introduced to the natural history of the area and the monitoring and research projects that we conduct. LBCS aims to bring about greater understanding of the natural world and increased awareness of local conservation issues through the visitor program.

Most visitor groups who stop on Limestone Island are partaking in ecotourism excursions by sailboat into Gwaii Haanas. This year we had visits from 4 tour groups: *Island Roamer* on May 21st, June 5th and June 13th, and *Passing Cloud* on June 8th. Other visitors were two small kayaker groups (a group of 2, and one

of 3), and a film crew from Parks Canada (3). In total there were 104 visitors to the island throughout the field season.

Staff

LBCS staff this year were Ellen Hunter Perkins, Assistant Biologist/Interpreter (May); Jake Pattison, Camp Supervisor (June); and Vivian Pattison, Assistant Biologist/Interpreter (June) and Camp Supervisor (May and July).

Student Interns

In 2010, LBCS began a program that provides students in biology or environmental studies with an opportunity to gain valuable hands-on field experience as an intern on Limestone for a six week period. This year's interns were Emilee Chamberland, Sonya Pastran and Amy Greenwood. Emilee, a student from Dalhousie University, Nova Scotia, contributed 6 weeks to projects on Limestone Island and in Laskeek Bay. Sonya, a student at the University of Calgary, Alberta, was in the field camp for 5 weeks (including 4 days of BLOY survey work in Gwaii Haanas). She also assisted with data entry and report writing in the Queen Charlotte office for 1 week. Amy, from Sydney, Australia, is a recent graduate of the University of Western Sydney and spent 3 weeks in camp (including 4 days of BLOY survey work in Gwaii Haanas). She worked in the Queen Charlotte office for an additional 3 weeks, assisting with data entry and report writing. In total the interns this season contributed 126 hours to field and office work.

RGIS

Our long term partner the Research Group on Introduced Species conducted more research in the Laskeek Bay area this spring. Project BAMBI, a four year project focused on understanding deer behaviour and how it changes in response to predation risk, is in its fourth year. RGIS researchers were working from the camp on Reef Island from April 12th to May 21st. RGIS will be doing more work in Laskeek Bay in September with the objective of maintaining a marked deer population in order to gain insights on their demography in a forest where the understory has become scarce.

RESEARCH AND MONITORING PROGRAMS

Ancient Murrelets *Synthliboramphus antiquus*

Chick capture work

Chick-capture funnels 5-8 were monitored in Cabin Cove beginning on May 7th. Funnels were closed nightly to capture departing chicks from 22:30-2:30 for the period of May 7-19 and 23:00-2:30 after May 19th to compensate for increasing day length. Funnels were checked at regular 15 minute intervals and the date, time, location (funnel number) and mass for each departing chick was recorded. Funnel protocol is kept constant across years so that the number of chicks departing gives a consistent index of the overall breeding population. Capture work ends after two consecutive nights with no chick captures in any of the funnels. This season the first chicks arrived the night of May 11th and the last on June 2nd. A total of 110 chicks were captured in funnels 5 to 8 (Fig. 1). Peak night of departures (15 chicks captured) occurred on May 18th and 19th and 50% of chicks left during May 17-21. Chick numbers recorded this season in funnels 5-8 were lower than last year (136 chicks) which was the highest recorded since 2007 (Table 1). Although the total number of chicks this year was lower, it is comparable to 2012 (110) and 2011 (106) and higher than 2009, which was the lowest number on record.

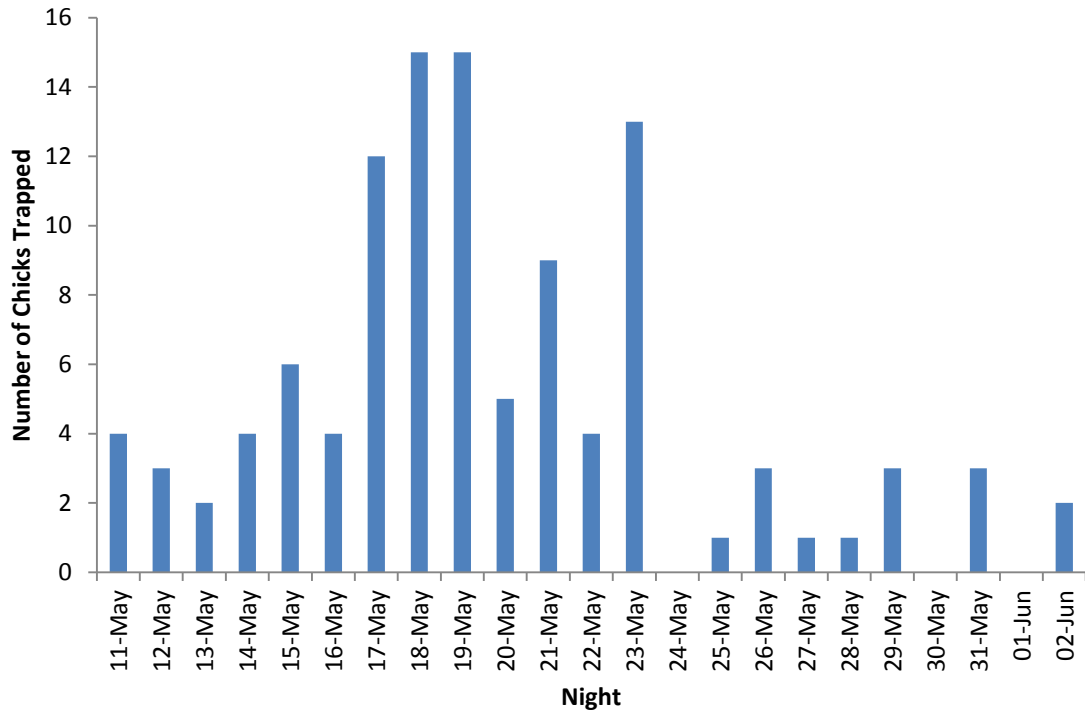


Figure 1. Nightly chick captures, Funnels 5-8, East Limestone Island, 11 May – 2 June 2014.

Table 1. Summary of chick departures, peak nights and totals for funnels 5 to 8 on East Limestone Island, 2006 to 2014.

<i>Year</i>	<i>First night with chicks</i>	<i>Peak night</i>	<i>Peak count</i>	<i>Last night</i>	<i>Total days</i>	<i>Total chicks</i>
2006	10-May	21-May	24	30-May	21	197
2007	15-May	4-Jun	16	12-Jun	29	166
2008	12-May	14-May	13	3-Jun	23	125
2009	10-May	18-May	16	29-May	20	104
2010	8-May	21-May	19	2-June	26	121
2011	11-May	15-May	11	9-June	30	106
2012	12-May	17, 22-May	14	31-May	20	110
2013	13-May	21-May	15	1-June	20	136
2014	11-May	18, 19-May	15	2-June	23	110

Funnels 5 & 6

As of this season, funnels 5 and 6 have been monitored continuously for 25 years, and are the primary means of assessing the long-term population trend in the Cabin Cove colony area. The location of the funnels has not changed during this period and therefore represents the same geographic area of the colony year to year. Funnels 7&8 were installed in 2006 flanking funnels 5&6 to see if the colony area had shifted, which might have contributed to a decline at the two original funnels. Last season the number of chicks captured at funnels 7 & 8 was very high compared to previous years (51 chicks from the two funnels), while this year the total is back to a number comparable to previous years (35 chicks). The reason for this abrupt increase in 2013 is unknown, and peaks such as this have not been noted in previous years. Although the increase in 2013 could indicate a colony shift related to the major blow-down events of 2010/2011, this would not explain the lower number of chicks captured from these areas again this year.

A total of 75 chicks were captured this season in funnels 5 and 6 which is lower than the number captured in 2013 and 2012, but similar to the number in 2011. The lowest number of chicks to date was in 2009 (Fig. 2). This year, the first chicks arrived in these funnels on 11-May and peak night (12 chicks) occurred on 18 May (Table 2). Chick captures continued until 2 June for a total of 23 nights of chick capture work (Table 2).

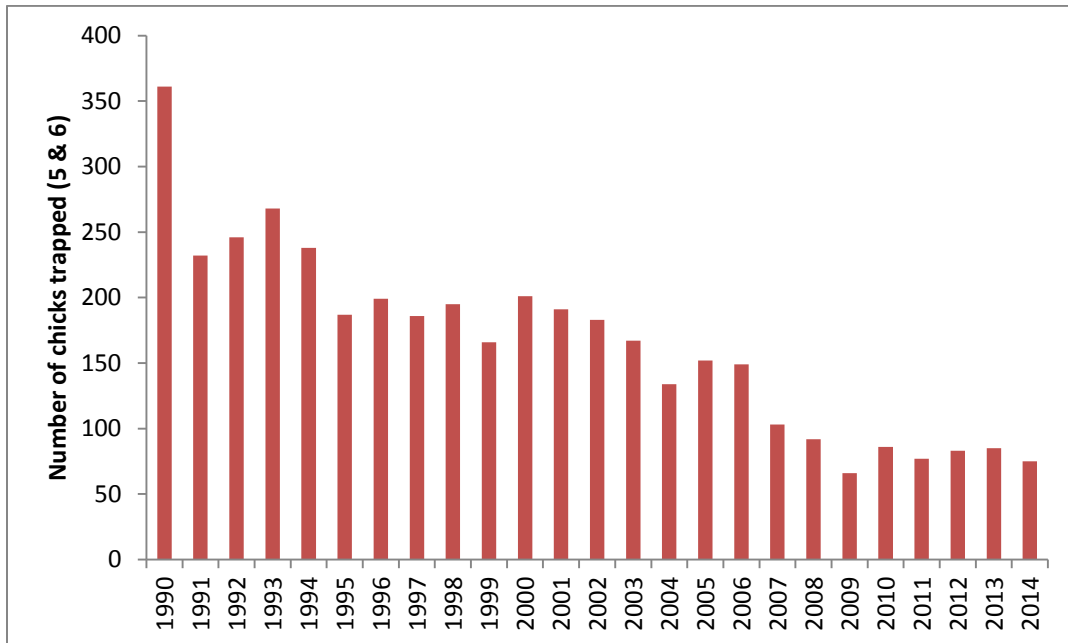


Figure 2. Total Ancient Murrelet chick captures at funnels 5 and 6 East Limestone Island, 1990-2014.

Table 2. Summary of chick departures, peak nights and totals from funnels 5 and 6 on East Limestone Island, 1990 to 2014.

Year	1st night with chicks	Peak night	Peak count	Last night	Total days	Total chicks
1990	13-May	20-May	28	15-Jun	34	361
1991	10-May	25-May	22	05-Jun	27	232
1992	14-May	22-May	29	02-Jun	20	246
1993	12-May	18-May	39	04-Jun	24	268
1994	08-May	20-May	29	06-Jun	30	238
1995	11-May	23-May	18	12-Jun	33	187
1996	11-May	18-May	17	07-Jun	28	199
1997	13-May	28-May	22	05-Jun	24	186
1998	11-May	20-May	23	20-Jun	41	195
1999	11-May	21-May	22	09-Jun	30	166
2000	11-May	21-May	22	06-Jun	27	201
2001	11-May	19-May	21	15-Jun	36	191
2002	09-May	21-May	33	01-Jun	24	183
2003	11-May	21-May	19	03-Jun	24	167
2004	08-May	16,17-May	15	01-Jun	25	134
2005	07-May	19, 23-May	12	05-Jun	30	152
2006	10-May	21-May	20	31-May	22	149
2007	15-May	04-Jun	16	12-Jun	29	103
2008	13-May	20,22,23-May	8	03-Jun	22	92
2009	12-May	18,19-May	10	29-May	20	66
2010	8-May	21-May	16	2-June	25	86
2011	11-May	21-May	9	9-June	30	77
2012	13-May	22-May	12	31-May	19	83
2013	13-May	22-May	11	1-June	20	85
2014	11-May	18-May	12	02-Jun	23	75
Average ± SD	11-May ± 2 days	21-May ± 3.7 days	19 ± 7.9 chicks	6-Jun ± 5.4 days	27 ± 5.5 days	165 ± 73 chicks

North Cove

The forest in the area of the North Cove funnels 1-4 was heavily impacted by the blow-down events of 2010/11. Only a few trees remained standing in funnel 4 and only a small portion of funnel 3 remain intact. Virtually all trees in funnels 1 and 2 were blown over or broken off, leaving a very open stand and a dense tangle of twisted and broken tree trunks. This year we monitored only funnel 4, using an infrared motion activated camera (Reconyx PC900). The camera was set at the mouth of the funnel on May 5th and left in place until June 13th. A wooden chute, designed to direct the chicks towards the camera and slow them down, was installed at the funnel mouth in front of the camera. A total of 13 chicks were recorded between May 16th and 30th with the peak departure (4 chicks) occurring on the night of May 19th. This total is much lower than last year, when 41 chicks were recorded departing from funnel 4. This year, there were also 5 instances when photos were taken with an unknown trigger during the peak time of chick departures (between May 18th and 29th). It is possible that some chicks were not being recorded on camera, and that the total may be slightly higher.

Camera Monitoring

This year two other Reconyx infrared cameras were set up at funnels in addition to the one in North Cove funnel 4. These cameras were set up in a similar manner to the funnel 4 camera, and were at the mouths of funnel 5 and 6, in Cabin Cove. We are hoping to get an idea of how many chicks pass by the camera but do not get photographed. This will allow us to assess the accuracy of using only cameras for monitoring chick departure numbers at funnels, as we are doing presently in North Cove. At funnel 5, 85% of the chicks that passed by the camera were captured on photo (17 out of 20 chicks). At funnel 6, between 77%



Ancient Murrelet in a funnel (Photo: Reconyx, LBCS)

and 80 % of the chicks were photographed (not all chicks pass by the camera before being caught at funnel 6, causing some uncertainty). In the future we might consider using the cameras for early and late season monitoring (early May and early June). We also could use the cameras for early morning monitoring; we normally end monitoring each night at 02:30, but with cameras we could continue to capture photos of the chicks that depart later in the night, giving a better estimate of colony size. This year, at funnel 5, there were 3 chicks that departed the colony later than 02:30; at 02:49, 04:18 and 04:38. This is 15 % of the total number of chicks captured on camera. At funnel 6 there were also 3 chicks that departed later, at 03:07, 03:49, and 05:00 (13.6 % of chicks photographed).

It is important to assess the accuracy of this technique by continuing to monitor with cameras at the same time as manual capture. There have been some issues with photo analysis, for example if two chicks arrive at the camera at or close to the same time, it is not possible to differentiate between the two. Also, in funnel 6 there are multiple places that chicks can be manually caught, but the camera is only in one place. Monitoring using cameras will continue in the next few seasons to determine the accuracy of this method.

Gathering grounds

Ancient Murrelets enter and leave the breeding colony only at night. In late afternoon and evening the birds gather on the water in areas called gathering grounds, where they wait until it is sufficiently dark before entering the colony. Both breeding and non-breeding birds are thought to gather in these areas and engage in important social interactions. The Limestone Island gathering ground is located between Low Island and Limestone Island. Between 4 May and 20 June we conducted standardized 10 minute counts of birds on the gathering grounds. The highest count occurred on May 6th, with a total of 120 birds observed. Counts averaged (\pm SD) 23.2 \pm 30.6 this season, a similar count to last season (20.7 \pm 23.0).

Point counts

We conducted point counts in the colony area to monitor the activity of adult birds in the forest at night. Five minute counts were conducted in Cabin Cove at approximately 2:30 each night for the period of May 21st to June 4th. The maximum count, 23 birds and 103 calls, occurred on May 27th.

Band Recoveries & Recaptures

Recapture of adult birds was ended in 2003. However, we still opportunistically capture adult birds that are trapped in funnels or are otherwise easily captured along the trail. We also scan feather piles, raven pellets and other predation remains looking for bands. There were no bands recovered or banded birds recaptured in 2014.

Predation transects

In previous years we checked for predation remains along 5 fixed, 20m wide transects. These transects were heavily impacted by the 2010/2011 blow-down and have not been monitored since 2011. See the ‘Raccoons’ section below for a description on the use of cameras to detect the presence of raccoons.

Population Trends & Social Attraction

The breeding population of Ancient Murrelets has been declining over time (Fig 2). The number of departing chicks in funnels 5&6 declined by 56% between 2006 and 2009, likely due to the presence of raccoons in 2007 and 2009. The last census of the colony was completed in 2006 and estimated \pm SE 509 \pm 132 breeding pairs compared to the estimate of 1273 \pm 254 in 1995. Chick numbers have rebounded slightly since 2009 and seem to have stabilized in these two funnels (Fig 2). The number of chicks exiting the colony in the North Cove funnel 4 area seems to be declining, suggesting breeding birds are moving elsewhere, possibly due to the extreme blow-down that took place in North Cove. In 2013, chick numbers, based on photo monitoring, had only declined by ~20% in funnel 4 since it was last monitored in 2010. Based on camera monitoring this year, the number of chicks leaving the funnel 4 area of the colony has declined by ~75 % since 2010, probably because of the blowdown.

In 2014 we continued the social attraction work that we began in 2011. Colony sounds were broadcast from two megaphones located behind the cabin and on the East Coast trail. Playback occurred on 9 nights, 0:00-2:30am between May 9th and 31st.

Black Oystercatchers *Haematopus bachmani*

Background

Oystercatchers are large, conspicuous shorebirds that are easily studied because of the relative ease with which nesting sites can be located. Because they are entirely dependent on the intertidal system, these birds are also thought to be a good indicator species for this ecosystem. LBCS has been monitoring the breeding population of Black Oystercatchers in Laskeek Bay annually since 1992 (except in 2011).

LBCS conducted Black Oystercatcher surveys in both Laskeek Bay and in Gwaii Haanas in 2014. The Laskeek Bay survey is summarized below. For details on the two surveys within Gwaii Haanas, please consult the separate report titled “2014 Black Oystercatcher survey in Gwaii Haanas”. Methodology for shoreline surveys and territory visits followed the methods outlined in the Gwaii Haanas report. Survey maps of the Laskeek Bay area are produced by Gwaii Haanas and included as an appendix in the Gwaii Haanas report.

Site occupancy and reproductive success

Oystercatcher territories were visited in Laskeek Bay between mid-June and early July. We visited and searched on foot all territories known to be occupied by breeding pairs in the last three survey years. Territories not active in the last three survey years were scanned during shoreline surveys, but not visited on foot. All shoreline segments were completed during both surveys, except Lost Islands, which was only surveyed once. The territories at Cumshewa Island were not visited on the second survey due to swell, although some activity was recorded from the boat. Shoreline surveys followed the same protocol developed for the Gwaii Haanas surveys and involved scanning shoreline areas from ~50m offshore at 11 km/hr (2500rpm) to search for new territories.

Out of 57 territories visited, 36 were occupied by an alarmed adult pair, or had other conclusive evidence of breeding in 2014 (e.g. eggshell membranes and prey present at scrape). Of these, 32 were active, that is there were live eggs or chicks present on at least one visit. Two new territories were found this year.

During the first survey (conducted between June 8-14th), we found 44 eggs and 16 chicks, and during the second survey (June 24th – July 9th) we found 9 eggs and 15 chicks.

Chick Diet

Oystercatchers feed their chicks hard-shelled invertebrates which they bring intact to the breeding territory. We collected prey remains from 14 territories in Laskeek Bay this year in order to quantify average diet composition fed to chicks. Limpets were the primary prey (70%), followed by mussels (17%), and chitons (11%) (Fig. 3). These three prey items made up more than 99% of the diet, consistent with what has been found in past years. In 2013, there were a notably higher proportion of chitons (14%) consumed in relation to mussels (6%) than in previous years. However, 2014 saw this brief trend revert back. In Gwaii Haanas, prey remains were collected from 32 territories, where diet composition was similar to that of Laskeek Bay (Fig. 3).



Black Oystercatcher & chick
(Photo: LBCS)

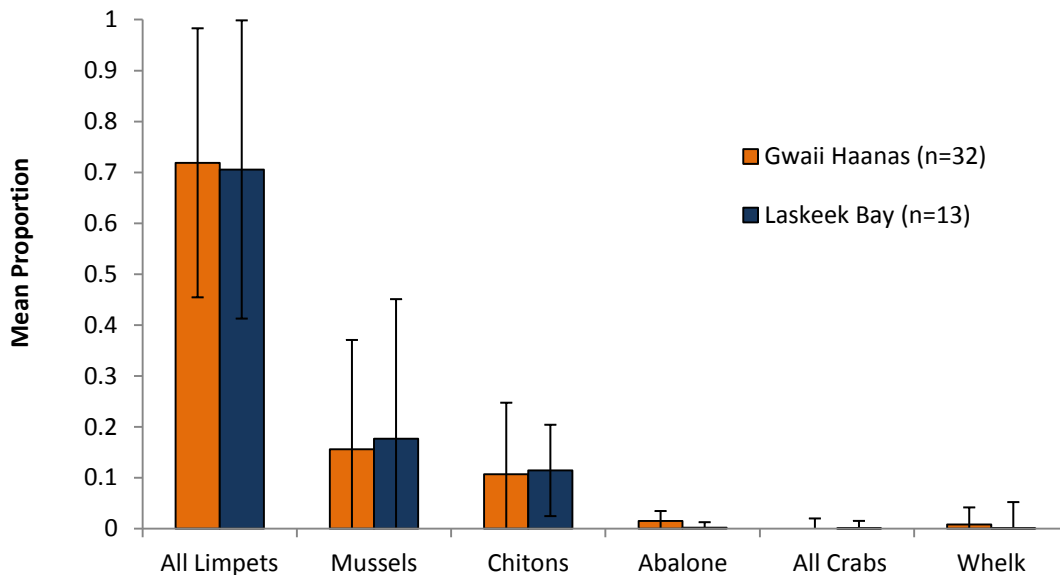


Figure 3. Black Oystercatcher chick diet from prey collections in Laskeek Bay and Gwaii Haanas 2014. Error bars are \pm SD.

Banding and re-sighted birds

Birds banded in the years before 2013 have a combination of one metal band on the right leg that carries a unique number and a color band combination that indicates the year of banding as well as the area where the bird was banded. Metal bands are permanent, while the plastic bands tend to be lost over time. Since 2013, alphanumeric bands are being used on both legs, instead of color bands, due to their field readability. All oystercatchers seen during the course of the season were checked for bands as this gives us information on the age and dispersal of these birds. There were 28 sightings of banded birds in Laskeek Bay (Table 3) and 9 sightings in Gwaii Haanas (Table 4).

Table 3. Banded Black Oystercatchers re-sighted in Laskeek Bay in 2014.

Band combination (Left - Right) ¹	Location seen / Nest site	Year Banded	Banded as Adult or Chick
W-UB/M	ELI-4	Unknown	-
W-UB/M	ELI-4	Unknown	-
W-UB/M	ELI-4	Unknown	-
UB-UB/M	KNG-3	Unknown	-
UB-UB/M	LOW-1	Unknown	-
UB-UB/M	LOW-1	Unknown	-
UB-UB/M	REE-1	Unknown	-
UB-UB/M	REE-1	Unknown	-
M-UB/UB	REE-11	Unknown	-
UB-UB/M	REE-11	Unknown	-
M-UB/UB	REE-11	Unknown	-
UB-UB/M	REE-2	Unknown	-
UB-UB/M	REE-2	Unknown	-
UB-UB/M	REE-3	Unknown	-
UB-W/M	REE-4	2009	Chick
UB-W/M	REE-4	2009	Chick
UB-UB/M	REE-6	Unknown	-
UB-UB/M	REE-6	Unknown	-
UB-UB/M	Skedans Islands	Unknown	-
UB-UB/M	Reef Island	Unknown	-
A3-A3/M	Louise Island	2013	Chick
UB-UB/M	South Low Island	Unknown	-
UB-Y/M	SKE-10	2007	Chick
UB-Y/M	SKE-10	2007	Chick
UB-UB/M	SKE-12	Unknown	-
UB-UB/M	SLW-4	Unknown	-
UB-UB/M	SLW-8	Unknown	-
UB-UB/M	Reef Island	Unknown	-
UB-UB/M ²	Skedans Islands	Unknown	-

¹Band codes: UB = unbanded (birds can lose bands), M = metal, Or = orange, W = white, LG = Light Green, R = Red, Bk = Black, Br = Brown, Y = Yellow, DB = dark blue.

²Incidental sightings in Laskeek Bay that occurred outside of designated survey

An individual with band #1015-026117 was observed at Reef Island (territory REE-4), which was originally banded as a chick at the Skedans Islands (territory SKE-3) in 2009. A young bird banded last year was seen on the shoreline of Louise Island, on the north side of Dass Point. This individual was banded with the combination A3, at territory KNG-5 on Kingsway Rock. We did not observe the oldest known bird, or any others, at territory SKE-6 this year. It will be interesting to continue watching for this individual next year as its absence could indicate a new maximum recorded age for the species. Banded as a breeding adult with band number #0785-63024 in 2000, it was a minimum of 17 years old in 2013.

Table 4. Banded Black Oystercatchers re-sighted in Gwaii Haanas, 2014.

Survey	Band combo (Left -Rt) ¹	Location seen / Nest site	Year Banded	Banded as Adult or Chick
1	UB-DB/M	560-3-1	2006	Chick
1	UB-OR/M	530-3-2	2004	Chick
1	W-W/M	Lost Islands	2009	Chick
1	UB-OR/M	LOS-11	2004	Chick
2	DB-DB/M	From 535-2-1?	2006	Chick
2	UB-OR/M	530-3-2	2004	Chick
2	UB-UB/M	LOS-13	Unknown	Chick
2	W-W/M	LOS-13	2009	Chick

¹Band codes: UB = unbanded (birds can lose bands), M = metal, OR = orange, DB = dark blue, W = white, LG = light green.

Glaucous-winged Gulls *Larus glaucescens*

Since 1992, LBCS has been censusing gull colonies within Laskeek Bay (Fig. 4). This year, we visited the known colonies on Kingsway Rock, Low Island, Cumshewa Island and Lost Islands. No gulls were seen by boat at the Skedans Islands therefore this area was not searched on foot. One GWGU nest was observed on the South side of Reef Island on 9 and 26 June during the BLOY survey. Because they were on a cliff we could not check the area on foot. At each of the visited colonies the number of active nests (those containing either eggs or chicks) was recorded. Lost Island, the largest colony in the area, had a total of 202 active nests (June 24th), followed by Kingsway Rock with 77 nests (June 15th) and Low Island with 1 nest (June 18th). No active nests were observed on Cumshewa Island. In total we counted 280 nests on these three colonies containing 1 egg (7.8% of nests), 2 eggs (11.2%), or 3 eggs (69.8 %). 17 nests on Lost Islands were found with hatched chicks. The total number of nests counted this season (280) was above the long-term average (\pm SD) of 259 ± 65.5 .

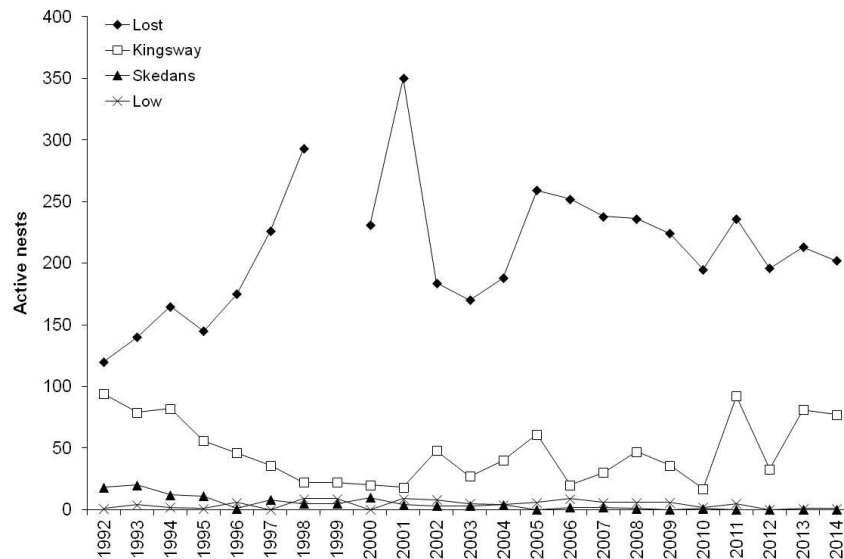


Figure 4. Glaucous-winged Gull nests containing eggs or chicks at four colonies in Laskeek Bay, 1992-2014.

Pigeon Guillemots *Cepphus columba*

As of 2014, there are 27 Pigeon Guillemot nest boxes at Lookout Point. Boxes #1-10 were installed in 2001 and boxes #11-28 in 2010. Nest box #3 went missing during the winter of 2013. The use of nest boxes #1-10 has stabilized at a high occupancy level (Fig. 5).

Boxes were checked at the beginning of the season to ensure they were intact. Boxes were then checked at the end of the season (July 9th), to determine if they had eggs or chicks. All 9 of the remaining original boxes were active. Nine of the 18 new boxes were active: three with chicks, five with eggs, and one with an adult potentially sitting on more eggs (P21). An egg membrane was found in P28, although no chicks were present.

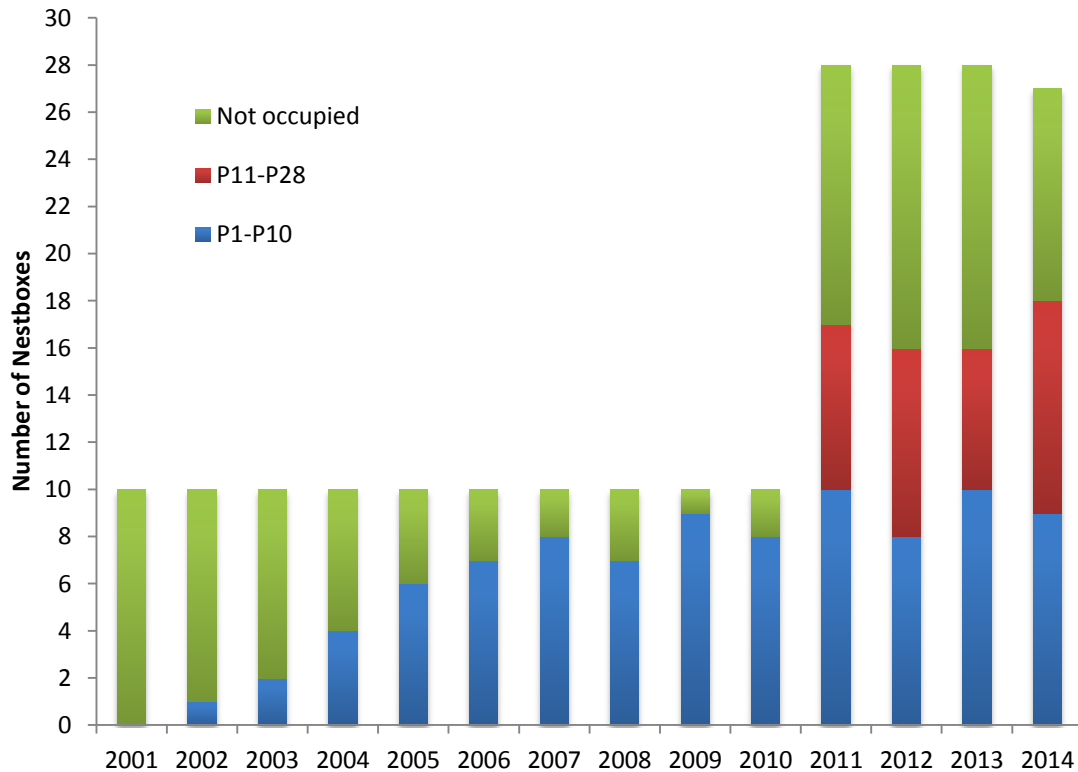


Figure 5. Use of nest boxes #1-28 by Pigeon Guillemots, Lookout Point, East Limestone Island, 2001-2014. #1-10 were installed in 2001 and #11-28 were added in 2010. One nest box was lost in the winter of 2013.

Cassin's Auklets and Fork-tailed Storm Petrels

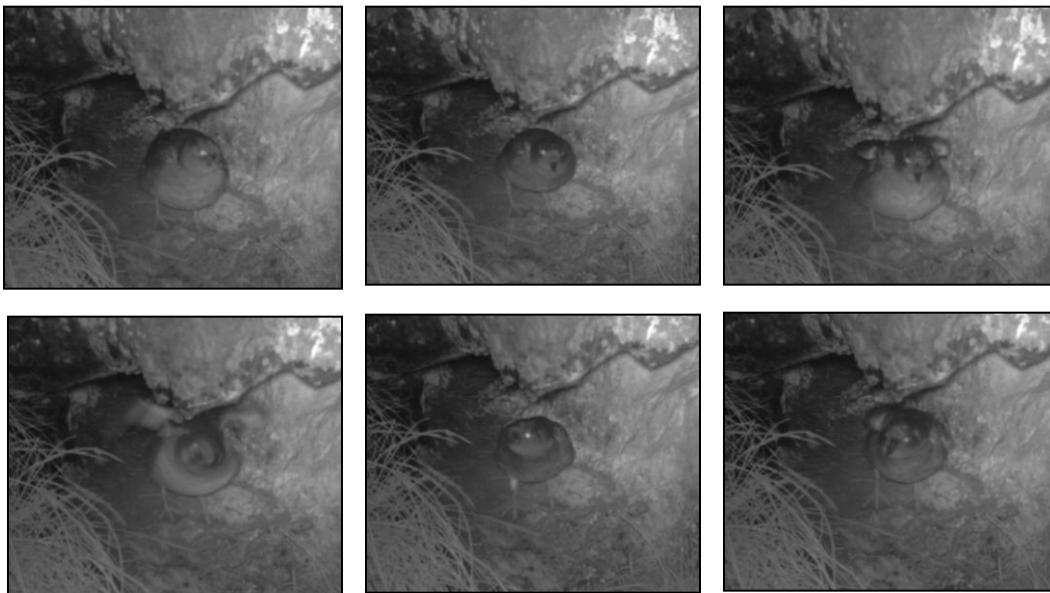
Ptychoramphus aleuticus and *Oceanodroma furcata*

Small populations of Cassin's Auklets and Fork-tailed Storm Petrels breed on Limestone Island. Like Murrelets, these species are nocturnal burrow nesters and are only active in the colony at night. Breeding activity on the island has fluctuated over the years, which is partly attributed to predation by introduced raccoons. In previous seasons we monitored several locations on the island for breeding activity and noted increasing activity in recent years. We did not monitor natural burrows this season, as it was decided that it would be more productive to complete a more thorough survey of breeding activity every 3-5 years.

Cassin's Auklet nest boxes were monitored again this year at both Lookout Point and at the East Coast plots. Knock-down sticks were placed at the entrances of all nest boxes early in the season and were checked every 4-5 days.

A total of 46 nest boxes were monitored at the East Coast plots (North and South), and 24 at Lookout Point. Seven boxes contained chicks: six at North Plot (#16, 18, 19, 25, 30, 31) and one at Lookout Point (#7). Chicks were weighed at 5-7 day intervals and 7 chicks were banded. Five chicks had fledged, and two remained as of July 7th.

The amount of storm petrel activity this season was above average, based on the number of days the species was recorded in the daily bird checklist (2014 = 47, 2013=30, 2012= 32, 2011 = 30, 2010 = 36, 2009 = 31, 2008 = 28, 2007 = 34). Petrels were heard frequently at night during the murrelet season, particularly in the area northeast of funnel 6 and near Lookout Point.



Examples of infrared camera stills taken of nighttime activity at Cassin's Auklet and Fork-tailed Storm Petrel burrows, Lookout Point, East Limestone Island (Photos: LBCS)

Motion activated infrared video cameras were placed in front of various burrows at both Lookout Point and the East Coast to record nighttime activity. Many videos were acquired of Cassin's Auklet adults and chicks. A few videos recorded a Storm Petrel that was entering and exiting a burrow on the upper portion of Lookout Point, and was in very close proximity to another burrow being used by a Cassin's Auklet.



Storm Petrel at burrow, Lookout Point, East Limestone Island (Photos: LBCS)

Sea Surveys

Boat surveys are conducted throughout the season to monitor the distribution and abundance of marine birds and mammals encountered along pre-determined 100m wide strip-transects in Laskeek Bay. The objective of these surveys is to develop a strong baseline data-set for marine wildlife in the Laskeek Bay area as well as to specifically monitor the abundance and distribution of Marbled Murrelets (*Brachyramphus marmoratus*), a forest canopy nesting seabird that is provincially red listed and designated as threatened by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). These surveys have been conducted since 1991 and represent a very important dataset within the province.

Near-shore surveys

Near-shore surveys cover the inshore waters as far north as Cumsheewa Island and south to Haswell Island. Three near-shore surveys were completed this year: May 7th and 24th as well as June 25th. On these surveys we counted 22 species: Bald Eagle, North-western Crow, Marbled Murrelet, Pigeon Guillemot, White-winged Scoter, Pelagic Cormorant, Common Loon, Ancient Murrelet, Rhinoceros Auklet, Harlequin Duck, Long-tailed Duck, Red-neck Phalarope, Glaucous-winged Gull, Herring Gull, Black Oystercatcher, Mallard, Red-necked Grebe, Common Merganser, Bufflehead, Common Murre, Green-winged Teal, and Pacific Loon. A total of 26, 43, and 71 Marbled Murrelets were counted on the May 7th, May 24th, and June 25th surveys, respectively. These numbers are similar to 2012, and much lower than 2013 and previous years.



Common Merganser & chicks (Photo: LBCS)

Hecate Strait surveys

This survey takes us approximately five nautical miles into Hecate Strait, and allows us to record species that tend to stay farther from shore. We completed three Hecate Strait surveys this year, on 14 and 26 May, as well as 26 June. On these surveys we counted 15 Species: Sooty Shearwater, Cassin's Auklet, Rhinoceros Auklet, Common Murre, Ancient Murrelet, Glaucous-winged Gull, Pacific Loon, Common Loon, Pigeon Guillemot, Fork-tailed Storm Petrel, Herring Gull, Marbled Murrelet, Pelagic Cormorant, Tufted Puffin, and Red-necked Phalarope.

Marine Mammals

We kept a daily record of all marine mammal sightings, with the exception of Harbour seals (*Phoca vitulina*) and Steller's sea lions (*Eumetopias jubatus*). These species are counted at specific haul outs during sea surveys in order to keep an index of population trends.

Beginning this season, along with recording incidental sightings and sightings during sea watches and sea surveys, we now also do a 5 minute scan and count of marine mammals from Cabin Cove. This is done in combination with the ANMU gathering ground count, each evening approximately two hours before sunset. The results of this season's total sightings are summarized in Table 5.

Table 5. Total counts of marine mammals from sea surveys, sea watches, and other sightings, 2006-2014[†]. Data for 2014 include sightings during the 5 minute evening count.

Species (common name)	Scientific name	2014	2013	2012	2011	2010	2009	2008	2007	2006
Dall's porpoise	<i>Phocoenoides dalli</i>	0	0	0	8	0	0	0	0	0
Northern elephant seal	<i>Mirounga angustirostris</i>	0	0	0	0	0	0	0	0	0
Fin whale	<i>Balaenoptera physalis</i>	0	0	0	0	0	0	0	0	0
Grey whale	<i>Eschrichtius robustus</i>	0	1	1	1	0	0	0	0	1
Harbour porpoise	<i>Phocoena phocoena</i>	31	7	4	19	0	10	0	1	4
Humpback whale	<i>Megaptera novaeangliae</i>	347	12	14	193	86	102	261	203	91
Killer whale	<i>Orcinus orca</i>	26	16	13	49	11	14	18	26	4
Minke whale	<i>Balaenoptera acutorostrata</i>	3	6	2	1	0	0	1	3	1
Pacific white-sided dolphin	<i>Lagenorhynchus obliquidens</i>	0	0	0	0	46	334	0	81	365
California sea Lion	<i>Zalophus californianus</i>	4	0	0	1	1	0	0	4	0

[†]Harbour seal *Phoca vitulina* and Steller's sea lion *Eumetopias jubatus* sightings are not reported here. Sightings do not necessarily reflect number of individuals, as individuals may be recorded more than once.

Humpback whales

There were very few humpback sightings in the last two years, compared to previous years, but this year we again recorded many humpbacks in Laskeek Bay, with the highest number of humpbacks sighted since 2006 (Table 5). Most sightings were in early May, and at times there were more than 40 humpbacks seen during a single one-hour sea watch. We also observed many humpbacks much farther offshore, during Hecate Strait sea surveys, when ~20 whales were observed spouting during one scan of the horizon.



Humpback in Laskeek Bay (Photo: LBCS)

Killer whales

There were five sightings of killer whales in Laskeek Bay this season. We were able to take ID photographs during three of these encounters. Our ID photographs are sent to the killer whale database at the Pacific Biological Station in Nanaimo. Most sightings seemed to be of the same group of 2 females, 2 calves and 1 bull. We have not been able to ID the group yet.

Steller's sea lions



Sea lion haulout (Photo: LBCS)

There are several sea lion haul outs in Laskeek Bay. The largest of these is on the east end of Reef Island. There are also smaller haul outs on the Skedans Islands, Cumshewa Rocks, and Helmet Island. We regularly count the number of individuals on the Reef and Skedans haul outs. The maximum number counted this season was 522 individuals at Reef (May 7th) and 82 at Skedans Islands (May 7th). Occasionally we sight branded sea lions that have been individually marked by researchers in the United States. On May 7th we saw two branded

individuals, C449 (a large bull) and 746R. 746R is a male that was branded as a pup in 2009 in southern Oregon. Throughout the season we also recorded 4 observations of California sea lions, which is the highest number since 2007.

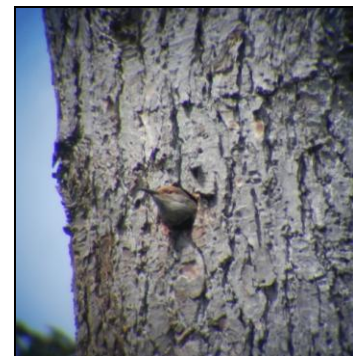
Other species

Two other marine mammal species were sighted this season: Minke whales and harbor porpoises. Two minke whales were seen travelling across Laskeek Bay and feeding in early June, and another was observed very close to Lookout Point during a sea watch in mid-June. There were a total of 31 harbour porpoises seen in 2014, which is the most sighting since before 2006.

Wildlife Trees

LBCS has been monitoring cavity nesting birds on Limestone Island since 1990. Wildlife trees (dead standing snags used by cavity nesting birds) were monitored opportunistically from 1990-94, and since 1995 there has been a systematic effort each year to cover the island thoroughly, looking for active trees. Through this monitoring program, LBCS has amassed a long-term data set on tree use across many years, showing the importance of these trees as habitat for cavity nesting species. A total of 152 wildlife trees have been identified over the past 25 field seasons. New access trails have been established following the 2010/2011 blow-down, allowing some of the more difficult trees in the blow-down area to be monitored.

In 2014 we found a total of 15 active trees, occupied by five different species. Six new trees were identified in 2014. Ten nests were occupied by Red-breasted Sapsuckers, two by Chestnut-backed Chickadees, two by Hairy Woodpeckers, one by Northern Flickers, and one by Red-breasted Nuthatches (Table 6). This was the second Northern Flicker nest on East Limestone since 2006. Wildlife tree #118 had been inactive for five years, but was again active this year, and occupied by a pair of Red-breasted Sapsuckers.



Northern Flicker in Wildlife Tree (Photo: LBCS)

Table 6. Wildlife tree activity on East Limestone Island in 2014. †

Tree #	Cavity Nester	Tree Species	Fledge Date (min)*	Fledge date (max)*
51	RBSA	Hw	14 June	16 June
72	RBSA	Ss	14 June	16 June
72	RBNU	Ss	10 June	14 June
109	RBSA	Ss	18 June	20 June
115	CBCH	Hw	04 June	06 June
116	RBSA	Ss	16 June	18 June
118	RBSA	Ss	13 June	20 June
140	HAWO	Ss	11 June	14 June
142	CBCH	Hw	23 May	27 May
145	RBSA	Ss	18 June	20 June
147	RBSA	Hw	14 June	16 June
148	RBSA	Hw	14 June	16 June
149	HAWO	Ss	29 June	02 July
150	RBSA	Hw	19 June	20 June
151	RBSA	Ss	13 June	16 June
152	NOFL	Hw	04 July	06 July

†RBSA = Red-breasted Sapsucker, NOFL = Northern Flicker, RBNU = Red-breasted Nuthatch, HAWO = Hairy Woodpecker, CBCH = Chestnut-backed Chickadee, Ss = Sitka spruce, Hw = Western hemlock.
*For min and max, fledging may have occurred on any day between the given dates.

NATURAL HISTORY

Daily Bird Checklist

Throughout the field season, we keep a daily record of all bird species seen or heard within Laskeek Bay. The peak number of species was 47 on May 7th. There were a total of 65 species recorded over 66 days. Many species were recorded almost every day: Common Raven, Northwestern Crow, Black Oystercatcher, Red-breasted Sapsucker, Bald Eagle, Pelagic Cormorant, Glaucous-wing Gull, Pigeon Guillemot, Hairy Woodpecker, Pacific-slope Flycatcher, Hermit Thrush, Varied Thrush, Orange-crowned Warbler, Townsend's Warbler, and Pacific Wren. Many less frequently observed species were recorded this year as well, such as Horned Grebe, Red-tailed Hawk, Sharp-shinned Hawk and Blue Grouse. Migratory duck species including Green-winged Teal, Long-tailed Duck and Black Scoter were observed, and shorebirds such as Surfbirds and Black Turnstone were also sighted. Additionally, we had a record of a Great Blue Heron, a species that is very rarely seen in Laskeek Bay.

Raptors and Corvids

As with cavity nesting birds, we make a concerted effort through the season to keep track of other nesting birds including Bald Eagles, Peregrine Falcons, Common Ravens and Northwestern Crows.

This year we had two Bald Eagles nests on Limestone Island that were likely active. No chicks were seen in the nests, although some were audible near BAEA-6 and fresh prey remains were found below both BAEA-6 and BAEA-4.

We checked the Peregrine Falcon nest on the south cliffs but it was inactive this year. The nest was checked several times between May and July, however each time no adults were seen at the nest and there were two abandoned eggs in the nest. Also, Peregrine Falcons were only recorded 12 times during the 2014 daily bird checklist, which is significantly lower than the 50 observations in 2013.

Peregrine Falcons have nested on Limestone Island discontinuously since research began in 1990. During the first 9 years (1990-1998), an active nest was observed in all years except 1992. During the next 8 years (1998-2006) there was no nesting activity observed. For the 7 years prior to 2014 (2007-2013) there has been an active nest, generally with 2-3 young observed. The nest has always been on the south cliffs, although the position has shifted somewhat between years.

As in past years, one pair of Common Ravens nested on the island. The nest was in the new nest site that was found in 2013 (CORA-3) and chicks were heard calling loudly throughout May. Three were visible in the nest on May 12th, and the fledglings were seen around camp by late May.

Plants

There are relatively few wildflowers and berry bushes left on Limestone Island as a result of heavy browsing by introduced deer. Most flowering plants are now found restricted to cliff areas where the deer cannot reach them. Although Limestone Island hosts a high density of deer, the steep cliffs provide some deer-free habitat. Throughout the season we keep a record of the dates on which particular species are first observed in bloom. For example, this year we recorded sightings of blooming shore blue-eyed grass (*Sisyrinchium littorale*), northern rice-root (*Fritillaria camschatcensis occidentalis*), monkey flower (*Mimulus guttatus*), and red columbine (*Aquilegia formosa*); these species tend to be common in areas with no deer, but are otherwise rarely seen.

A number of rare plants are present on Limestone due to the unique limestone geology which is uncommon on the rest of Haida Gwaii. These plants are showy Jacob's ladder (*Polemonium pulcherrimum*), few-flowered shooting star (*Dodecatheon pulchellum*), Richardson's geranium (*Geranium richardsonii*), and cut-leafed anemone (*Anemone multifida*). Showy Jacob's ladder, Richardson's geranium and cut-leafed anemone were all found to be blooming by early June, while the discovery of few-flowered shooting star was in early July.

Two other plants of interest were identified by volunteers Pat McAllister and Margaret Mackenzie. Northern starflower (*Trientalis arctica*) was discovered in North Cove and had not previously been recorded on any of the 10 islands in Laskeek Bay, where extensive plant surveys have been carried out. Cooley's hedge-nettle (*Stachys cooleyae*) was found growing in Crow Valley this year also. Although this species is abundant on Reef Island, it is the first time that the plant has been recorded on East Limestone Island.



Northern Starflower (Photo: LBCS)

Invasive plants that have become established on Limestone include bull thistle (*Cirsium vulgare*), Canada thistle (*Cirsium arvense*), prickly sow-thistle (*Sonchus asper*), and wall lettuce (*Lactuca muralis*). Cudweed (*Gnaphalium uliginosum*) was detected on the island for the first time in 2013 and was recorded again this year. For the past three seasons, no invasive plant control work has been done on Limestone. However, we acquired funding in 2014 for some minor invasive weed removal, whereby staff and volunteers pulled out several large patches of bull thistle along the main trail.

Introduced Species

Sitka Black-tailed Deer *Odocoileus hemionus*

Deer were intentionally introduced to Haida Gwaii in 1878 and in several years between 1911 and 1925 to provide game meat for local people. Because they have no major predators on the islands, the deer population has reached very high density and has dramatically impacted plant communities, particularly in the forest understory. LBCS is a partner in the Research Group on Introduced Species (RGIS, www.rgisbc.com) which has carried out extensive research on this topic in Laskeek Bay as well as on the rest of Haida Gwaii.

RGIS is currently working on a project entitled BAMBI (Behavioral Adjustments to Mitigate Biodiversity loss). This study looks at how the deer of Haida Gwaii have adapted to life in the absence of predators, and the role that fearless behaviour plays in helping deer maintain high densities on islands with severely browsed understories. This season the researchers and local support assistants were again based at the field camp on Reef Island and worked there as well as on East Limestone Island and Kunga Island. Two Masters students were working on projects regarding deer behaviour and the role of their “personality”, and marine inputs into deer diet.



Automatic cameras are a good non intrusive way to study inter-individual differences in deer behaviour: here we examine differences in behaviour in presence of a non activated box trap baited with apples at its far end. (Automatic photo/RGIS)

date/time, location, tag color/number, collar and sex were recorded along with any behavioural notes. We also collected deer jawbones of any dead deer that were found. These will be used in a stable isotope study on deer diet.

Raccoons *Procyon lotor*

Raccoons were introduced in the early 1940s to provide local trappers with a source of employment. Raccoons (as well as rats) are one of the largest threats to ground and burrow nesting seabirds on Haida Gwaii. With few defenses against mammalian predators, birds such as Ancient Murrelets, Cassin’s Auklets and Fork-tailed Storm Petrels are very vulnerable to raccoon predation and typically experience rapid declines where these predators become established in colonies.



Collection of seaweed samples to be dried for stable isotope analyses to study the contribution of marine subsidies in deer diet (Photo RGIS/Mathilde Schlaeflin)

On Limestone Island, there is only one of the original three deer exclosures remaining since the blow-down in 2010. This exclosure has been damaged by more blowdown in the last few winters, but this season it did not require repair. Despite repeated damage, the exclosure still highlights the contrast between browsed and unbrowsed areas. The understory vegetation (huckleberry, salal, ferns, and young trees) inside this exclosure is almost entirely absent from areas that deer can access. We are also noticing that a consequence of the blow-down is the creation of many small refugia on top of turned up roots. Spruce and huckleberry regeneration is particularly abundant.

We continued to record all deer sightings on Limestone Island this year to assist with the BAMBI project. The

Raccoon predation is an ongoing concern on Limestone Island. During 1990 and 1991 there was considerable raccoon presence on the island and very high rates of predation. Based on predation rates observed during earlier visits to the island, it is reasonable to assume high levels of predation for the period of 1983-1989 as well (see LBCS Science Report #3 for further discussion). Raccoons were removed from the colony in 1992 and predation rates dropped dramatically. Raccoons were again present in 1993, 1994 and were suspected in 1995 and 2001. More recently a raccoon was removed from the island in 2007, and raccoon presence was confirmed again in 2009. No raccoons have been confirmed present on Limestone since 2009.

Due to the large raccoon population on Louise Island it seems likely that raccoons will continue to disperse to Limestone in future years. It is therefore very important to initiate spring surveys for raccoons to eliminate them from the colony before birds begin breeding in early April. By the time field camp opens in early May, a raccoon could have already had a considerable impact on the colony.

This year, cameras were set up and surveys took place early in the season. On March 17th, a crew set up four infrared cameras baited with cans of fish. They were set up in Anemone Cove, Cabin Cove, on the northwest point, and in Crow Valley. Anemone Cove is a likely spot where raccoons crossing to Limestone from Vertical Point could be intercepted, and Cabin Cove is part of the known Ancient Murrelet colony. The cameras were in place continuously until the staff arrived to begin the field season on May 3rd. On March 16, 17, and 18th, a crew conducted evening and nighttime surveys of East Limestone, West Limestone and the adjacent shoreline of Louise Island. No raccoons were sighted on East or West Limestone, but a total of 6 were seen on Louise Island, 4 of which were killed.

Monitoring for raccoons continued throughout the field season, with one camera that was baited and checked regularly. It was located in Anemone Cove until June 3rd, when it was moved to Cabin Cove until June 18th. In early May, this camera was relocated to Haswell Island for one week (May 7-14) to verify that the baited camera would capture photos of raccoons if they were present. Haswell Island is an area where raccoons have been observed in the past. Images of raccoons that were attracted to the bait were captured soon after the camera was set up. The first raccoon arrived at the bait at 22:00 on the night of 8 May (the second night the camera was in place). The last image of a raccoon at the bait was at 11:15 on May 13th, the night before the camera was removed. This indicates that when raccoons are present in an area, they are attracted to the bait for an extended period of time. Because of intensive and prolonged monitoring, we are certain there were no raccoons on East Limestone Island this spring. Although all cameras captured many photos of deer, ravens, squirrels and deer mice, no raccoons were observed.



Raccoon caught on camera (Photo: LBCS)

This season we were also loaned cameras which were used to conduct a short-term remote camera survey for raccoon presence on other islands in the Laskeek Bay area. We set up 9 other cameras in addition to the ones used on East Limestone. They were located on Cumshewa Island, three of the Skedans Islands, Skedans Islet, West Limestone Island, Nelson Point on Louise Island, Haswell Island, and Kingsway Rock. The cameras were deployed between June 8th and 14th, and retrieved between July 7th and 8th. Raccoons were recorded on the camera on Haswell Island. No unexpected raccoon sightings were recorded, although two cameras did not function properly (on central Skedans Island and Nelson Point). It is important to realize that such a short term survey could miss recording raccoon sightings if the raccoons are present only intermittently, as they have been on East Limestone in the past. The survey does demonstrate that when raccoons are present they are attracted to the bait, as on Haswell Island.

Unfortunately, because the camera on Louise Island did not function we were not able to determine if this was also the case on a larger island with confirmed raccoon presence.

Red Squirrels *Sciurus vulgaris*

Squirrels were introduced to Haida Gwaii in 1950 to aid in cone gathering for the forest industry. Squirrels may have been introduced to Limestone directly at this time. Squirrels are now well established on Limestone and are known to be a nest predator on various songbird species (see www.rgisbc.com).

Since 2007, we have been conducting squirrel surveys on Limestone to measure the annual abundance of squirrels. Over time we hope to describe population cycles of this introduced species and gain a better understanding of the consequences of squirrel presence. Eleven squirrel surveys were completed this season.

CONCLUSION

This season was our 25th year of research, monitoring, and environmental education in Laskeek Bay. Since 1990, LBCS has focused on developing baselines and long-term data sets for the marine and terrestrial ecosystems of Laskeek Bay, as well as providing volunteers, students and visitors the chance to visit our research camp. The society remains dedicated to long-term monitoring and engaging the public in addressing local conservation issues.

Between the years 2006-2009 we documented a very serious decline in Ancient Murrelet numbers on East Limestone Island. Based on this year's chick departure numbers, it is not possible to say whether the population is increasing, although we may be seeing a stabilization of the population in the Cabin Cove area of the colony. A concerted effort to keep raccoons off the island during the breeding season is likely the largest factor responsible for slowing the downward trend. We will continue to monitor for raccoons, and also continue the social attraction techniques to assist the recovery of the colony. It is still unclear what the long-term implications of the blow-down of 2010/2011 will be for the murrelet colony, although it appears that the North Cove colony may be relocating, as chick departures in this area were much lower this season.

The lessons that we learn from our research on Limestone Island are of great importance when considering the prospects of other colonies threatened by introduced raccoons and rats as they continue to disperse throughout the many islands of Haida Gwaii. Along with the core long-term monitoring programs, LBCS also hopes to incorporate more island restoration techniques in future field seasons.

ACKNOWLEDGEMENTS

Laskeek Bay Conservation Society would like to thank all those organizations which provide financial support to our programs. In the 2014 field season, these included:

- Bird Studies Canada
- Employment and Social Development Canada – Canada Summer Jobs
- Environment Canada – Canadian Wildlife Service, Pacific Region
- Gwaii Trust
- Habitat Conservation Trust Foundation
- NSERC Promo-Science
- Parks Canada and Gwaii Haanas National Park Reserve, National Marine Conservation Area Reserve and Haida Heritage Site
- Province of British Columbia - BC Gaming
- TD Friends of the Environment
- Walmart - Evergreen Green Grants

We would also like to thank the individuals and businesses who support us throughout the year, with great service, donations and assistance in many forms. We especially thank:

- Anne Hansen
- BC Parks
- Bluewater Adventures
- City Centre Stores
- Council of the Haida Nation
- Delmas Coop in Skidegate
- Highlander Marine Services
- Isabel Creek Store
- Maple Leaf Adventures
- Moresby Explorers
- Jeremy Hyatt
- Jason Shafto
- Outer Shores Expeditions
- Queen Charlotte Visitors Centre

Finally, we thank:

- Our staff and all the interns and volunteers at East Limestone Island
- LBCS Directors for their time and efforts
- Dr. Tony Gaston for advice and guidance during the season
- Jean-Louis Martin and the Research Group on Introduced Species