

EAST LIMESTONE ISLAND FIELD STATION

FIELD SEASON REPORT 2012



SUMMARY

This was Laskeek Bay Conservation Society's 23rd field season on East Limestone Island, Laskeek Bay, Haida Gwaii. The 2012 season ran from 4 May to 12 July, bringing 19 volunteers and 42 visitors to the island. There were no school groups or student interns this year. Ancient Murrelet chicks were captured at Cabin Cove and numbers increased slightly from last season. No raccoons were detected on the island this season. Black Oystercatcher surveys were conducted in both Laskeek Bay and in Gwaii Haanas. We censused Glaucous-winged Gull colonies in Laskeek Bay and found 231 active nests at three colonies. Pigeon Guillemots used 16 of the 28 nest boxes at Lookout Point. Seven Cassin's Auklet nest boxes were active, but only one chick fledged. Three near-shore sea surveys were completed resulting in very low Marbled Murrelet counts; one Hecate Strait sea survey was completed. There were few marine mammal sightings this year and only 14 Humpback sightings. One Grey whale and two Minke whales were also recorded in Laskeek Bay. There were five sightings of Killer whale groups in Laskeek Bay. Fourteen wildlife trees were active: eight with Red-breasted Sapsuckers, two with Chestnut-backed Chickadees, one with Hairy Woodpeckers, one with Brown Creepers and one with Red-breasted Nuthatches. There were three active Bald Eagle nests. Both the Common Raven and Peregrine Falcon nests were also active.

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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 23 years 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, life history and population dynamics 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 offers a unique program involving the public in educational and interpretive programs with the goal of raising awareness of local conservation issues and the natural history of Laskeek Bay. Students, volunteers and visitors are invited to visit our research camp on Limestone Island, learn about our research projects and assist in some of the monitoring programs.

Project Limestone

Due to the BC teacher’s strike, no school groups were able to participate in Project Limestone this season. We look forward to having the students back on Limestone next year.

Volunteers

Volunteers play an integral role in the operation of the field camp on Limestone Island. They generally stay for one week and work alongside field staff, contributing their time and energy to many different tasks that are required throughout the season. These tasks include both research oriented work as well as general camp maintenance and chores. This is a unique opportunity for the public to get involved in long-term monitoring work while living in a remote field camp on Haida Gwaii.

Nineteen people volunteered this year, contributing 133 volunteer days to projects on Limestone Island, surrounding islands, and within Gwaii Haanas. Five of the volunteers had been to the island in previous years. All volunteers stayed for one week. Volunteers came from a variety of places: 10 from Haida Gwaii, five from other parts of BC, two from Winnipeg, one from Germany, and one from France.

Visitors

The LBCS visitor program provides opportunities for tourist groups to visit Limestone Island, participate in an interpretive tour and learn about the research that we are involved in. Through this program, LBCS aims to raise public awareness and appreciation of local conservation issues. Most of these visitor groups are part of ecotourism excursions in Gwaii Haanas.

Three tour groups visited this year: *Island Roamer* on May 22 and June 22 and *Island Odyssey* on June 12. In total there were 42 visitors to the island this season, not including frequent visits by the crew from Reef Island.

Staff

LBCS staff this season were Alan Moore, Operations Manager; Jake Pattison, Camp Supervisor (June/July); Ainsley Brown, Camp Supervisor (May), Assistant Biologist/Interpreter (June/July); and Vivian Pattison, Assistant Biologist/Interpreter (May).

There were no student interns on Limestone this year.

The Research Group on Introduced Species (RGIS) crew was in the Laskeek Bay area beginning in March. This was the second year for project BAMBI, a four year project focused on understanding deer behaviour and how it changes in response to predation risk. The crew will continue working between Limestone Island, Reef Island and Kunga throughout the fall of 2012 with more field work planned for next spring.

RESEARCH AND MONITORING PROGRAMS

Ancient Murrelets *Synthliboramphus antiquus*

Chick capture work

Chick-capture funnels 5-8 were monitored in Cabin Cove beginning on 7 May. Funnels were checked at regular 15 minute intervals and the date, time, location (funnel number) and mass for each departing chick were recorded. Funnel protocol is kept constant across years so that the number of chicks departing gives a consistent index of the overall breeding population. Funnels were closed nightly from 22:30-2:30 for the period of 7-19 May and 11:00-2:30 after 19 May to compensate for increasing day length. 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 12 May and the last on 31 May. A total of 110 chicks were captured in funnels 5 to 8 (Fig. 1). Peak night of

departures (14 chicks captured) occurred on 17 May and 22 May. Chick numbers recorded this season in funnels 5-8 were slightly higher than recorded in 2011 (Table 1).

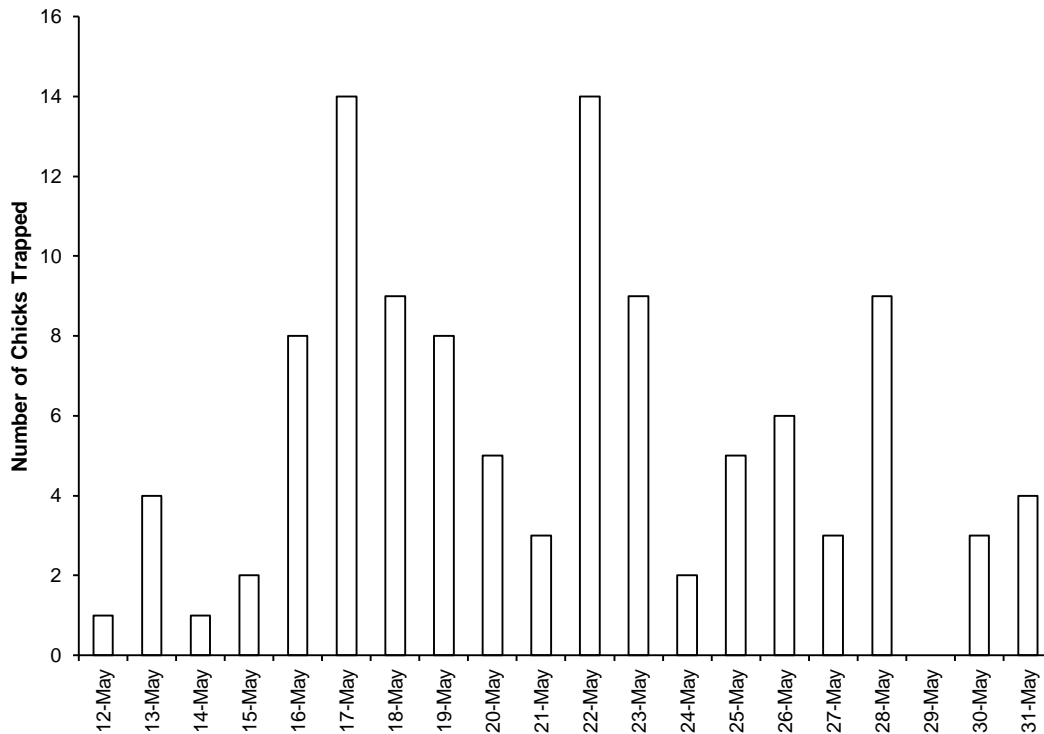


Figure 1. Nightly chick captures, Funnels 5-8, East Limestone Island, 12 May – 31 May 2012.

Table 1. Summary of chick departures, peak nights and totals for funnels 5 to 8 on East Limestone Island 2006 to 2012.

<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

Funnels 5 & 6

As of this season, funnels 5 and 6 have been monitored continuously for 23 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 and 8 were installed in 2006 flanking funnels 5 and 6 to see if the colony area had shifted, resulting in decline. Comparison of chick

numbers between funnels 5 and 6 and funnels 7 and 8 do not suggest a shift in the colony area. The blow-down event of 2010 had a large impact on the colony area feeding into funnel 5 and a lesser impact on funnel 6.

A total of 83 chicks were captured this season in funnels 5 and 6 which is higher than the number captured in 2011 but lower than 2010 (Fig. 2). First chicks arrived on 13-May and peak night (12 chicks) occurred on 22 May (Table 2). Chick captures continued until the 31-May this season for a total of 19 days with chicks (Table 2).

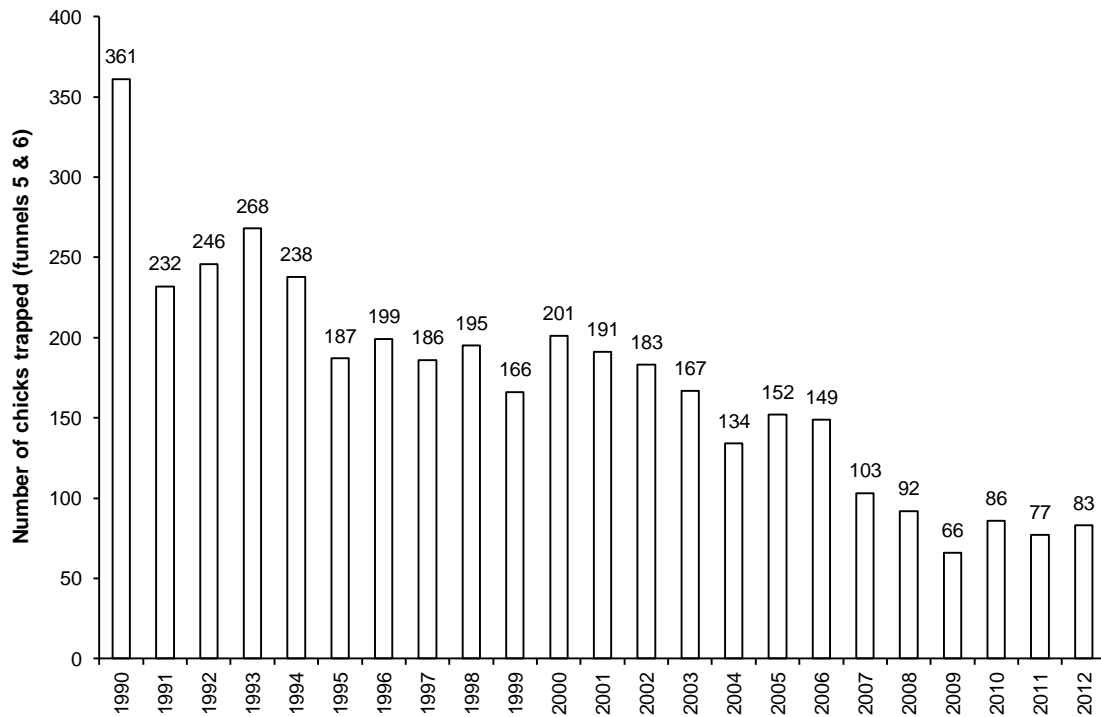


Figure 2. Total Ancient Murrelet chick captures at funnels 5 and 6 East Limestone Island, 1990-2012.

Table 2. Summary of chick departures, peak nights and totals from funnels 5 and 6 on East Limestone Island, 1990 to 2012.

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
Average ± SD	11-May ± 2 days	21-May ± 3.8 days	20 ± 7.8 chicks	6-Jun ± 5.5 days	27 ± 5.5 days	172 ± 71 chicks

North Cove

As a result of the blow-down events of 2010/11 we were unable to monitor North Cove funnels 1-4 again this year. However, we did set up two partial funnels (95% of funnel 4 and a small section of funnel 3) to see if this colony was still active. An infrared, motion activated camera was set at the mouth of each funnel to determine activity. The cameras recorded between 20 and 27 May during which time seven chicks came down these funnels: five from funnel 4 and two from the portion of funnel 3.

Two nights were also spent observing activity in North Cove (18 and 24 May). The first night, 18 May, was very active with adults calling steadily from the water. Two chicks and one adult were also seen at N-6 along the North Cove trail, along with other adults near the funnels. The second night however, 24 May, was completely quiet with no adults or chicks heard on the water or in the forest.

Gathering grounds

Ancient Murrelets enter and leave the breeding colony at night and 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 6 May and 19 June we conducted standardized 10 minute counts of birds on the gathering grounds. The highest count occurred on 8 June, with a total of 73 birds observed. Counts averaged (\pm SD) 15.5 ± 15.4 this season, a major decrease from last season (43.7 ± 36.2).

Point counts

We conducted point counts in the colony area to monitor the activity of adult birds. Five minute counts were conducted in Cabin Cove at approximately 2:30 each night for the period of 21 to 31 May. The maximum count, (15 birds 106 calls) occurred on 25 May. Two point counts were also conducted at North Cove 18 and 24 May. On 18 May adults were recorded calling steadily for 5 minutes and 24 May resulted in no calls.

Band Recoveries & Recaptures

Recapture of adult birds was phased out 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 band recoveries or recaptures in 2012.

Predation transects

In previous years we checked for predation remains along 5 fixed, 20m wide transects. These transects were heavily impacted by blow-down and not monitored in 2011 or 2012. In general, very few predation remains were seen on the island this season. See the 'Raccoons' section below for a description on the use of cameras to detect the presence of raccoons.

Population Trends & Social Attraction Experiment

The breeding population of Ancient Murrelets has been declining over time (Fig 2), and this trend has become more pronounced since 2006 when the last survey of the colony estimated \pm SE 509 \pm 132 breeding pairs compared to the estimate of 1273 \pm 254 in 1995. The number of departing chicks in funnels 5&6 declined by a further 56% between 2006 and 2009, likely due to the presence of raccoons in 2007 and 2009. Chick numbers rebounded in 2010, and decreased again in 2011, likely related, in part, to the blow-down events of the previous winter (Fig 2). The numbers increased slightly in 2012, although work was limited to the colony near the cabin. There were few chicks noted in North Cove likely because a large area of this colony suffered heavy blow-down in windstorms in the winter of 2010/2011. Setting up funnels in most of this area is no longer possible although we did manage to reinstall most of Funnel 4 in 2012.

In 2011 we initiated a project aimed at increasing the recruitment of Ancient Murrelets to the Limestone colony. Megaphones (TOA model ER-2230W) were placed in two different locations (Station 1: N52.90889, W131.61024; Station 2: N52.90760, W131.61069) and used to broadcast murrelet colony sounds to attract the attention of prospecting birds. By artificially increasing the amount of colony noise we hope to attract young birds to the colony and by doing so increase the breeding population over time. We continued this project again in 2012 playing the megaphones between 0:00 and 2:30 on 8 May to 17 May and again on 22 May to 31 May. Megaphones were not played on nights with high winds or heavy rain or during the expected peak nights (18 – 21 May). It is unclear whether this activity is causing an increase on the number of nesting pairs.

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 2012. A summary of the Laskeek Bay survey is below. For details on the two 5-day surveys within Gwaii Haanas, please consult the separate report titled "2012 Black Oystercatcher survey in Gwaii Haanas".

Site occupancy and reproductive success

Oystercatcher territories were visited in Laskeek Bay beginning the end of May through to the middle of July. We visited all territories known to have been active in past years except for the five territories on Cumshewa Island. All segments of shoreline surveys were also completed. Shoreline surveys followed the same protocol developed for the Gwaii Haanas surveys and involved scanning shoreline areas from ~50m offshore at 11 km/hr (2000rpm) to search for new territories.

Out of 46 territories visited, 25 were occupied with an alarmed adult pair, and of these, 20 had eggs or chicks at some point during the season. No new territories were found. During the first survey (conducted between 27 May and 27 June), we found 37 eggs and seven chicks. During the second survey (8 to 11 July) we found four eggs and 15 chicks. The low chick survival rate was likely due to a cool, wet and windy spring.

Banding and re-sighted birds

Birds banded in previous years have a combination of one metal band on the right leg that carries a unique number and a colour 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. 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 21 sightings of banded birds in Laskeek Bay (Table 3) and seven sightings in Gwaii Haanas (Table 4). The oldest bird sighted this year was banded as an adult in 2000 on the Skedans Islands. We were also able to read the band on an adult this year. This bird was seen on Ramsay Island (territory 470-6-2) with band number 0695. It was banded in 2004 as a chick at nearby territory 470-4-1. No birds were banded this season.

Table 3. Banded Black Oystercatchers re-sighted in Laskeek Bay in 2012.

Band combination (Left - Right)¹	Location seen / Nest site	Year Banded	Banded as Adult or Chick
UB-DB/M	LOW-2	2006	Chick
UB-UB/M	KNG-1	Unknown	-
AL-Bk/M	SKE-6	2000	Adult
UB-UB/M	SKE-6	Unknown	-
UB-Y/M	SKE-10	2007	Chick
UB-UB/M	REE-9	Unknown	-
W-?	Reef Island	Unknown	-
M-UB/UB	REE-11	Unknown	-
UB-Br/M	REE-11	2001	Chick
UB-UB/M	Reef Island	Unknown	-
W-UB/M	SLW-1	Unknown	-
UB-UB/M	SLW-4	Unknown	-
UB-UB/M	SLW-8	Unknown	-
W-LG/M	REE-3	2008	Chick
W-W/M	Reef Island	2009	Chick
UB-UB/M	Reef Island	Unknown	-
UB-UB/M	Reef Island	Unknown	-

UB-UB/M	LOW-1	Unknown	-
UB-UB/M	LOW-4	Unknown	-
UB-UB/M	Skedans Islands	Unknown	-
UB-UB/M	KNG-3	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.

Table 4. Banded Black Oystercatchers re-sighted in Gwaii Haanas, 2012.

Survey	Band combination (Left - Right) ¹	Location seen / Nest site	Year Banded	Banded as Adult or Chick
1	UB-DB/M	From 560-4-?	2006	Chick
1	UB-OR/M	470-6-2, band ends in 0695. Banded on Ramsay Island @ 470-4-1	2004	Chick
2	UB-DB/M	560-3-1	2006	Chick
2	UB-UB/M	560-4-1	Unknown	-
2	UB-OR/M	470-6-2	2004	Chick
2	W-W/M	Kunga Island, in group of 19	2009	Chick
2	UB-OR/M	LOS-11	2004	Chick

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

Chick Diet

Oystercatchers feed their chicks hard-shelled invertebrates which they bring intact to the breeding territory. We collected prey remains from 14 territories this year in order to quantify average diet composition fed to chicks. Limpets were the primary prey (60%), followed by mussels (26%) and chitons (14%) (Fig. 3). These three prey items made up more than 99% of the diet, consistent with what has been found in past years.

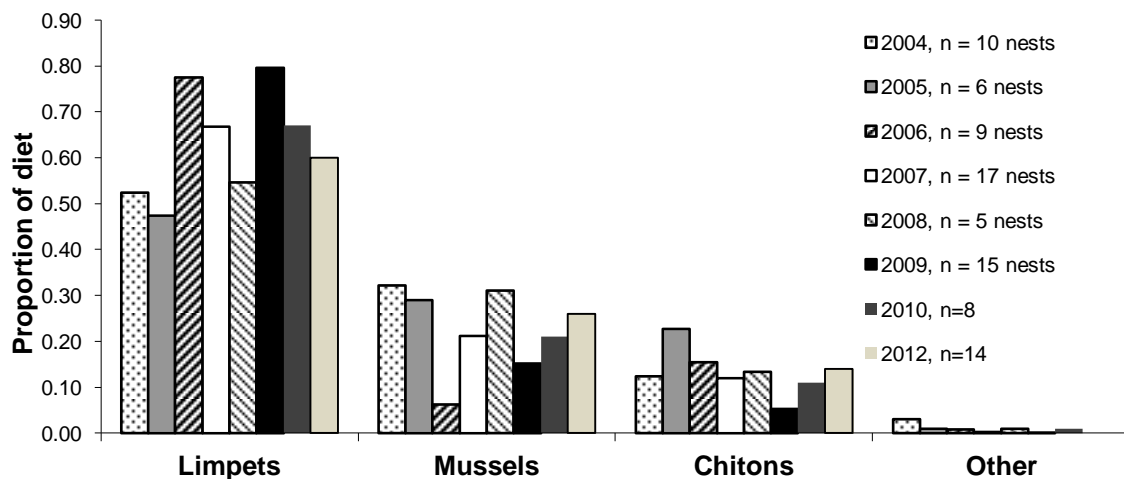


Figure 3. Black Oystercatcher chick diet from prey collections at Laskeek Bay territories 2004-2012.

Glaucon-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 and Lost Island but did not visit the colony on Cumshewa Island. No gulls were seen by boat at the Skedans Islands therefore this area was not searched 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 196 active nests (21 June), followed by Kingsway Rock with 33 nests (27 May) and Low Island with 2 nests (14 June). The number of active nests at Kingsway Rock was lower than usual likely because it was visited early in the season. There were 61 empty nests recorded which would have presumably been active later in the season. In total we counted 229 nests on these three colonies containing either 1 egg (12% of nests), 2 eggs (18%), or 3 eggs (67%). Eight nests on the Lost Islands were found with hatched chicks. The total number of nests counted this season was below the long-term average (\pm SD) of 256 ± 68 , partially due to the earlier visit to Kingsway Rock.

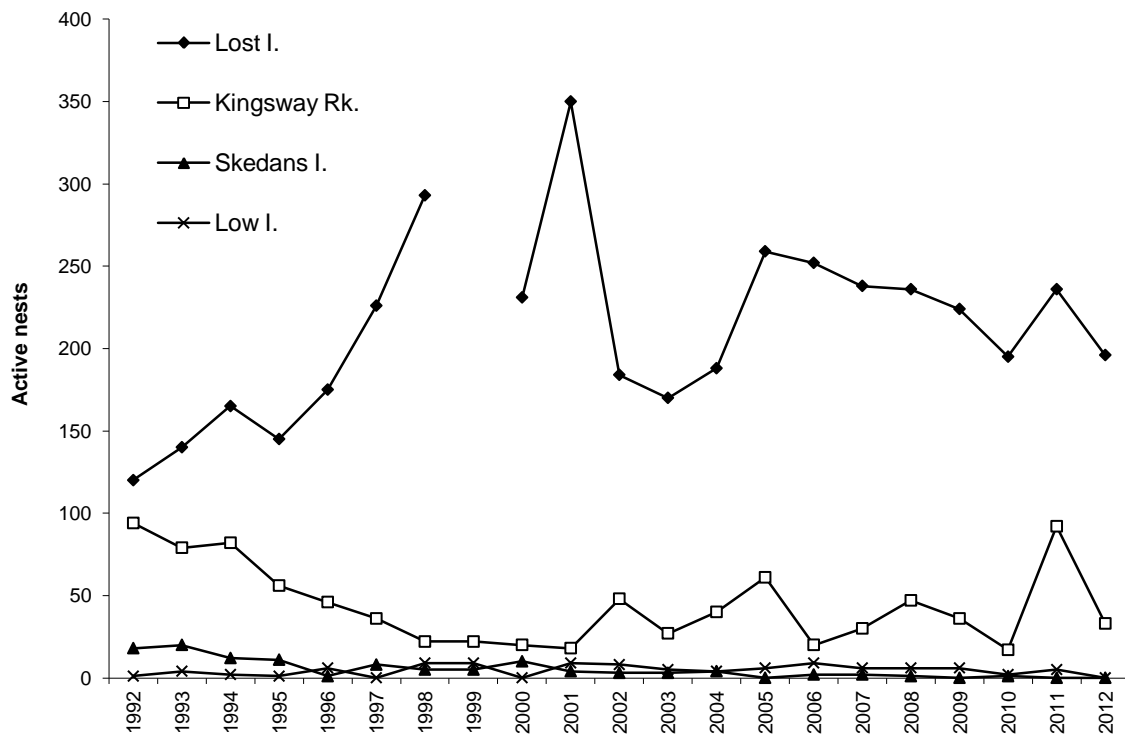


Figure 4. Glaucon-winged Gull nests containing eggs or chicks at four colonies in Laskeek Bay, 1992-2012.

Pigeon Guillemots *Cepphus columba*

There are 28 Pigeon Guillemot nest boxes at Lookout Point. Boxes #1-10 were installed in 2001 and boxes #11-28 in 2010. The use of nest boxes 1-10 has stabilized at a high occupancy level, since the birds are accustomed to them (Fig. 5).

Boxes were checked at the beginning of the season to ensure they were intact. One box had been damaged over the winter (box #3) and was unusable. Boxes were then checked at the end of the

season (12 July), to determine activity. Eight of the 10 original boxes were active, all containing chicks and one with one egg and two chicks. Eight of the 18 new boxes were active: four with chicks, three with live and dead chicks, and one with an egg. No banding was done this year.

Due to the cooler weather this year, temperature was not a concern for the nest boxes and no shades were installed.

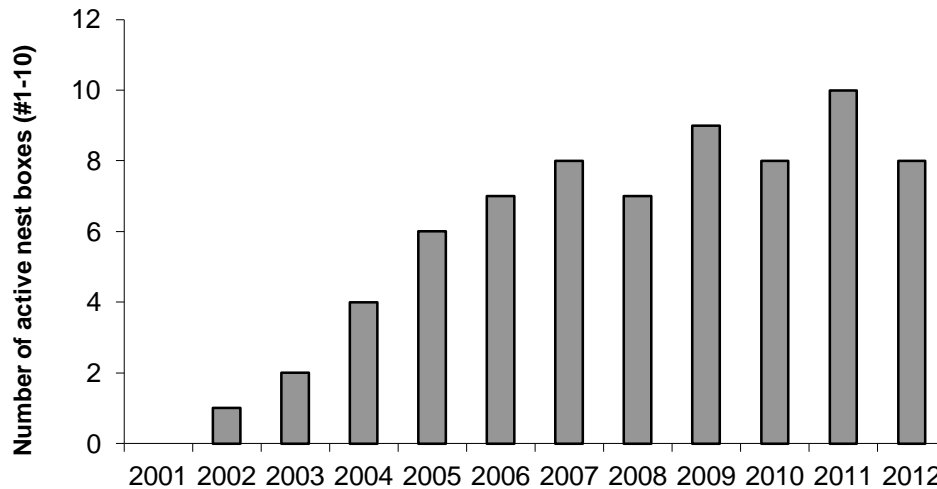


Figure 5. Use of nest boxes #1-10 by Pigeon Guillemots, Lookout Point, East Limestone Island, 2001-2012.

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, partly attributed to predation by introduced raccoons. Each season we monitor several locations on the island for breeding activity in order to obtain an index of the breeding population.

Cassin's Auklet breeding activity was monitored again this year at both Lookout Point and at the East Coast plots. Knock-down sticks were placed at the entrances of all known burrows (natural nest cavities) and nest boxes (artificial nest cavities) early in the season and were checked every 4-5 days.

A total of 41 nest boxes were monitored at the East Coast plots (North and South), and 25 at Lookout Point. Seven boxes contained chicks: four in North Plot (#18, 23, 25, 30), one in South Plot (#4), and two at Lookout Point (#6, 7). Chicks were weighed at five day intervals and two chicks were banded. The chick from #18 fledged between 21 and 26 June. There was one chick remaining (#23) at the end of the season. The other 5 chicks died before fledging, presumably from a shortage of food in the local area. Cassin's feed mainly on krill and it was presumed this feed was further offshore this year, making it more difficult for adult birds to bring food to their young.

Burrows were also monitored at the East Coast site and Lookout Point with knockdown sticks set up to determine activity. There were a total of 25 active burrows at the East Coast site, and five at Lookout Point. There was no monitoring of Cassin's Auklet burrows at Cassin's Tower. We also set up an infrared, motion activated camera in front of nestbox #25 and got several photos of the adult entering the box and the chick in the entrance way.

The amount of Storm petrel activity this season was similar to average, based on the number of days the species was recorded in the daily bird checklist (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 NE of funnel 6 and more infrequently near Lookout Point.

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 Cumshewa Island and South to Haswell Island. Three near-shore surveys were completed this year: 23 May, 9 June and 19 June. On these surveys we counted 15 species: Bald Eagle, Marbled Murrelets, Pigeon Guillemots, White-winged Scoters, Pelagic Cormorants, Common Loons, Ancient Murrelets, Rhinoceros Auklets, Common Merganser, Harlequin Duck, Glaucous-winged Gulls, Black Oystercatchers, Pacific Loons. A total of 15, 55 and 22 Marbled Murrelets were counted on the 23 May, 9 June, and 19 June surveys, respectively. These numbers were much lower than those in previous years.

Hecate Strait surveys

This survey takes us approximately five nautical miles into Hecate Strait, and allows us to see species that tend to stay farther from shore. Due to poor weather and lack of time we only completed one Hecate Strait survey this year, on 28 May. Sightings included Common Murres, Sooty Shearwaters and Cassin's Auklets.

Marine Mammals

We kept a daily record of all marine mammal sightings, with the exception of Harbour seals (*Phoca vitulina*) and Stellar sea lions (*Eumetopias jubatus*). These species are counted at specific haulouts during sea surveys in order to keep an index of population trends. The results of this season's sightings are summarized in Table 5.

Table 5. Total counts of marine mammals from sea surveys, sea watches and other sightings, 2006-2012[†].

Common Name	Scientific name	2012	2011	2010	2009	2008	2007	2006
Dall's porpoise	<i>Phocoenoides dalli</i>	0	8	0	0	0	0	0
Grey whale	<i>Eschrichtius robustus</i>	1	1	0	0	0	0	1
Harbour porpoise	<i>Phocoena phocoena</i>	4	19	0	10	0	1	4
Humpback whale	<i>Megaptera novaeangliae</i>	14	193	86	102	261	203	91
Killer whale	<i>Orcinus orca</i>	13	49	11	14	18	26	4
Minke whale	<i>Balaenoptera acutorostrata</i>	2	1	0	0	1	3	1
Pacific white-sided dolphin	<i>Lagenorhynchus obliquidens</i>	0	0	46	334	0	81	365
California sea Lion	<i>Zalophus californianus</i>	0	1	1	0	0	4	0

[†]Harbour seal *Phoca vitulina* and Steller 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 far fewer humpback sightings this year than in previous years. Some tour boats reported seeing the whales much further out into Hecate Strait this year, indicating the feed was further offshore. The 14 humpbacks we did encounter were relatively close to shore and all appeared to be travelling, not feeding.

Killer whales

There were five sightings of Killer whale groups this season, and we were able to take ID photographs of three of these groups. Identification of individuals from these photos helps contribute to the Killer whale database at the Pacific Biological Station in Nanaimo. All five sightings were in the Laskeek Bay area; none were seen in Gwaii Haanas this year.

Steller's sea lions

There are several sea lion haulouts in Laskeek Bay. The largest of these is on the East end of Reef Island and there are smaller haulouts on the Skedans Islands, Cumshewa Rocks and Helmet Island. We regularly count the number of individuals on the Reef and Skedans haulouts. The maximum number counted this season was 521 individuals at Reef (10 May) and 68 at Skedans Islands (10 May). Occasionally we sight branded sea lions that have been individually marked by researchers in Alaska. On 8 June, we saw a branded individual (904R) at Reef Island on the outer rock. No California sea lions were seen or heard this year.

Other species

There were few marine mammal sightings overall this year, although a few are worth noting. A Grey whale was seen on 23 May, just off of Limestone Island, travelling south. Two Minke whales were seen this year: one on 8 June and one on 10 July, both within one mile of Low Island. No Pacific white-sided dolphins were seen this year.

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 139 wildlife trees have been identified over the past 23 field seasons. New trails allowed some of the more difficult trees in the blow-down to be more accessible.

We had a total of 14 active trees this season, three of which were newly identified this year. Eight nests were occupied by Red-breasted Sapsuckers, two by Chestnut-backed Chickadees, one by Hairy Woodpeckers, one by Brown Creepers and one by Red-breasted Nuthatches (Table 7). The last time a Red-breasted Nuthatch was found nesting on Limestone was in 1996.

Table 6. Wildlife tree activity on East Limestone Island in 2012. †

Tree #	Cavity Nester	Tree Species	Fledge Date*
12	RBSA	Ss	14 June
98	RBSA	Ss	19-22 June
103	BRCR	Hw	14-23 June
107	RBSA	Ss	19 June
109	RBSA	Ss	19-22 June
113	RBSA	Hw	12-15 June
115	CBCH	Hw	24 June
120	CBCH	Ss	28 June-8 July
129	RBSA	Hw	13-15 June
131	HAWO	Hw	2-7 June
134	RBSA	Hw	24 June
137	RBSA	Ss	19-21 June
138	RBNU	Ss	24 June
139	RBSA	Ss	19-20 June

†RBSA = Red-breasted Sapsucker, CBCH = Chestnut-backed Chickadee, BRCR = Brown Creeper, Ss = Sitka spruce, Hw = Western hemlock.

*Fledge dates not determined for many of the trees. For dates given as a range, fledging may have occurred on any day between the dates given.

NATURAL HISTORY

Daily Bird Checklist

We keep a daily record of all the bird species seen or heard within Laskeek Bay. The two highest counts this year were the first two days of camp: 38 on 4 May and 36 on 5 May. A total of 64 species were seen this season. Bald Eagles, Common Ravens, Black Oystercatchers, Glaucous-winged Gulls, Pigeon Guillemots and Northwestern Crows were recorded most frequently. The less frequently sighted species this season included a Wilson's Warbler, Red-breasted Nuthatch, Northern Flicker, Red-tailed Hawk, Tree Swallow, Spotted Sandpiper, Western Sandpiper, Surfbird, Whimbrel (four sightings), and Red-throated Loon. A pair of puffins was also seen this year (11 July) flying north near South Low. The last time a Tufted Puffin was seen in Laskeek Bay was in 2009.

There were more daily recordings of woodpeckers this year than in the past. Hairy Woodpeckers were recorded 44 days and Northern Flickers were recorded 52 days (out of 59 days). In 2011, Hairy Woodpeckers were recorded 29 days and Northern Flickers one day (out of 61 days). This could be due in part to the more open forest post blow-down, with more dead trees available for nesting or feeding.

Raptors & Corvids

Like 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.

Three pairs of Bald Eagles were confirmed nesting this season on Limestone Island: two in previously identified trees BAEA-3 and BAEA-7 and one in new tree BAEA-9.

The Peregrine Falcon had three chicks this year at their usual location along the south cliffs. The nest ledge was observed on 29 May at which point an adult was observed feeding three downy chicks. It is unknown when the chicks fledged.

The Common Raven nested in the same tree as last year. Young chicks could be heard from the main trail in early May and were confirmed in the nest 9 May. The chicks were confirmed fledged by 27 May and could be seen in the trees nearby.

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. Throughout the season we keep a record of the dates on which particular species were first observed in bloom. Anecdotal observations suggest that plants bloom much earlier on islands such as S. Low where deer are absent.

A number of rare plants are present on Limestone due to the unique limestone geology which is uncommon on the rest of the islands. These plants are Showy Jacob's Ladder (*Polemonium pulcherrimum*), Few-flowered Shootingstar (*Dodecatheon pulchellum*), Richardson's Geranium (*Geranium richardsonii*), and Cut-leafed Anemone (*Anemone multifida*). Tufted Saxifrage (*Saxifraga cespitosa*) was found in one spot on the cliffs in boat cove, although it was washed away by the winter 2010 storms.

Lichenologist Stu Crawford spent a week volunteering this year identifying different lichen specimens on Limestone Island. He identified a large number of Plasmata, Lobaria, Pseudocyphellaria, Nephroma, and Peltigera species as well as many others. He also found a more rare Lichenompholium sp., growing on a rotten log near Cassin's nestbox #1 (East Coast, South Plot). See the separate report titled 'Lichens of East Limestone Island' (May 2012) for more details.

Invasive plants that are established on Limestone include: bull thistle (*Cirsium vulgare*), Canada thistle (*Cirsium arvense*), prickly Sow-thistle (*Sonchus asper*), and wall lettuce (*Lactuca muralis*). No invasive plant control work has been done on Limestone in the past two years.

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 the rest of Haida Gwaii.

RGIS is currently working on a project titled BAMBI (Behavioral Adjustments to Mitigate Biodiversity). This study looks at how the deer of Haida Gwaii have adapted to life without fear of predators, their effect on the vegetation, and what happens if you introduce fear/predation through limited hunting and scaring with blanks. Preliminary data on intertidal foraging by deer is also collected to better understand the possible role of that in helping deer maintain high numbers on islands with severely browsed understories. The researchers and local support assistants are based at the field camp on Reef Island and work there as well as East Limestone Island and Kunga Island. They have radio collared 10 deer on Limestone Island, five male and five female.

On Limestone Island, there is only one of the original three deer exclosures remaining since the blow-down. This 20x20m exclosure is there to demonstrate the impact of deer browsing on native vegetation. The understory vegetation (huckleberry, salal, ferns, and young trees) in the interior of this exclosure is almost entirely absent from areas that deer can access.

We also started recording all deer sightings on Limestone Island this year to assist with the BAMBI project. The date/time, location, tag colour/number, collar and sex were recorded along with any behavioural notes.

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 are likely to experience rapid decline where these predators become established on colonies.

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 in 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.

In March, director Jan Oord and trapper Len Morgan came to Limestone to monitor for raccoons. They spent seven nights (24 March to 31 March) searching the island by foot for signs of raccoons. They did not find any evidence of raccoons on Limestone, although they did see many on adjacent Vertical Point. They set traps on Vertical Point although none were successful. In April, Jake Pattison visited Vertical Point and successfully shot and killed one raccoon.

To continue monitoring for raccoons throughout the Ancient Murrelet season we set up two infrared cameras on Limestone, baited with sardines and cat food. One camera was stationed in Anemone Cove and one near the cache. These cameras, along with those from RGIS, were set for the majority of the field season and captured photos of deer, ravens, and deer mice, but no raccoons.

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. This year we conducted six squirrel surveys.

CONCLUSION

This season was our 23rd 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 allowing 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.

We continue to document a serious decline in the Ancient Murrelet breeding population on Limestone Island. With a concerted effort to keep raccoons off Limestone during the breeding season, and by implementing social attraction techniques, we hope to reverse this downward trend. The major windstorm events in the winter of 2010/2011 caused heavy blow-down in a large area of the colony. The amount of blow-down has prevented us from continuing our regular funnel monitoring work in North Cove, although cameras did indicate that at least some parts of the colony are still active. 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.

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- Mountain Equipment Co-op
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