

## **EAST LIMESTONE ISLAND FIELD STATION**

### **FIELD SEASON REPORT 2010**



#### **SUMMARY**

This marks Laskeek Bay Conservation Society's 21<sup>st</sup> field season on Limestone Island, Laskeek Bay. The 2010 season ran from 1 May to 9 July, bringing 20 volunteers, 5 school groups (from three schools), and 45 visitors to the island. Ancient Murrelet chicks were again captured at North Cove, and total numbers increased this season, particularly in the colony area near camp. No raccoon activity was detected on the island this season. We monitored Black Oystercatcher territories in Laskeek Bay, where we found 25 occupied territories, 15 with chicks or eggs at some point in the season. We banded only 3 oystercatcher chicks this season and re-sighted 16 birds banded in previous years, one of which has occupied the same breeding territory on Reef Island for 11 years. Two 5-day oystercatcher surveys were completed in Gwaii Haanas. We completed a census of Glaucous-winged Gull colonies in Laskeek Bay, and found four colonies active with a total of 215 nests containing eggs or chicks; fewer than in previous years. Pigeon Guillemots used 8 of the 10 nest boxes at Lookout Pt, and 5 Cassin's Auklet nest-boxes were active with adults incubating eggs, but only one chick fledged. We completed two sea-surveys and recorded a maximum count of 50 Marbled Murrelets on 20 June. We recorded fewer Humpback whale sightings compared to previous years. Killer whales were encountered on three occasions in Laskeek Bay, and once in Gwaii Haanas. Eighteen wildlife trees were monitored, and contained nests of 11 Red-breasted Sapsuckers, 3 Chestnut-backed Chickadees, 1 Hairy Woodpecker, and 4 Brown Creepers. This number of Brown Creeper nests was the highest recorded. Peregrine Falcons successfully fledged two chicks and Common Ravens also had two young.

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### INTRODUCTION

Laskeek Bay Conservation Society (LBCS) is 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 operating for 21 years with 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, and other threats to coastal ecosystems.

### EDUCATION AND INTERPRETATION PROGRAM

LBCS continues to involve 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 to assist in some of the monitoring work.

#### **Project Limestone**

Project Limestone has for 20 years brought local students to Limestone Island to participate in Ancient Murrelet research. The students are led on an interpretive walk across the island and are given an introduction to the projects that we run. A walk to Lookout Point allows the students to learn more about the natural history and geography of the area, and ends with a panoramic view of Laskeek Bay. The group then assists with the Ancient Murrelet work from 10:30 pm to 2:30 am, which involves capturing chicks and weighing them before releasing them near the ocean.

The group then spends the remainder of the night in the Visitor's cabin before heading back to their camp at Vertical Point the next morning.

Five groups with a total of 31 students and 10 teachers / chaperones visited Limestone Island this year. The groups represented three local schools: Anges L. Mathers School (Sandspit) on 11 and 12 May, Queen Charlotte Secondary School on 19 and 21 May, and Tidal Elements on 24 and 25 May. This was the first time that Tidal elements had visited the island. Since 1991, 590 students have visited the island as part of this program.

### **Volunteers**

Volunteers continue to play an integral role in the operation of the field camp on Limestone Island. Volunteers generally stay for one week and work alongside field staff, contributing their time and energy to the 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.

A total of 20 volunteers visited the island this year contributing 165 volunteer days to projects, both on Limestone, on surrounding islands, and within Gwaii Haanas. Five of the volunteers had been to the island in previous years. The majority of volunteers stayed for one week, with three staying for two weeks and one for 4 days. Volunteers came from a variety of places: six were from Haida Gwaii, eleven from elsewhere in BC and three from other countries (Germany, France, China).

Executive Director, Christine Pansino assisted in camp during the first week and LBCS Director, Keith Moore volunteered during the second week.

### **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 visitor groups that have visited Limestone in the past are part of ecotourism excursions in Gwaii Haanas.

While there were no formal tours booked in 2010, we received several impromptu visits from Moresby Explorers (13 May, 25 May, 25 June, 6 July) and Gwaii Haanas staff (31 May, 4 June). Rob Pettigrew and Shirley Ireland stopped in on 11 May, and a group of 15 from the *Island Roamer* took a short walk to see the deer exclosures on 11 June. In total, there were 45 people that visited the island this season (not including visits by the crew from Reef).

The Reef Island field camp was also up and running this year with Dr. Tony Gaston, Jean-Louis Martin, Akiko Shoji, Myra Burrell, Simon Chollet, Simon Chamaille-James, Flore Saint-Andre, Malcolm Hyatt, Jake Pattison and Erin Harris working there for varying lengths of time between 13 April and 21 June. We receive frequent visits from the Reef Crew, some of who were completing work on Limestone.

Akiko Shoji stayed with us on Limestone from 28 May – 9 July while she worked on an independent Pigeon Guillemot project at Lookout Point. Simon Chollet and Flore Saint-Andre were also in camp during the last week while they completed their work of vegetation plots.

**Staff**

LBCS Staff this year consisted of Christine Pansino (Executive Director), Jake Pattison (Camp Supervisor / Biologist), and Ainsley Brown (Assistant Biologist / Interpreter). Ainsley Brown worked in camp 14 May to 25 June and then took over as interim Executive Director at the LBCS office on 28 June.

A 6 week student Intern Position was created this season. Shari Ikoma (Burnaby) completed an internship over the last half of the field season. This position was vacant in the first half of the season.

## RESEARCH AND MONITORING PROGRAMS

### **Ancient Murrelets** *Synthliboramphus antiquus*

#### *Monitoring Program*

Since 2007 LBCS has focused on reducing the impact of research related activities within the Ancient Murrelet colony. No chick capture work was carried out in the North Cove colony area for a three year period (2007 – 2009), during which time this area was off-limits and not visited during the breeding season. Chicks were again captured in North Cove in 2010, and like our activities at Cabin Cove, involve only weighing and releasing chicks. In this way we are confident that we are having an absolute minimum impact on departing chicks, while still gathering information on population trends and condition of chicks on departure. Comparison of data collected this season in North Cove and Cabin Cove gives some insight into the impact of our activities during the breeding season.

#### *Chick capture work*

Eight chick-capture funnels (numbers 1-8) were monitored in Cabin Cove and North Cove beginning on 7 May. Funnels were checked at a regular interval (10-15 minutes) and we recorded date, time, location (funnel number) and mass for each departing chick. 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 8 May and the last on 2 June. In total, 285 chicks were captured in funnels 1 to 8 (Fig. 1). The peak night of departures (34 chicks captured) occurred 21 May. The number of chicks recorded this season in funnels 5-8 showed an increase from last season (Table 1).

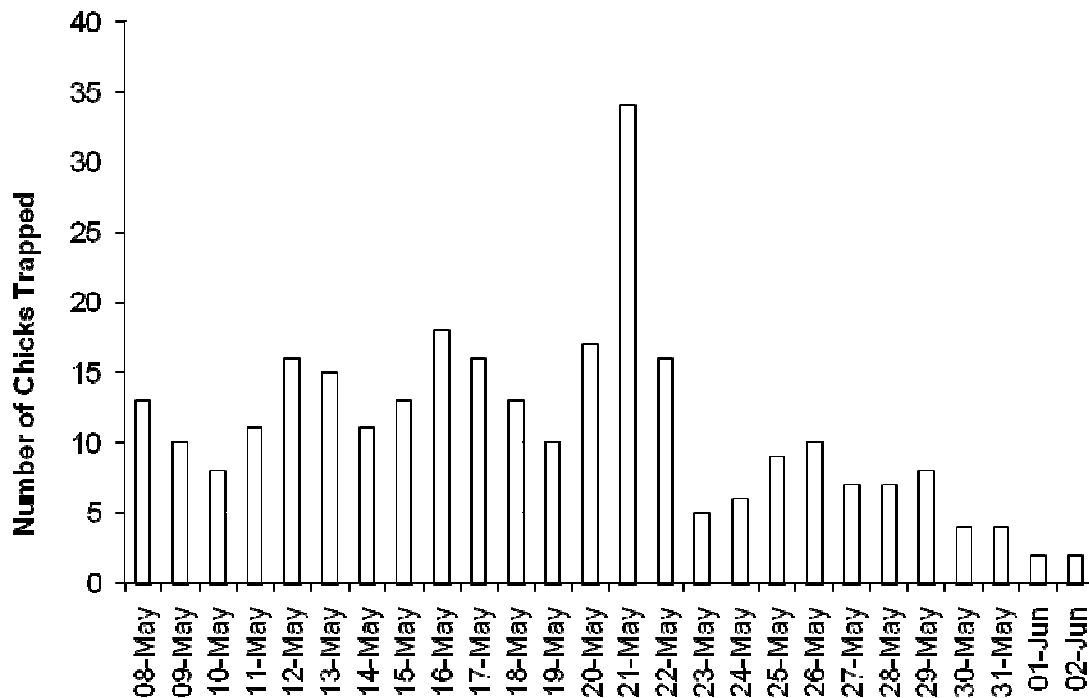


Figure 1. Nightly chick captures, Funnels 1-8, East Limestone Island, 8 May – 2 June 2010.

Table 1. Summary of chick departures, peak nights and totals for funnels 5 to 8 on East Limestone Island 2006 to 2010.

<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

*Funnels 5 & 6*

As of this season, funnels 5 and 6 have been monitored continuously for 21 years, and are our 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&6 and funnels 7&8 do not suggest a shift in the colony area.

There were a total of 86 chicks captured this season in funnels 5 and 6 which is a 30% increase from the total caught in 2009 (Fig. 2). First chicks arrived early this season, but peak night

occurred on 21 May, the mean date for peak departures (Table 2). Chick captures ended earlier than average this season and total days with chicks was similar to previous years (Table 2).

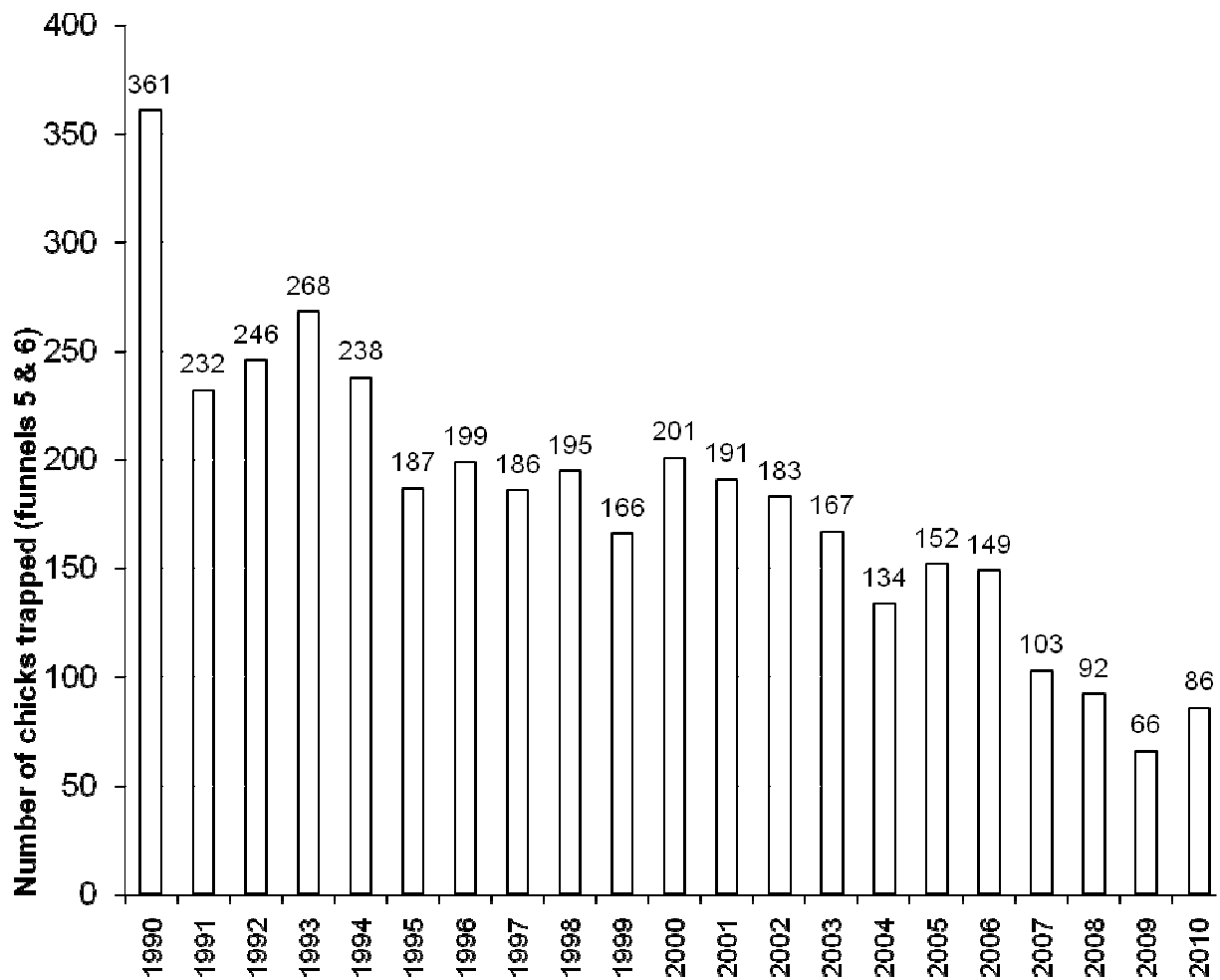


Figure 2. Total Ancient Murrelet chick captures at funnels 5 and 6 East Limestone Island, 1990-2010.

Table 2. Summary of chick departures, peak nights and totals from funnels 5 and 6 on East Limestone Island, 1990 to 2010.

Year	1st night with chicks	Peak night	Peak count	Last night	Total days	Total chicks
1990	13-May	20-May	28	15-Jun	33	361
1991	10-May	25-May	22	05-Jun	26	232
1992	14-May	22-May	29	02-Jun	19	246
1993	12-May	18-May	39	04-Jun	23	268
1994	08-May	20-May	29	06-Jun	29	238
1995	11-May	23-May	18	12-Jun	32	187
1996	11-May	18-May	17	07-Jun	27	199

1997	13-May	28-May	22	05-Jun	23	186
1998	11-May	20-May	23	20-Jun	40	195
1999	11-May	21-May	22	09-Jun	29	166
2000	11-May	21-May	22	06-Jun	26	201
2001	11-May	19-May	21	15-Jun	35	191
2002	09-May	21-May	33	01-Jun	23	183
2003	11-May	21-May	19	03-Jun	23	167
2004	08-May	16,17-May	15	01-Jun	24	134
2005	07-May	19, 23-May	12	05-Jun	29	152
2006	10-May	21-May	20	31-May	21	149
2007	15-May	04-Jun	16	12-Jun	28	103
2008	13-May	20,22,23-May	8	03-Jun	21	92
2009	12-May	18,19-May	10	29-May	19	66
2010	8-May	21-May	16	2-June	25	86
Average ± SD	10-May ± 2.1 days	21-May ± 4.0 days	21 ± 7.5 chicks	6-Jun ± 5.6 days	26 ± 5.4 days	181 ± 68 chicks

#### *Funnels 1-4*

Chicks were captured in funnels 1-4 using the same protocol as funnels 5-8. First chicks were captured on 8 May and last chicks on 31 May. Peak night occurred on 21 May (15 chicks), however the median departure date was earlier for these funnels (17 May) compared to funnels 5-8 (20 May). A total of 164 chicks were caught in funnels 1-4, a 45% decrease from when chicks were last captured from these funnels in 2006 (Fig. 3).

The proportionate distribution of chick numbers between funnels 1-4 and funnels 5&6 has changed over time (Fig. 4). Overall, the percentage of chicks captured in funnels 5&6 has declined relative to the numbers captured in funnels 1-4. However, it appears that this trend has stabilized since approximately 2002. In 2010, funnels 5&6 did better in comparison to funnel 1-4 than in any year since 2001 for which data is available. This increase in chicks numbers in the area around camp relative to North Cove provides strong evidence that research activities as they are now conducted are not implicated in the continued decline of the colony.

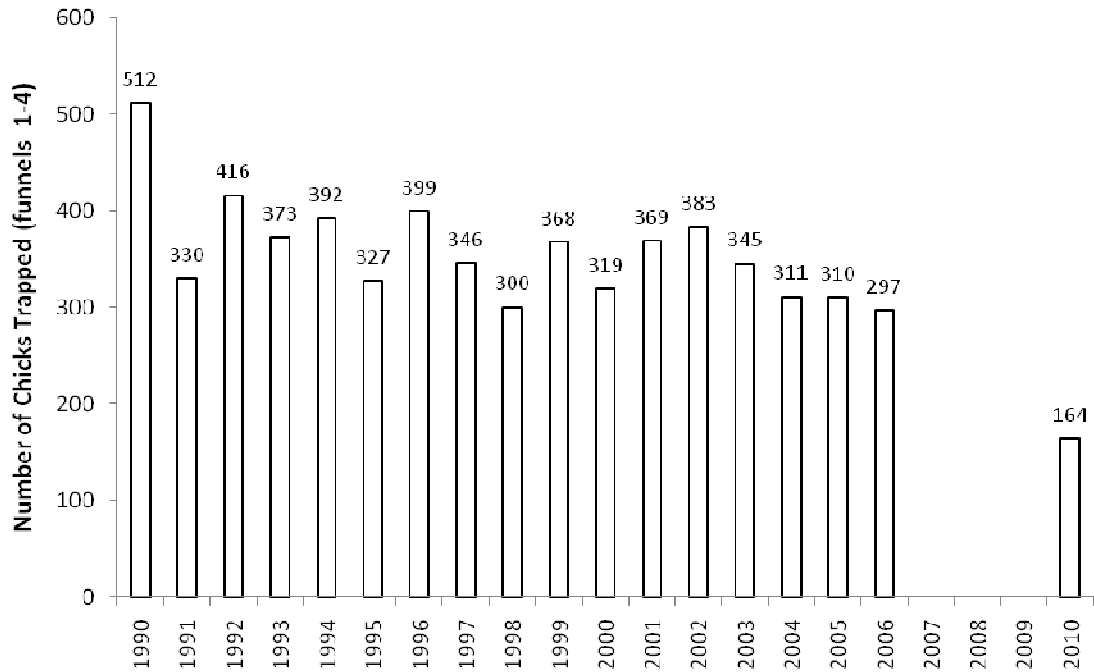


Figure 3. Total Ancient Murrelet chicks captured at funnels 1-4, East Limestone Island, 1990-2010.

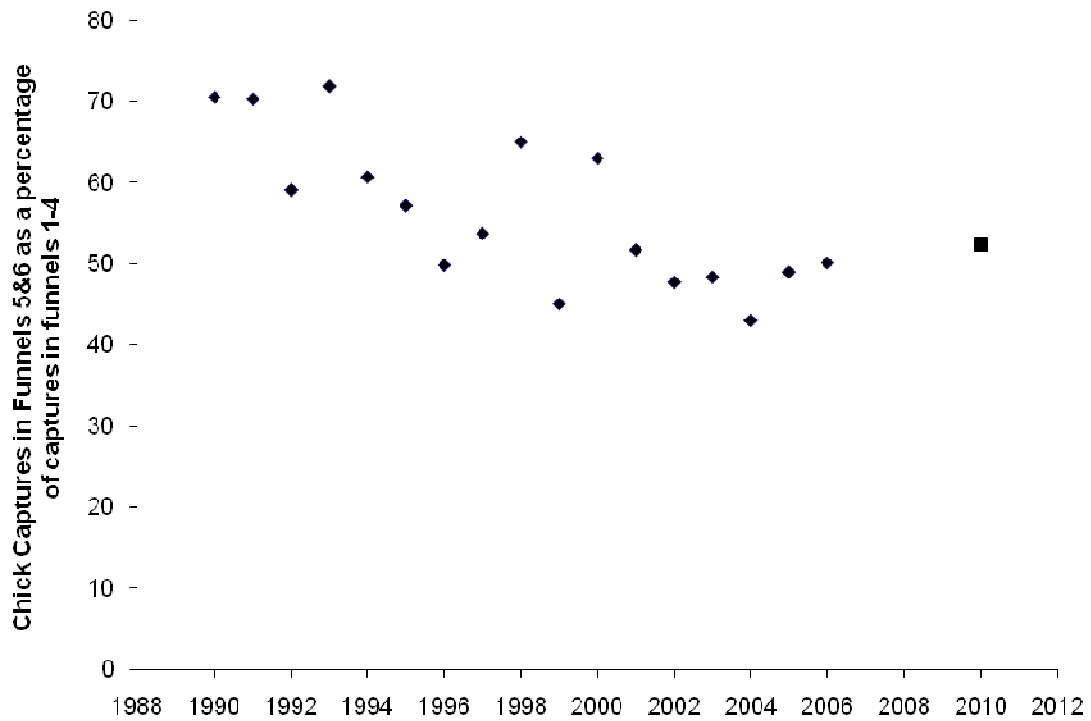


Figure 4. Proportionate distribution of chick captures between funnels 5&6 and funnels 1-4, 1990-2010.

*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 important social interactions also take place during this time. The Limestone Island gathering ground is located between Low Island and Limestone and this season, as in the past, we conducted standardized 10 minute counts of birds on the gathering grounds between 5 May and 20 June. The peak count occurred on 17 May, with a total of 203 birds observed; an unusually high number. Counts averaged ( $\pm$ SD)  $26.9 \pm 39.8$  this season, consistent with the downward trend in numbers that has been observed over the years.

#### *Point counts*

We conducted point counts in the colony area to monitor the activity of adult birds. Five minute counts were made at approximately 2:30 each night for the period of 21 May to 4 June. Counts were conducted both at Cabin Cove and North Cove colony areas. Maximum counts occurred at Cabin Cove on 22 May (10 individuals; 108 calls), and at North Cove on 21 May (8 individuals; 68 calls) but most nights were much quieter. No birds were recorded during the 1 June count.

#### *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 as we check funnels. We also scan feather piles, raven pellets and other predation remains looking for bands. A total of 4 banded birds were recaptured from the funnels in 2010. Two of the birds were banded as chicks (1990, 1994) and two as adults (1990, 2002). Murrelets breed at a minimum age of 2 years making the adult banded in 1990 a minimum of 22 years old, the second oldest record for an Ancient Murrelet (a bird was re-captured on Reef Island in 2009 with a minimum age of 25). There were no bands recovered from predation remains this season.

#### *Predation transects*

To estimate predation rates in the colony, we checked for predation remains along 5 fixed, 20m wide transects. Transects were cleared of remains on 8 May and checked weekly until 30 May, for a total of three surveys. During surveys we were careful to remove remains, or otherwise mark them to avoid double-counting on subsequent weeks. Transects cover 1.6 ha of the total 12.6 ha area that the colony is estimated to cover. Based on this season's predation transects, a minimum of 8 adult murrelets were estimated to have been killed by predators in the colony area over the 3 weeks period (2.7 birds per week). This estimate is conservative, as it is based only on feather piles and carcasses and excludes wings which are potentially associated with feather piles. This estimate is dramatically lower than in previous years: the estimate in 2009 was 20.4 birds per week, and 70.6 per week in 2008. Field staff noted that there were very few predation remains in the forest this season in comparison with previous years. Native predators on Ancient Murrelets include Common Ravens, Peregrine Falcons, Bald Eagles, and River Otters (*Lutra Canadensis*). All these species were observed this season, although the amount of otter activity seemed reduced this year. There were no signs of Raccoons on Limestone Island this season, perhaps accounting for a reduction in predation.

#### *Population trends*

The number of departing Ancient Murrelet chicks has shown major decline over time (Fig 2). The colony census completed in 2006 estimated  $\pm$  (SE)  $509 \pm 132$  breeding pairs compared to  $1273 \pm 254$  pairs estimated in 1995. Chick numbers declined by another 56% between 2006 and 2009 in funnels 5&6 indicating a rapidly shrinking breeding population. In 2010, chick numbers in funnels 5&6 increased by 30%, likely due to the apparent absence of Raccoons in the colony this season. Funnels 1-4 in North Cove have not seen a rebound in chick numbers relative to

Cabin Cove over the closed period. In fact, it appears that in 2010 there was re-colonization taking place in Cabin Cove at a greater rate than in North Cove, based on both the later median date of departure and the shift in distribution of chick numbers that is apparent in Cabin Cove compared to North Cove.

### **Black Oystercatchers *Haematopus bachmani***

#### *Background*

LBCS has been monitoring the breeding population of Black Oystercatchers in Laskeek Bay since 1992. 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. Each season we attempt to locate all breeding Oystercatchers within Laskeek Bay between Cumshewa Island and Lost Islands by visiting known territories and scanning for new territories. In the past, the shoreline of Louise Island was not included in the survey, but since 2005 the shoreline area between Dass Point and Nelson Point has also been included. A breeding territory was located on Haswell Island in 2009 and is now included in the survey as well.

LBCS was again contracted in 2010 to complete oystercatcher surveys within Gwaii Haanas. Two surveys were completed within Gwaii Haanas in 2010. The first survey was conducted 6-10 June and the second survey 27 June – 1 July. The survey area was extended slightly in 2010 and methodology standardized. Survey length was increased to 5 days to account for these changes.

#### *Site occupancy and reproductive success*

In Laskeek Bay, most visits to oystercatcher territories occurred in late June. In most years, territories are checked beginning in late May or early June, but the schedule of the Gwaii Haanas surveys did not allow this in 2010. We visited all territories known to have been active in past years and also completed shoreline surveys of all areas except E. Limestone Island, S. Low Island and Haswell Island. 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. In total we found 33 territories being occupied by adult birds, and of these, 21 had eggs or chicks at some point during the season. Since most areas were only visited once this season, there was little information gathered on timing of laying, chick hatch dates or chick survival. Only three chicks were banded this season, all on Kingsway Rock.

#### *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. Birds re-sighted in Laskeek Bay are summarized in Table 3. Banded birds were also re-sighted in Gwaii Haanas and these are summarized in Table 4. The oldest birds sighted this year were banded as adults in 2000. The band number was read on one of these individuals: it is still occupying the same territory on Reef where it was banded 11 years ago. There were 16 sightings of banded birds in Laskeek Bay and 10 sightings in Gwaii Haanas this season. Figure 5 presents the number of birds banded and re-sighted in Laskeek Bay over the period 1992-2010.

Table 3. Banded Black Oystercatchers re-sighted in Laskeek Bay in 2010.

<b>Band combination (Left - Right)<sup>1</sup></b>	<b>Location seen / Nest site</b>	<b>Year Banded</b>	<b>Banded as Adult or Chick</b>
W-LG/M	Low Island, non-territorial bird	2008	Chick
UB-M	Skedans Islands, non-territorial bird		
UB-M	SKE-6, both members of pair banded		
UB-M	SKE-6, both members of pair banded		
AL-BK/M	Cumshewa Island, not clearly associated with a territory	2000	Adult
UB-M	North side of Reef Island East of Camp		
UB-Or/M	LOS-2, one individual of 3 present in territory	2004	Chick
W-LG/M	In group of 6 non-territorial birds near REE-7	2008	Chick
M-UB	REE-11. New territory on S. Side of Reef Island. Both members of pair banded.		
UB-Br/M	REE-11. New territory on S. Side of Reef Island	2001	Chick
UB-M	REE-1. Band number 63028.	2000	Adult, REE-1
UB-Y/M	LOU-2. In group of three adults present at territory.	2007	Chick
UB-M	KNG-3		
UB-R/M	SLW-1. Both members of pair banded.	2003	Chick
UB-Bk/M	SLW-1. Both members of pair banded.	2000	?
UB-Y/M	East end of Reef Island (sealion haulout)	2007	

<sup>1</sup>Band codes: UB = unbanded (birds can lose bands), M = metal, Or = orange, W = white, LG = Light Green, R = Red, Bk = Black, Br = Brown, Y = Yellow

Table 4. Banded Black Oystercatchers re-sighted in Gwaii Haanas, 2010.

Survey	Band combination (Left - Right) <sup>1</sup>	Location seen / Nest site	Year Banded	Banded as Adult or Chick
1	UB-M	EM-560-4-1, may be from EM-560-4-2	unknown	Chick
1	W-W/M	E. side Ramsay Island in group of 7	2009	Chick
1	DB-DB/M	N. side Faraday Island in group of 6	2006	Chick
1	DB-DB/M	E. end House island, member of a pair	2006	Chick
2	UB-Or/M	EM-470-6-1 (last 4 digits of band: 6906.)	2004	Chick, 470-4-1
2	UB-DB/M	EM-560-4-1, may be from EM-560-9-1	2006	Chick
2	DB-DB/M	N. side Faraday Island in group of 7. May be same individual that was sighted on first survey – same location.	2006	Chick
2	W-W/M	E. side Ramsay Island in group of 8. May be same individual that was sighted on first survey – same location.	2009	Chick
2	UB-Or/M	N. shore Ramsay Island in group of 5	2004	Chick
2	UB-DB/M	EM 560-9-1, member of pair	2006	Chick

<sup>1</sup>Band codes: UB = unbanded (birds can lose bands), M = metal, Or = orange, DB = dark blue, W = white

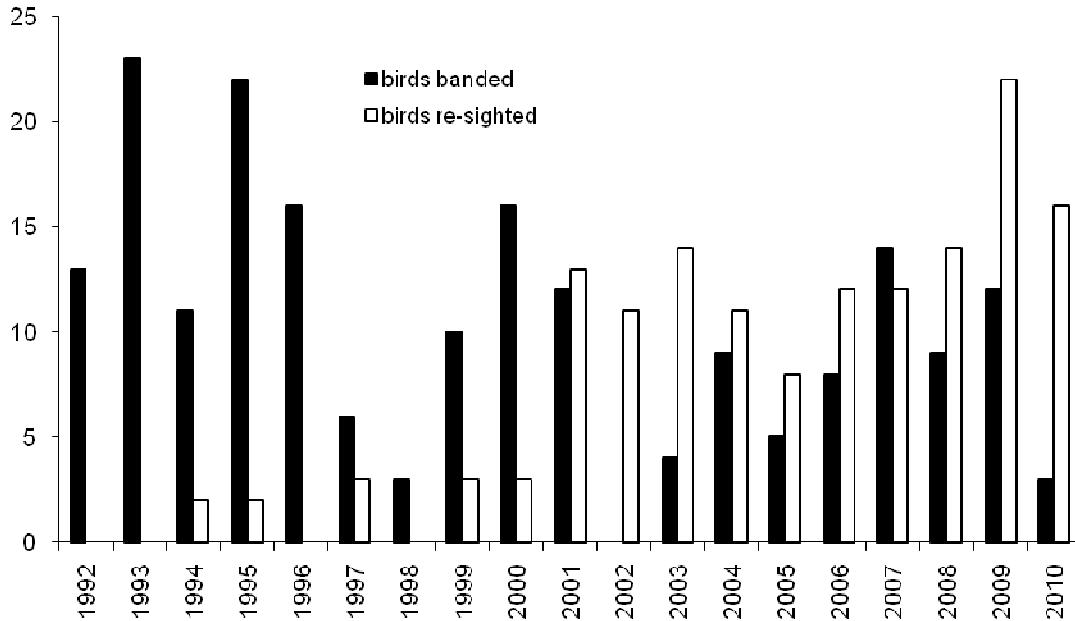


Figure 5. Number of Black Oystercatchers banded and re-sighted, Laskeek Bay, 1992-2010.

#### Chick Diet

Oystercatchers feed their chicks hard-shelled invertebrates which they bring intact to the breeding territory. We collected prey remains from 7 territories in Laskeek Bay in order to quantify average diet composition being fed to the chicks. Limpets were the primary prey item (67%),

followed by mussels (21%) and chitons (11%) (Fig. 6). These three items made up more than 99% of the diet, consistent with what has been found in past years.

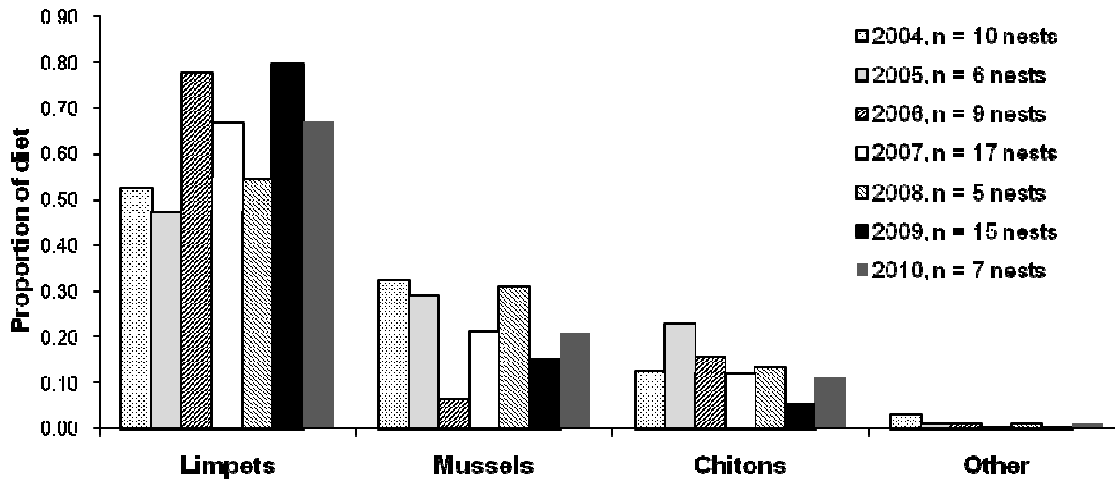


Figure 6. Black Oystercatcher chick diets from prey items collected at nest sites in Laskeek Bay 2004-2010.

### **Glaucous-winged Gulls *Larus glaucescens***

Since 1992, LBCS has been censusing gull colonies within Laskeek Bay (Fig. 7). We visited sites where gulls were found nesting in the past and also kept an eye out for signs of new activity. Between 29 May and 21 June we visited occupied colonies and counted the number of active nests. Lost Island, the largest colony in the area had a total of 195 active nests (21 June), followed by Kingsway Rock with 17 nests (29 May), Low Island with 2 nests (19 June), and Skedans Islands with a single nest. Because Kingsway Rock was visited in May, the number of nests is probably an underestimate of the total active in June. In total we counted 215 nests on these three colonies containing either 1 egg (13% of nests), 2 eggs (19%), 3 eggs (68%). No chicks were seen hatched at any of the colonies. Only one nest was active at Skedans Islands this season. We did not find activity at Cumshewa Island or at any other locations. The total number of nests counted this season is below the long-term average ( $\pm$ SD) of  $256 \pm 73$ .

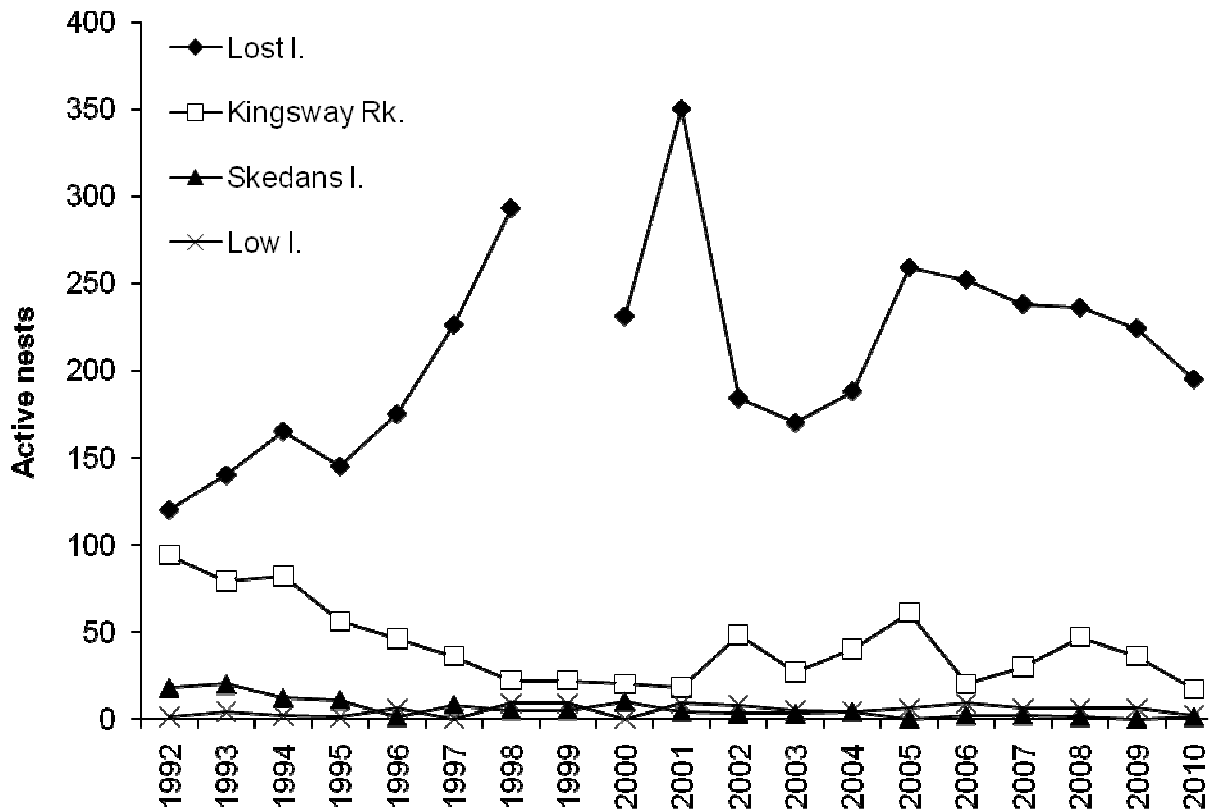


Figure 7. Glaucous-winged Gull nests containing eggs or chicks at four colonies in Laskeek Bay, 1992-2010.

### Pigeon Guillemots *Cepphus columba*

Ten nest boxes for Pigeon Guillemots were installed at Lookout Point on Limestone Island in 2001. Use of the boxes increased steadily until 2007 and there has been a high level of occupancy since then (Fig. 8). We checked the boxes in early May to make sure that the boxes were intact and contained enough gravel. Boxes were checked again at the end of the season (9 July), and we found 8 boxes active, containing either chicks (7 boxes) or eggs (1 box). Of the 11 chicks present, 6 were dead. No Pigeon Guillemot chicks were banded this season.

A total of 18 new nest boxes for Pigeon Guillemots were installed this season to the South of the existing boxes. The boxes were weighted down with rocks and a layer of gravel placed in the nest chamber of each box. These boxes will be monitored in coming years along with the previously installed boxes. Many of the new boxes are installed in such a way that they can be viewed from a distance with a spotting scope, making future observational work a possibility.

Akiko Shoji completed a pilot project this season on the Pigeon Guillemots using the nest boxes at Lookout Point. She installed small video cameras at the entrances of several nest boxes to observe adult birds coming and going from the boxes. This made it possible to assess the frequency and timing of visits and to observe fish being brought to the chicks in the boxes. Another goal was to measure respiratory rates during incubation, but this was not possible due to

equipment malfunction. Time-depth recorders were placed on two adult birds to record depth and duration of diving behavior. Re-capturing the birds to recover the devices proved to be difficult.

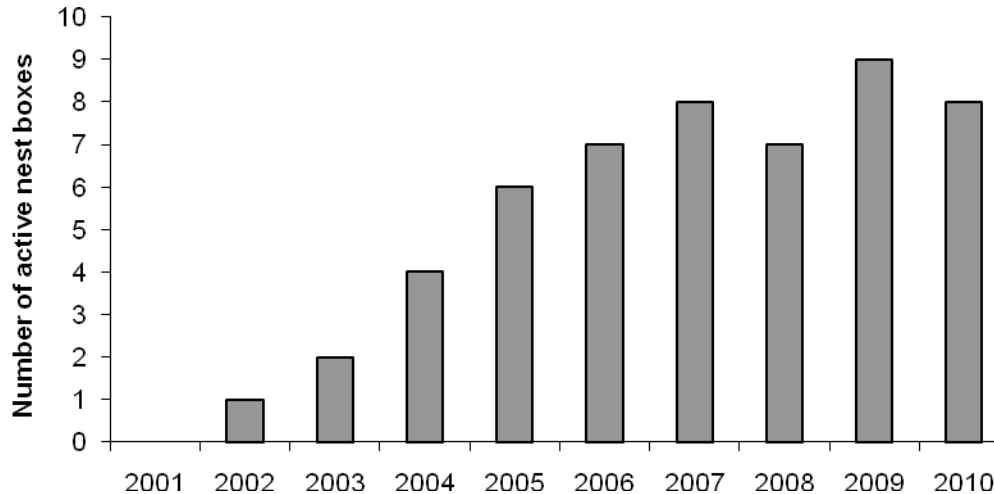


Figure 8. Use of nest boxes by Pigeon Guillemots, Lookout Point, East Limestone Island, 2001-2010.

### 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 by 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.

This season we monitored Cassin's Auklet breeding activity at 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 we returned regularly to monitor activity. At the East Coast plots (North and South) we monitored a total of 46 nest boxes: 44 boxes installed in 2007 and 2 old boxes. At Lookout Point we monitored 25 boxes, also installed in 2007. A total of 8 boxes were active at the East Coast plots, and 3 at Lookout Point based on knockdown activity. We checked these boxes for chicks beginning on 16 May, at which point box #31 (E. Coast N. Plot) had an adult incubating, box #3 (E. Coast S. Plot) had an adult incubating, and box #1 at this plot had a cold egg. Because of the number of incubating adults found at the E. Coast site, a complete check of the Lookout Point boxes was deferred until 30 May at which point box #7 had a large chick and box #6 had an adult incubating. A young chick was found in box #3 (E. Coast S. Plot) on 30 May, but subsequently died. The only box to be successful was #7 at Lookout Pt. The chick in this box was banded on 24 June at which point it had all its adult plumage and appeared to be near fledging. It was later verified that the chick had left the box and presumably fledged.

Natural burrows were monitored at the East Coast site and at Lookout Point using knockdown sticks. There were a total of 24 active burrows at the East Coast site, and 5 active at Lookout Point. No monitoring of Cassin's Auklet burrows took place at Cassin's Tower this season.

The amount of Storm petrel activity this season was somewhat more than in past years, based on the number of days the species was recorded in the daily bird checklist (2010 = 36, 2009 = 31, 2008 = 28, 2007 = 34). Petrels were very noisy at night during the murrelet season, particularly in the area NE of funnel 6 and 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 the 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. Due to poor weather and time constraints, we completed only one full nearshore survey in 2010. Another survey was started but had to be called off due to deteriorating weather conditions.

### *Nearshore surveys*

These surveys cover the inshore waters as far North as Cumshewa Island and South to Haswell Island. We completed a partial survey on 11 May, and a complete survey on 20 June. Between these two surveys we counted 12 species: Marbled Murrelets, Pigeon Guillemots, White-winged Scoters, Pelagic Cormorants, Red-necked Grebes, Common Loons, Ancient Murrelets, Herring Gulls, Rhinoceros Auklets, Common Murre, Glaucous-winged Gulls and Harlequin Ducks. A total of 50 Marbled Murrelets were counted on the 20 June survey.

### *Hecate Strait surveys*

This survey takes us approximately 5 nautical miles into Hecate Strait, and allows us to see species that tend to stay farther from shore. We were not able to complete any Hecate Strait surveys in 2010.

## 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, 2005-2010<sup>†</sup>.

<i>Species (common name)</i>	<i>Scientific name</i>	<i>2010</i>	<i>2009</i>	<i>2008</i>	<i>2007</i>	<i>2006</i>	<i>2005</i>
Dall's porpoise	<i>Phocoenoides dalli</i>	0	0	0	0	0	1
Northern elephant seal	<i>Mirounga angustirostris</i>	0	0	0	0	0	0
Fin whale	<i>Balaenoptera physalis</i>	0	0	0	0	0	0



Grey whale	<i>Eschrichtius robustus</i>	0	0	0	0	1	1
Harbour porpoise	<i>Phocoena phocoena</i>	0	10	0	1	4	3
Humpback whale	<i>Megaptera novaeangliae</i>	86	102	261	203	91	15
Killer whale	<i>Orcinus orca</i>	11	14	18	26	4	11
Minke whale	<i>Balaenoptera acutorostrata</i>	0	0	1	3	1	0
Pacific white-sided dolphin	<i>Lagenorhynchus obliquidens</i>	46	334	0	81	365	8
California sea lion	<i>Zalophus californianus</i>	1	0	0	4	0	1

†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*

Humpback sightings were fewer this season than in previous years. As in the past, most of the sighting took place in the first half of May and then became more infrequent after that. On 17 May we counted approximately 20-30 humpbacks feeding East of Reef, and the Reef crew reported having seen more than 50 individuals on one occasion. There were continued reports of large numbers of humpbacks East of Reef Island later in the season, but they had moved further offshore and we did not have the opportunity to see them.

### *Killer whales*

There were four sightings of Killer whales this season. There were two sightings in Laskeek Bay in May, and another group was sighted along the E. shoreline of Ramsay Island while we were surveying oystercatchers on 7 June. We took ID photographs of these 3 groups to contribute to the Killer whale database at the Pacific Biological Station in Nanaimo. Our last sighting occurred on 1 July, from camp on Limestone. It was too late in the evening to follow this group or get photographs.

### *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 505 individuals at Reef (11 May) and 115 at Skedans Islands (6 May). Occasionally we sight branded sea lions that have been individually marked by researchers in Alaska. No marked individuals were seen this season.

## **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 130 wildlife trees have been identified over the past 21 field seasons. The nest history of five of the longest active trees is presented in Table 6. Two of these trees were not active this season and #45 had fallen since last field season.

Table 6. History of activity by cavity nesting bird species<sup>†</sup> at wildlife trees #10, #16, #17, #33 and #45 on East Limestone Island.

Year	Wildlife Tree #				
	10	16	17	33	45
1992	RBSA				
1993		RBSA	RBSA		
1994					
1995				RBSA	
1996		HAWO	RBSA	RBSA	RBSA
1997			CBCH	RBSA	
1998				NOFL	
1999			RBSA	RBSA & HAWO	
2000		RBSA	RBSA	RBSA	RBSA
2001	RBSA			RBSA	RBSA
2002	CBCH	RBSA	RBSA		RBSA
2003	CBCH		RBSA		RBSA
2004			RBSA	RBSA	RBNU
2005	RBSA		RBSA		CBCH
2006	RBSA		NOFL		RBSA
2007	RBSA				RBSA
2008			RBSA	RBSA	RBSA
2009	CBCH	RBSA	RBSA	RBSA	RBSA
2010		RBSA	RBSA		Fallen

<sup>†</sup>RBSA = Red-breasted Sapsucker, CBCH = Chestnut-backed Chickadee, NOFL = Northern Flicker, HAWO = Hairy Woodpecker

This season, beginning in early May, we began to visit wildlife trees looking for signs of activity. We had a total of 18 active trees this season, seven of which were newly identified this year. Eleven nests were occupied by Red-breasted Sapsuckers, three by Chestnut-backed chickadees, one by Hairy Woodpeckers, and four by Brown Creepers (Table 7). One tree (#107) was used by both RBSA and CBCH in 2010. There were more than usual BRGR nests found in 2010. Creeper nests have only been located in 9 years, and 1998 (2 nests) was the only other year when multiple nests were found.

Table 7. Wildlife tree activity on East Limestone Island in 2009.<sup>†</sup>

Tree #	Cavity Nester	Tree Species	Fledge Date
16	RBSA	Hw	14 June*
17	RBSA	Ss	19 June
71	RBSA	Ss	21 June*
72	RBSA	Ss	19 June
106	RBSA	Ss	17 June
107	RBSA / CBCH	Ss	17 June / 3 July
111	RBSA	Hw	13 June*
112	RBSA	Hw	4-13 June
121	RBSA	Hw	6-11 June

124	RBSA	Hw	19-27 May
129	RBSA	Ss	4-16 June
119	BRCR	Cr	30 May*
125	BRCR	Ss	30 May*
127	BRCR	Ss	4-13 June
128	BRCR	Cr	4-13 June
117	CBCH	Ss	2 June
130	CBCH	Ss	After 8 July
126	HAWO	Ar	6-13 June

†RBSA = Red-breasted Sapsucker, CBCH = Chestnut-backed Chickadee, NOFL = Northern Flicker, HAWO = Hairy Woodpecker, BRCR = Brown Creeper, Ss = Sitka spruce, Hw = Western hemlock, Cr = Red Cedar, Ar = Red Alder.

\*Fledge dates approximate within 2 days. 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. This season's peak count was 39 species on 6 May. In total, 61 different species were seen this season. Bald Eagles, Common Ravens and Townsend's Warblers were recorded on all days. The less frequently sighted species this season included Black Scoter, Common Merganser, Whimbrel, Wandering Tattler, Black Turnstone, Wilson's Warbler, Tree Swallow, Spotted Sandpiper, Northern Pintail, Greater White-fronted Goose, American Widgeon, Common Goldeneye, and Western Grebe.

### 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.

No Bald Eagles were confirmed nesting this season on Limestone Island. Eagles were seen frequently in the vicinity of the NE point (BAEA #7), but because it is difficult to see this nest, breeding activity was not confirmed. Eagles also breed on other islands in Laskeek Bay: eagle chicks were observed in nests on S. Low, Skedans Islands, and Lost Islands.

Peregrine Falcons again raised two chicks on the cliff located at the South side of the island. The nest ledge was observed on 2 & 25 June and appeared to be active, although no chicks could be seen. The adult peregrines were nearby and agitated. Two young peregrines were observed flying with their parents in early July, confirming that the pair was successful in raising chicks this season.

The Common Raven nest near the deer enclosures was again active this season. Young could be heard in the nest upon arrival on the island on 1 May, and the chicks were observed taking their first flights from the nest on 29 May. Inspection of the area below the nest showed fewer murrelet remains and more abalone shells than seen in past seasons. A total of 23 shells were collected from near the nest.

## 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. Through the season we kept 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. Showy Jacob's Ladder (*Polemonium pulcherrimum*), Few-flowered Shootingstar (*Dodecatheon pulchellum*), Richardson's Geranium (*Geranium richardsonii*), Tufted Saxifrage (*Saxifraga cespitosa*) and Cut-leafed Anemone (*Anemone multifida*) were all seen in bloom this season.

There are a number of invasive plants that have become established on Limestone Island including bull thistle (*Cirsium vulgare*), Canada thistle (*Cirsium arvense*), prickly Sow-thistle (*Sonchus asper*), and wall lettuce (*Lactuca muralis*). This season we followed up on a pilot project began last season to address the problem of invasive plants in Laskeek Bay. Plots where we had pulled plants last season were re-visited to assess the impact of last season's treatment. In general, only a slight reduction in plant density was noted in areas where thistles were pulled last season. Some manual removal of thistles was completed this season, and black plastic sheeting was put down over one particularly large patch of Canada thistle to test the effectiveness of this treatment.

## Introduced Species

### **Sitka Black-tailed Deer** *Odocoileus hemionus*

Deer were intentionally introduced to Haida Gwaii in 1878 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](http://www.rgisbc.com)) which has carried out extensive research on this topic in Laskeek Bay as well as the rest of Haida Gwaii. On Limestone Island, we maintain three 20m x 20m deer exclosures that dramatically demonstrate the impact of deer browsing on native vegetation. The interior of the exclosures contain abundant understory vegetation including huckleberry, salal, ferns, and young trees that are almost entirely absent from areas accessed by deer. Unfortunately, the deer exclosures are difficult to maintain, due to damage caused by falling trees in the winter months. Deer exclosure #3 was breached at some point between the 2009 and 2010 field seasons and deer had entered and eaten much of the vegetation. This exclosure was repaired during the first week in camp and the vegetation showed a marked recovery over the course of the season.

In 2009 we installed a small deer exclosure around a pair of large huckleberry bushes near the main trail. These old bushes are dying of old age all over the island and this experiment illustrated how quickly these bushes can regenerate from their base if browsing is prevented. By the end of the 2010 season, some of the new growth within this exclosure was close to a metre tall.

### **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.

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

In 2010, George Schultz completed a cull of raccoon on the shorelines of Louise Island opposite East Limestone and West Limestone Islands. This cull took place in March and removed approximately 10 raccoons from the adjacent shorelines. This was apparently effective in keeping raccoons off Limestone in 2010. No signs of raccoon activity were noted, and predation transects this season showed dramatically lower levels of predation. No night-time surveys for raccoons were completed this season due to the absence of suitable low tides during the breeding season.

#### **Red Squirrels** *Sciurus vulgaris*

Squirrels were introduced to Haida Gwaii in 1950, perhaps to aid in cone gathering for the forest industry. Squirrels may have been introduced to Limestone directly at this time. In any case, squirrels are well established on Limestone and are known to be a nest predator on various songbird species (see [www.rgisbc.com](http://www.rgisbc.com)). Since 2007 we have been completing squirrel surveys on Limestone Island to measure the annual abundance of squirrels on the island. Over time we hope to describe population cycles of this introduced species and gain a better understanding of the consequences of squirrel presence.

## **CONCLUSION**

This season marked 21 years of research 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.

Data gathered in North Cove this season shed more light on the causes of decline in the Ancient Murrelet colony on Limestone Island. The decline in chick numbers over the period from 1990 to 2006 led to the closure of all activities in North Cove for a three year period (2007, 2008, 2009). The area was re-opened in 2010 and chick numbers had shown no recovery relative to Cabin Cove where chick work had continued over this time period. This evidence strongly suggests that our research activities as they are now conducted are not implicated in the declines seen since 2006. A 30% increase in chick numbers was observed at Cabin Cove this season, likely in most

part due to the absence of raccoons in the colony this season. Our presence on the island may well be the sole defense that Ancient Murrelets have against raccoons, and therefore the importance of raccoon eradication on Limestone Island and the adjacent shorelines of Louise Island, particularly early in the season, cannot be overstated.

The lessons that we learn on Limestone Island will be 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.

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