EAST LIMESTONE ISLAND FIELD STATION

FIELD SEASON REPORT 2009

Ancient Murrelet family on the water, Jake Pattison, LBCS

SUMMARY

This marks Laskeek Bay Conservation Society's 20th field season on Limestone Island, Laskeek Bay. The season ran from 1 May to 14 July, bringing 26 volunteers and 11 visitor groups (4 schools, 5 tours) to the island. The number of Ancient Murrelet chicks trapped in funnels this season was the lowest on record. There was again evidence of raccoon predation in the murrelet colony this season. We monitored Black Oystercatcher territories in Laskeek Bay, where we found 35 occupied territories, 24 with chicks or eggs at some point in the season. We banded 12 oystercatcher chicks and re-sighted 22 birds banded in previous years, the oldest banded in 1994. We censused Glaucous-winged Gull colonies in Laskeek Bay, and found three active with a total of 256 nests containing eggs or chicks. Pigeon Guillemots used 9 of the 10 nest boxes at Lookout Pt, and four of the Cassin's Auklet nestboxes installed in 2007 were active, but subsequently abandoned. We completed four sea-surveys and recorded a maximum count of 172 Marbled Murrelets on 8 July. We recorded more Harbour Porpoises than in recent years and fewer Humpback whales. Killer whales were encountered on four different occasions. Fourteen wildlife trees were monitored, containing nests of 10 Red-breasted Sapsuckers, 2 Chestnut-backed Chickadees, 1 Hairy Woodpecker, and 1 Brown Creeper. Peregrine Falcons successfully fledged two chicks and Common Ravens also had two young. A Belted Kingfisher nest was located on the South side of the island. We located a rare plant Tufted Saxifrage (*Saxifraga cespitosa*), last recorded on the island in 1913. A pilot project began this season to address the problem of invasive plants on Limestone and on the surrounding islands.

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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 projects, interpretive programs and public involvement. The field research station at East Limestone Island has been operating for 20 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 natural fluctuations in marine and terrestrial ecosystems and gives a baseline against which we can describe changes 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. The society's commitment to environmental education and public involvement is one of its key mandates.

Project Limestone

Project Limestone has for 19 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 given an introduction to our research programs. A walk to Lookout Point allows the students to learn more about the natural history of the area ending 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 the 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 Vertical Point the next morning.

Seven groups with a total of 42 students and 15 chaperones visited Limestone Island this year. The groups represented four local schools: Anges L. Mathers School (Sandspit) on 14 and 15 May; Living and Learning School (Queen Charlotte) on 17 and 18 May; Queen Charlotte Secondary School on 20 and 23 May; and G.M. Dawson (Masset) on 25 May.

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 26 volunteers visited the island this year contributing 203 volunteer days to projects, both on Limestone and on surrounding islands. Three of the volunteers had previously been on Limestone either as volunteers or with Project Limestone. The majority of volunteers stayed for one week, with the exception of two who stayed for two weeks, and two who stayed for twelve days. Volunteers came from a variety of places: five from Haida Gwaii; ten from elsewhere in BC; four from Ontario; one from the United States; and others from Sweden, Germany, Switzerland, Belgium, France and Australia. Berry Wijdeven of Tlell also spent a week on Limestone Island gathering footage for the 20th Anniversary Symposium in October. Executive Director, Christine Pansino and summer intern, Leigh Joseph also came down to help with closing up camp.

Visitors

The LBCS visitor program provides opportunities for tourist groups to visit the 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 stop on Limestone are part of ecotourism excursions in nearby Gwaii Haanas National Park.

Four groups visited the island this season with a total of 33 guests and 5 crew. The *Island Roamer* (Bluewater Adventures) had two separate tours on 22 and 24 of May, and both the *Maple Leaf* and Moresby Explorers had tours on 29 May.

The Reef Island field camp was also up and running this year with Dr. Tony Gaston, Jean-Louis Martin, Soizic LeSaout, Akiko Shoji, Malcolm Hyatt and Kyle Elliot working there for varying lengths of time between late April and July.

Staff

LBCS Staff this year consisted of Christine Pansino (Executive Director), Jake Pattison (Camp Supervisor / Biologist), Ainsley Brown (Assistant Biologist / Interpreter) and Leigh Joseph (Summer Intern).

RESEARCH AND MONITORING PROGRAMS

Ancient Murrelets *Synthliboramphus antiquus*

Monitoring Program

Since 2007 LBCS has focused on reducing the impact of research related activities on the Ancient Murrelet colony. North Cove continues to be off limits during the breeding season, and our activities at Cabin Cove involve 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. We hope that future comparisons between population trends in North Cove and Cabin Cove will shed light on the impact of our presence in the colony.

Chick capture work

Four chick-capture funnels (numbers 5-8) were monitored in Cabin 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 10 May and the last on 29 May. In total, 104 chicks were captured in funnels 5 to 8 (Fig. 1). The peak night of departures (16 chicks captured) occurred 18 May. The number of chicks recorded this season was the lowest to date (Table 1).

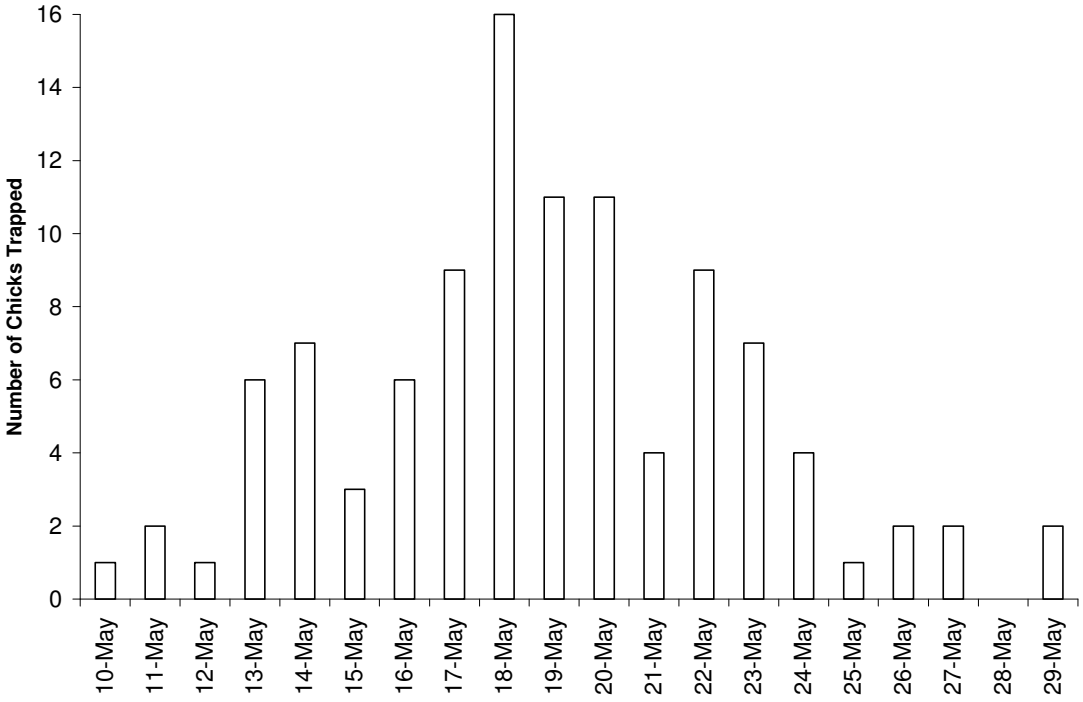

Figure 1. Nightly chick captures, Funnels 5-8, East Limestone Island, 10-29 May 2009.

Table 1. Summary of chick departures, peak nights and totals for funnels 5 to 8 on East Limestone Island 2006 to 2009.

Year	*First night with chicks*	*Peak night*	*Peak count*	*Last night*	*Total days*	*Total chicks*
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

Funnels 5 & 6

As of this season, funnels 5 and 6 have been monitored continuously for 20 years, and are therefore our primary means of assessing the long term population trend in the Cabin Cove area of the colony. The location of the funnels has not changed during this period and therefore represents the same geographic area of the colony year to year. One consideration is that there is potential for the colonized area to shift over time in relation to the funnels and with this in mind funnels 7 and 8 were installed in 2006 flanking funnels 5 and 6. So far there is no indication of a major shift in the colony area, rather an overall decline in numbers across the whole colony.

There were a total of 66 chicks captured this season in funnels 5 and 6 which is the lowest to date (Fig. 2). This season was similar to others in terms of first chick arrivals and the peak night occurred relatively early on May 18 (Table 2). Chick captures ended very early this season and total days with chicks was very reduced this season in comparison with the past (Table 2).

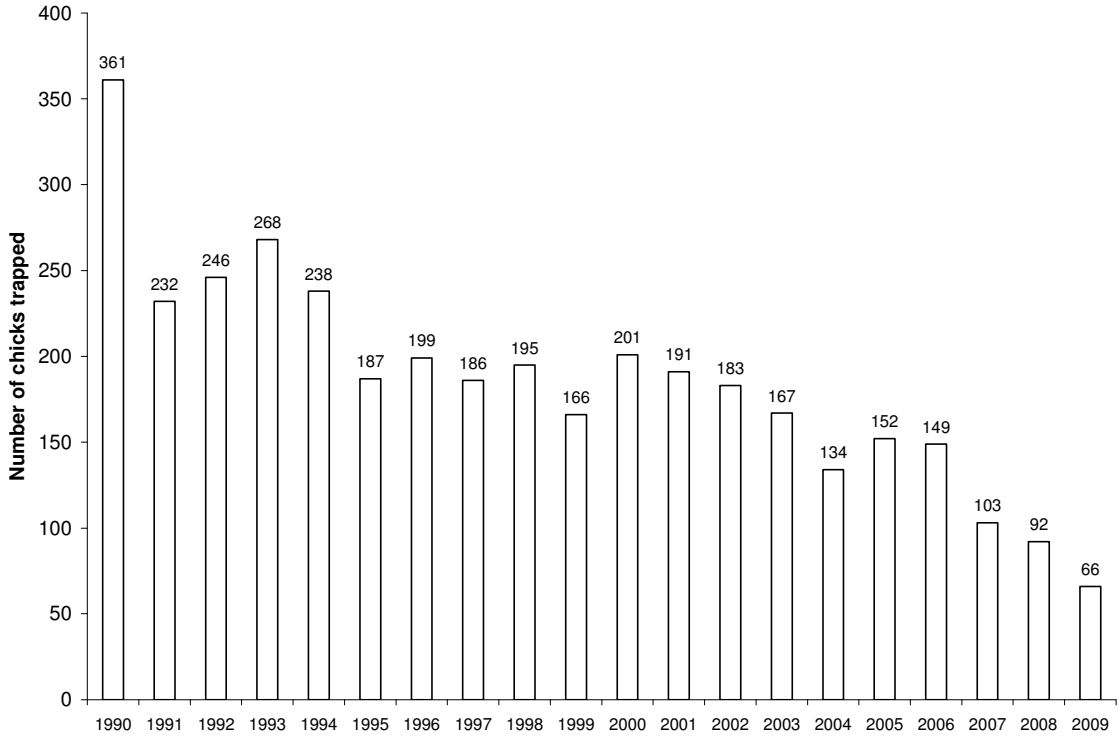

Figure 2. Total Ancient Murrelet chick captures at funnels 5 and 6 East Limestone Island, 1990-2009.

Table 2. Summary of chick departures, peak nights and totals from funnels 5 and 6 on ELI 1990 to 2009.

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
Average ± SD	11-May ± 2.0 days	21-May ± 4.1 days	21 ± 7.7 chicks	6-Jun ± 5.6 days	27 ± 5.5 days	186 ± 66 chicks

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. Both breeding and non-breeding birds are thought to gather and in these areas and important social interactions also take place. 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 the birds on the grounds between 2 May and 20 June. The peak count occurred on 22 May this season with a total of 183 birds observed. Counts averaged (±SD) 32.7 ± 36 this season which is lower than in previous seasons and mirrors the decline in chick numbers.

Point counts

We conducted point counts in the colony area to monitor the activity of adult birds. Five minute counts were made at appox 2:30 each night for the period of 21 to 31 May. Our maximum count occurred on 23 May (12 individuals; 80 calls), but most nights were much quieter. No birds were recorded during the 31 May count.

Band Recoveries & Recaptures
Recapture of adult birds was phased out in 2003, however we still opportunistically capture adult bird 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. There were no band recoveries or recaptures this season on Limestone, however the crew on nearby Reef Island recaptured a bird, originally banded on Reef, that is a minimum of 25 years old and by far the oldest known member of the species (this same bird was also captured in 2007). They also recaptured a bird from Limestone, now breeding on Reef, which is 17 years old.

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 of 5 May and checked weekly until 9 June, for a total of five 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 102 adult murrelets were estimated to have been killed by predators in the colony area over the 5 weeks period. 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 lower than in previous years, and anecdotal observations also pointed toward fewer predation remains in the forest than in past years. Native predators on Ancient Murrelets include Common Ravens, Peregine Falcons, Bald Eagles, and River Otters (*Lutra Canadensis*) all of which were present on Limestone this season. Raccoon presence was again confirmed on the island, based on findings along the predation transects (discussed later under 'introduced species').

Population trends
The number of departing Ancient Murrelet chicks continues to decline (Fig 2). The colony census completed in 2006 estimated ± (SE) 509 ± 132 breeding pairs compared to 1273 ± 254 pairs estimated in 1995. Considering that chick numbers have declined by 56% since 2006 (based on funnels 5 and 6) indicates that the current breeding population may be very small indeed. Neighbouring colonies such as Reef Island are stable and we therefore conclude that this is a situation specific to Limestone. LBCS is very concerned about this downward trend and is trying to gain a better understanding of the contributing factors.

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 found. 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.

Site occupancy and reproductive success
Our first visits to oystercatcher sites began on June 13, somewhat later this year than in the past. We visited all sites known to have been active in past years and also scanned for new active sites. In total we found 35 territories being occupied by adult birds. Of these, 24 had eggs or chicks at some point during the season. We began finding chicks as of 13 May and most likely hatched by the third week in June, although we found relatively young chicks at several sites in early July. Eighteen sites hatched chicks (32 total) and we were able to band 12 chicks.

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 as well as 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 (Table 3). Oystercatchers are long-lived and on three occasions we sighted a bird banded in 1994. There were a total of 22 banded birds sighted this season, the largest number to date. As expected, the number of re-sighted birds has increased over the years that the banding program has been running (Fig. 3). This season we saw a group of 10 birds, 6 of which were banded.

Table 3. Banded Black Oystercatchers re-sighted in Laskeek Bay in 2009.

Band Combination (left – right)	**Location seen / Nest site**	**Year Banded**	**Banded as Adult or Chick**
UB-BK/M	REE-1	2000	Adult or chick
UB-R/M	REE-2	2003 or 2004	Chick
UB-M	LOW-3	Unknown	-
UB-BK/M	SKE-6	2000	Adult or chick
UB-M	SKE-6	Unknown	-
AL-BK/M	SKE-6	2000	Adult
UB-BK/M	SLW-1	2000	Adult or chick
UB-R/M	SLW-1	2003 or 2004	Chick
UB-W/M	SLW-8	1994	Chick
UB-M	KNG-3	Unknown	-
UB-OR/M	LOS-2	2004	Chick
M-Y (?)	Lookout Pt, seen by volunteer	Unknown	-
W-Y/M	Reef sea lion haulout	2007	Chick
AL-UB	Reef, S. side	Unknown	-
W-Y/M	Louise, opposite WLI. Group of 10	2007	Chick
W-Y/M	Louise, opposite WLI. Group of 10	2007	Chick
W-LG/M	Louise, opposite WLI. Group of 10	2008	Chick
UB-R/M	Louise, opposite WLI. Group of 10	2003 or 2004	Chick
UB-R/M	Louise, opposite WLI. Group of 10	2003 or 2004	Chick
UB-W/M	Louise, opposite WLI. Group of 10	1994	Chick
W-Y/M	W. Limestone Island	2007	Chick
UB-W/M	S. Low Island	1994	Chick

Band codes: UB = unbanded (birds can lose bands), BK = black, M = metal, W = white, AL = aluminum, R = red, OR = orange, Y = yellow, LG = light green.

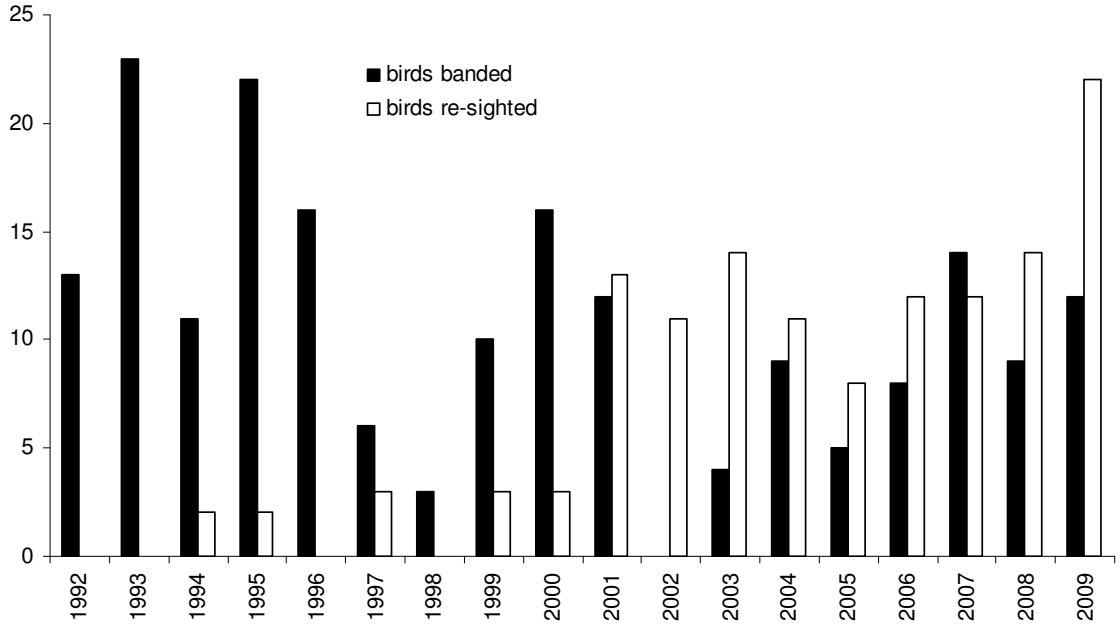

Figure 3. Number of Black Oystercatcher banded and re-sighted, Laskeek Bay, 1992-2009.

Diet

Oystercatchers feed their chicks hard-shelled invertebrates which they bring intact to the breeding territory. We collected prey remains from 15 sites in Laskeek Bay in order to quantify average diet composition being fed to the chicks. Limpets were the primary prey item (80%), followed by mussels (15%) and chitons (5%). These three items made up more than 99% of the diet, consistent with what has been found in past years.

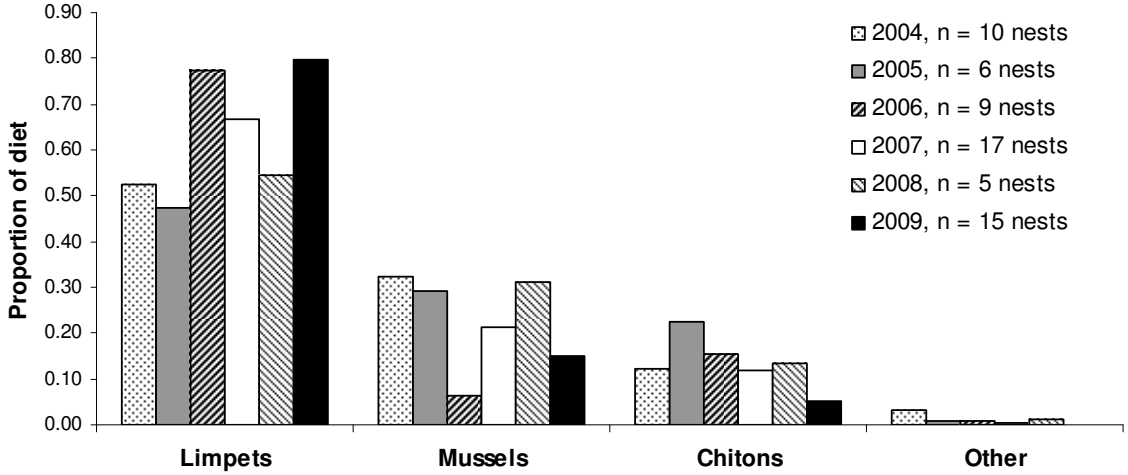

Figure 4. Black Oystercatcher chick diets from prey items collected at nest sites in Laskeek Bay 2004-2009.

Glaucous-winged Gulls *Larus glaucescens*

Since 1992, LBCS has been censusing gull colonies within Laskeek Bay (Fig. 4). We visited sites that had nesting gulls in the past and also kept an eye out for signs of new activity. Between 13 and 25 June we visited occupied colonies and counted the number of active nests. Lost Island,

the largest colony in the area had a total of 224 active nests (20 June), followed by Kingsway Rock with 36 nests (18 June) and Low Island with 6 nests (14 June). In total we counted 266 nests on these three colonies containing either 1 egg (8% of nests), 2 eggs (23%), 3 eggs (67 %), or chicks (2%). We did not find activity at Skedans Islands, Cumshewa Island or at any other locations. The total number of nests counted this season is greater that the long-term average (±SD) of 256 ± 73.

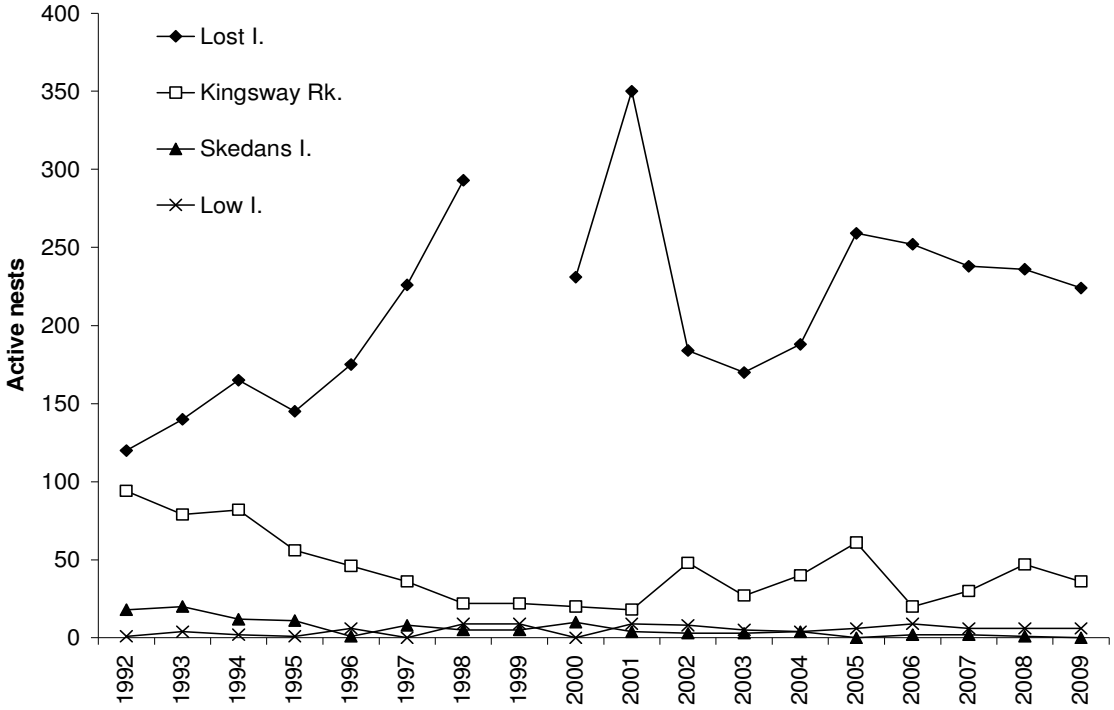

Figure 4. Glaucous-winged Gull nests containing eggs or chicks at four colonies in Laskeek Bay, 1992-2009.

Pigeon Guillemots *Cepphus columba*

Ten nest boxes for Pigeon Guillemots were installed at Lookout Point on Limestone Island in 2001, and the use of the boxes has increased steadily (Fig. 5). We checked the boxes on 7 May to make sure that the boxes were intact and contained enough gravel. Box P1 had two eggs at this time, which is the earliest that we have ever noted eggs. Boxes were checked again at the end of the season (13 July), and we found 9 boxes active, containing either chicks (7 boxes) or dead chicks (2 boxes). A total of 13 chicks were banded, and we noted that they were larger than chicks in previous years.

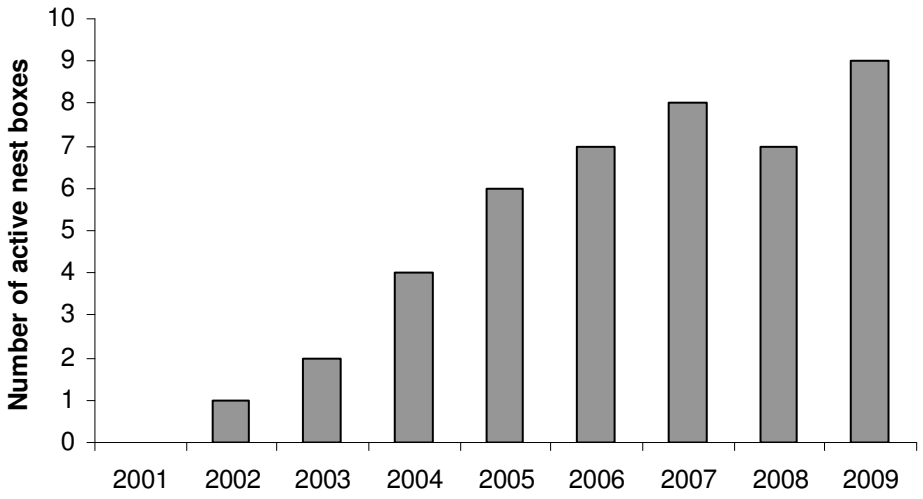

Figure 5. Use of nest boxes by Pigeon Guillemots, East Limestone Island, 2001-2009.

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, party 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 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. We saw activity in the new nest boxes for the first time this season, with boxes #19, #30 & #31 active at East Coast N. plot and box #5 active at the S. plot. We checked these active boxes for chicks beginning on 17 May and then weekly thereafter as all the boxes had incubating birds during the first check. A chick was present in #19 on June 4, but was dead the following week. The other boxes were all abandoned before chicks hatched. An adult was incubating in box #5 until at least 30 June. One of the old boxes (#17) was also active at the S. plot, but we were unable to access the nest cavity. We also monitored a total of 29 burrows at the East Coast site. Of these 15 were consistently active, and we could hear chicks in several of them. We monitored three active burrows at Lookout Point. No nest boxes were active in this location.

At Cassin's Tower we set up knock-down sticks on all potential burrows on 30 May and then re-checked on 2 July. Based on appearance of the burrow (active burrows look well used and are smelly) as well as knock-down evidence, we counted 44 active burrows. These burrows were likely occupied by either Cassin's Auklets or Fork-tailed Storm Petrels. The amount of Storm petrel activity this season was similar to the past two years based on the number of days the species was recorded in the daily bird checklist (2009 = 31, 2008 = 28, 2007 = 34).

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. We completed three nearshore and one Hecate Strait survey this season.

Nearshore surveys

These surveys cover the inshore waters as far North as Cumshewa Island and South to Haswell Island. We completed surveys on 9 May, 4 June, and 8 July. We counted 12 species: Marbled Murrelets, Pigeon Guillemots, White-winged Scoters, Pelagic Cormorants, Red-necked Grebes, Common Loons, Ancient Murrelets, Pacific Loons, Rhinoceros Auklets, Cassin's Auklets, Glaucous-winged Gulls and Harlequin Ducks. Our peak count of Marbled Murrelets occurred on the 8 July when we counted 172 flying or on the water within the transects.

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 only able to complete one Hecate Strait survey this season. During the survey on 21 June we sighted 9 species, including Sooty Shearwaters, Cassin's Auklets, Black-legged Kittiwakes, Pacific Loons, Rhinoceros Auklets, Marbled Murrelets, Ancient Murrelets and Pigeon Guillemots.

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 4.

Table 4. Total counts of marine mammals from sea surveys, sea watches and other sightings, 2004-2009†.

Species (common name)	***Scientific name***	***2009***	***2008***	***2007***	***2006***	***2005***
Dall's porpoise	*Phocoenoides dalli*	0	0	0	0	1
Northern elephant seal	*Mirounga angustirostris*	0	0	0	0	0
Fin whale	*Balaenoptera physalis*	0	0	0	0	0
Grey whale	*Eschrichtius robustus*	0	0	0	1	1
Harbour porpoise	*Phocoena phocoena*	10	0	1	4	3
Humpback whale	*Megaptera novaeangliae*	102	261	203	91	15
Killer whale	*Orcinus orca*	14	18	26	4	11
Minke whale	*Balaenoptera acutorostrata*	0	1	3	1	0
Pacific white-sided dolphin	*Lagenorhynchus obliquidens*	334	0	81	365	8
California sea lion	*Zalophus californianus*	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, e.g. in 2009 the same group of Orcas was re-sighted several times.

Humpback whales
There were fewer humpbacks in Laskeek Bay this season in comparison with the last two years. Most of our sighting took place in the first two weeks in May and then became less frequent. The most interesting humpback encounter this season occurred during camp start-up on May 1 when we heard some incredibly loud above-water vocalizations being produced by a group of whales near the Skedans Islands. These sounded identical to fog-horn blasts and due to the very calm conditions they were heard very clearly on Limestone Island approximately 4 miles away.

Killer whales
We sighted Killer whales on four occasions this season. The first three encounters, 16-17 June, consisted of several sightings of the same group of individuals. We were able to identify bulls T162 and T163, accompanied by 5 smaller individuals. One small individual had a very large and distinctive hump/deformity in front of the dorsal fin. We took ID photographs of this group to contribute to the Killer whale database at the Pacific Biological Station in Nanaimo. A group of two individuals was seen from Lookout Point on 3 July, however we were not able to 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 and Helmet Island. We regularly count the number of individuals on the Reef and Skedans haulouts. The maximum numbers counted this season were 468 at Reef and 137 at Skedans Islands (both on 9 May). Occasionally we sight branded sea lions that have been individually marked by researchers in Alaska. This season we saw one marked individual, 404R, at the Reef Island haulout.

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 123 wildlife trees have been identified over the past twenty field seasons. The nest history of the five longest active trees monitored this season is presented in Table 5.

Table 5. History of activity by cavity nesting bird species[†] at wildlife trees #10, #16, #17, #33 and #45 on East Limestone Island.

	Wildlife Tree #				
Year	**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

†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 14 active trees this season, three of which were newly identified this year. Ten trees were occupied by Red-breasted Sapsuckers, two by Chestnut-backed chickadees, one by Hairy Woodpeckers, and one by Brown Creepers (Table 6).

Table 6. Wildlife tree activity on East Limestone Island in 2009.†

Tree #	Cavity Nester	Tree Species	Fledge Date
10	CBCH	Ss	June 5
16	RBSA	Hw	June 13
17	RBSA	Ss	June 18
33	RBSA	Ss	June 20
45	RBSA	Ss	June 11
95	RBSA	Hw	Tree Fell
103	HAWO	Hw	June 11*
106	RBSA	Ss	June 15*
107	RBSA	Ss	June 15
112	RBSA	Hw	June 13
113	RBSA	Hw	June 22*
121	RBSA	Hw	June 13
122	CBCH	Ss	June 16
123	BRCR	Ss	June 28

†RBSA = Red-breasted Sapsucker, CBCH = Chestnut-backed Chickadee, NOFL = Northern Flicker, HAWO = Hairy Woodpecker, BRCR = Brown Creeper, Ss = Sitka spruce, Hw = Western hemlock
*Fledge dates approximate.

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 40 species on June 4. In total, 62 different species were seen this season. Bald Eagles, Black Oystercatchers and Winter Wrens were recorded on all days. The less frequently sighted species this season included Whimbrel, Leach's Storm Petrel, Tufted Puffin, Yellow-billed Loon, Red-throated Loon, Greater White-fronted Goose, Common Merganser, Red-breasted Merganser, Red-necked Grebe, Wandering Tattler, Sooty Shearwater and Red-tailed Hawk.

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.

We did not have any confirmed Bald Eagle nests this season. Although eagles were frequently observed at the Cassin's Tower nest (BAEA #5), there was no sign of chicks in the nest as in the past few years. We observed other eagle's nests in Laskeek Bay with large chicks by the end of June. These were located on the Skedans Islands, Reef Island, S. Low Island, and Lost Islands.

Peregrine Falcons raised two chicks on the cliff at the South side of the island. The ledge being used is the same one that was used in the past. We first observed chicks on the ledge on 31 May and they had most of their adult feathers by the end of June, fledging sometime before 12 July when they were seen flying with their parents at Lookout Point.

The Common Raven nest near the deer exclosures was again active this season. Young could be heard in the nest after 4 May and they fledged approximately 26 May when they were first observed flying with their parents.

Northwestern Crows were again suspected to be breeding along the ridge near Cassin's Tower. Although we did not locate a nest we observed behaviour consistent with nesting and heard young crows later in the season.

Other Birds

During the season we also encountered the nests of some other bird species. In 2009 LBCS is contributing to the BC Breeding Bird Atlas, and the details of opportunistic sightings that we collect in the Laskeek Bay Area are forwarded to their organization. This season we found a nests belonging to Rufus Hummingbird, Hermit Thrush, Winter Wren and Belted Kingfisher. The kingfisher nest was not actually observed as it was high on a cliff West of Cassin's Tower, however we observed the adults bringing fish to the area and could hear chicks begging for food.

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. A number of rare plants are present on Limestone due to the unique limestone geology which is uncommon on the rest of the islands. Menzies' Pipsissewa (*Chimaphila menziesii*), Showy Jacob's Ladder (*Polemonium pulcherrimum*), Few-flowered Shootingstar (*Dodecatheon pulchellum*) and Richardson's Geranium (*Geranium richardsonii*) were all seen in bloom this season. We also located a very small colony of Tufted Saxifrage (*Saxifraga cespitosa*) in Boat Cove (position N 52° 54.569' W 131° 37.053'±3m WGS 84 Datum), which we believe to be the first record on the island since Newcombe made a collection there in 1913. This species is wide spread on the mainland, but has been found in only two other locations on Haida Gwaii.

There are a number of invasive plants that are 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 conducted a pilot project to identify the extent of invasive plants in Laskeek Bay and to reduce the density of invasive plants on Limestone Island (For more information please consult the report prepared on this project). A

concerted effort was made to pull out accessible patches of thistle and wall lettuce that we found on the island, and we will revisit these areas next season to assess the effectiveness of the treatments. It should be noted that due to the presence of these plants on cliffs and their ability to disperse over long distances it is unlikely that permanent eradication will ever be feasible.

Introduced Species

Sitka Black-tailed Deer *Odocoileus hemionus*
Deer were intentionally introduced to Haida Gwaii in 1878 to provide food 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. 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 huckleberry, salmonberry, salal, ferns and young cedar that are almost entirely absent from areas accessed by deer.

This season we put up 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 we hope that this new exclosure will demonstrate how these old bushes can regenerate from their base if relieved of browsing pressure.

Raccoons *Procyon lotor*
Raccoons were introduced in the early 1940s to provide local trappers with a source of employment. Raccoons (and also rats) are one of the largest threats to ground 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.

Raccoon presence was again confirmed on Limestone Island in 2009. From 1-11 May we scanned for signs of digging and scat as well as clearing the predation transects, but found nothing unusual. During the predation transects on 12 May we located fresh diggings and partly consumed carcasses characteristic of raccoon predation. At one of the diggings we retrieved hair that was later positively identified as raccoon. Raccoon scat, containing murrelet remains, was also located in the same area on 1 June. We did not complete any night-time shoreline surveys this season as we did not have a night-hunting permit in place. However, the camp supervisor spent approximately 22 hours surveying shoreline and colony areas at night in an attempt to locate the raccoon and keep it up a tree until daylight. We also set four live traps (two in cabin cove, two in boat cove) and kept them baited from 26 May until early July. As in past years, the traps did not prove to be effective, highlighting the difficulty in effectively removing raccoons from even such as small island as Limestone.

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.

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). 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.

Beaver *Castor Canadensis*
Beavers were introduced to Graham island in 1936 in response to requests by local trappers. Since then they have become widespread on Graham, particularly in Naikoon Provincial Park. They are also present on Moresby and have been sighted on Louise Island. This season we found a huckleberry bush that had been chewed off at the base bearing the tooth marks and characteristic angled cut of beavers. This appeared to have taken place several years ago, and we suspect that the beaver did not spend much time on the island. A willow tree, felled and stripped by beaver, was located on the Skedans Islands in 2005. This scattered evidence suggests that dispersing beavers will swim even to these smaller islands for short periods of time.

CONCLUSION

This season was a landmark achievement for Laskeek Bay Conservation Society: twenty years of research and environmental education in Laskeek Bay. Since 1990 we have been focusing 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 serious decline in Ancient Murrelet population breeding on Limestone Island, likely as a result of predation by raccoons as well as other less understood factors. We continue to place great emphasis on reducing the impact of our research activities while still maintaining our commitment to long-term monitoring of the population with hopes of more fully understanding the reasons for this decline. 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 the 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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