

EAST LIMESTONE ISLAND FIELD STATION
FIELD SEASON REPORT 2023



Peregrine Falcon

Prepared by Rian Dickson
Reviewed and Edited by Laskeek Bay Conservation Society
Box 867, Daajing Giids, BC, V0T 1S0

Laskeek Bay
CONSERVATION SOCIETY

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SUMMARY

This was the Laskeek Bay Conservation Society's 34th field season on East Limestone Island (ELI), Laskeek Bay, Haida Gwaii. The season ran from 5 May to 21 July, bringing 22 volunteers, three student interns, 60 students and chaperones, and 132 visitors to the island.

Black Oystercatcher surveys were conducted in Laskeek Bay and Gwaii Haanas, and we continued to collaborate with researchers from Simon Fraser University to band and resight Black Oystercatchers in Laskeek Bay and Skidegate Inlet. Glaucous-winged Gull nesting activity was monitored at Kingsway Rock and the Lost Islands, with a total of 193 active nests found. Pigeon Guillemots used 27 of the 30 nest boxes at Lookout Point; at the end of the field season 24 boxes contained chicks and two had eggs that were still being incubated.

Five near-shore sea surveys were completed to monitor bird and marine mammal abundance in Laskeek Bay. Throughout the season, marine mammal sightings included about 340 Humpback Whales, 14 sightings of Killer Whales (~35 individuals), 53 Harbour Porpoises, 1 Fin Whale, 3 Minke Whales, 3 Dall's Porpoises, 50-100 Pacific White-sided Dolphins, and 1 Northern Fur Seal.

There were 22 active wildlife trees, eight of which were newly identified in 2023. As usual, most of the wildlife trees were occupied by Red-breasted Sapsuckers (RBSA), but there were two used by Chestnut-backed Chickadees (CBCH), one by Hairy Woodpeckers (HAWO), two by Tree Swallows (TRES) and one by Northern Saw-whet Owls. Common Ravens were nesting in one of the previously located nests on the island, which had last been used in 2021. They fledged three young shortly after the beginning of the field season. One of the Bald Eagle nests may have been active this year, but confirmation was challenging as the nest is not visible from the ground. There was a pair of Peregrine Falcons frequently seen near the eyrie, but no chicks were observed.

This was the fifth season since the initiation of our Restoration Project, which focusses on reducing the abundance of introduced Sitka Black-tailed Deer and observing the effects on the island ecosystem. Various monitoring programs were continued: vegetation plots, songbird point counts, tree growth monitoring, and invasive plant monitoring.

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INTRODUCTION

Laskeek Bay Conservation Society (LBCS) is a non-profit organization committed to increasing 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 33 consecutive field seasons and over this period LBCS has developed diverse long-term monitoring and public education projects in Laskeek Bay. Volunteers assist researchers with data collection in order to study the abundance, distribution, and life history of wildlife in Laskeek Bay. This information helps us understand the fluctuations in marine and terrestrial ecosystems and gives a baseline against which we can describe changes in the future due to introduced species, marine pollution, global climate change, extreme weather events, and other threats to coastal ecosystems.

EDUCATION AND INTERPRETATION PROGRAM

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

Project Limestone

Project Limestone brings local students to Limestone Island to learn about natural history and participate in our research and monitoring programs. Students are led on an interpretive tour, which crosses the island and ends at Lookout Point. They learn about the natural history and geography of the area and are introduced to the various projects that we run. Depending on the timing of their visit, students may participate in field activities such as wildlife tree observations, marine mammal sea watches from the Lookout Point observation blind, or Pigeon Guillemot nest box monitoring.

In 2024, three Haida Gwaii schools came to visit East Limestone Island: the grade 7s from Tahayghen Elementary, the older class from the Living and Learning School, and a group from GidGalang Kuuyas Naay Secondary School. The Applied Coastal Ecology program at Coast Mountain College in Prince Rupert brought two groups this year. Project Limestone began in 1991, and with 36 student visitors this year, our total is now over 1000 students that have visited the island as part of this program, some multiple times.

Volunteers

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

This year we had 22 volunteers who contributed 176 volunteer days to projects on Limestone and in Laskeek Bay. Most volunteers stayed for one week, but we had a couple of local volunteers that helped for shorter periods during camp set-up. Five volunteers had visited or volunteered on the

island previously. This year, most of our volunteers were from British Columbia, including 4 from Haida Gwaii, along with two who came all the way from Tasmania.

Visitors

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

Generally, visitor groups who stop on Limestone Island are partaking in ecotourism excursions into Gwaii Haanas. This year, we had 4 visits from Bluewater Adventures, 9 visits from Moresby Explorers, and 1 visit from Passing Cloud, for a total of 132 visitors during the field season.

Student Interns

In 1998, LBCS began a program that provides students in biology or environmental studies with an opportunity to gain valuable hands-on field experience as an intern on Limestone for a four to six week period. This year's interns were Georgia Moneo, Robin Glover, and Madeleine Springle. Georgia is completing a biology degree at the University of Victoria and had spent two seasons doing fieldwork with Parks Canada in the Kootenay region before coming to Laskeek Bay. She spent four weeks at ELI, participating in camp set up, whale photo ID, transect surveys, songbird point counts, hosting school groups, and more. Robin graduated with a biology degree from the University of British Columbia in 2021 and had worked with Ocean Wise's Pollution Tracker team and Whales Initiative. During Robin's four weeks at ELI, she was busy monitoring wildlife trees, surveying the Glaucous-winged Gull colony, downloading videos from the Pigeon Guillemot nest box cameras, identifying species in the vegetation plots and helping with a myriad of other tasks. After leaving Haida Gwaii, she returned to Vancouver to begin a Master's program at UBC. Maddy graduated from UVic with a biology degree in 2020, and has gone on to work at the Ucluelet Aquarium. Maddy spent her first week with us surveying Black Oystercatchers in Gwaii Haanas, along with Robin. Upon returning to Laskeek Bay, there was more BLOY surveying and some BLOY banding with the SFU crew. Maddy also spent a week in our Skidegate office, post-field season, helping with data entry and summaries. In total the interns this season contributed 78 days to field and office work.

Staff

LBCS staff this year were Rian Dickson (Lead Biologist/Program Manager), Max Nishima (Research Assistant), and Matt Peck (Assistant Camp Supervisor). Jake Pattison participated in both weeks of Black Oystercatcher surveys in Gwaii Haanas. Judy Hilgemann, our Executive Director handled in-town logistics and coordination.

Other Research Projects

LBCS assists with other research and monitoring projects in Laskeek Bay and the surrounding area. In 2023, we continued the Pigeon Guillemot nest box video monitoring program that we are conducting in collaboration with Greg McClelland of the Canadian Wildlife Service.

David Green, from the Biological Sciences Department at Simon Fraser University, spent a week at ELI, with his field assistant Katie Chettle. They were banding Black Oystercatcher adults and resighting individuals that had been previously banded.

RESEARCH AND MONITORING PROGRAMS

Ancient Murrelets *Synthliboramphus antiquus*

Background

In 2017, remote camera monitoring became one of the primary methods of monitoring for Ancient Murrelet (ANMU) chicks departing from East Limestone Island. In 2017 and 2018 the cameras were used throughout the ANMU season with manual monitoring being conducted every second night. Given the success of camera monitoring in 2017 and 2018, in 2019, manual monitoring was discontinued, and camera monitoring became the sole means of monitoring chick departure. This freed up staff and volunteers to undertake other activities. In 2020, camera monitoring was conducted on all the funnels in Cabin Cove (5,6,7 and 8). In 2021, it was decided to monitor ANMU chick departures in alternating years. The camera system was used in 2022 and there was no chick monitoring in 2023.

Chick capture work

We plan to resume camera monitoring of ANMU chick departures in 2024.

Point counts

In past years (1990-2018), point counts were conducted in the colony area to monitor the activity of adult birds in the forest at night; five-minute counts were conducted in Cabin Cove at approximately 02:30 on some manual monitoring nights. In 2019, an automated recording unit (ARU) was set up in the same location where the point counts were conducted. This allows us to record ANMU, Cassin's Auklet and Fork-tailed Storm Petrel calls from 23:00 to 04:00, throughout the field season. Data are being archived for future analysis.

Gathering grounds

Ancient Murrelets enter and leave the breeding colony only at night. In late afternoon and evening the birds gather on the water in areas called gathering grounds, where they wait until it is sufficiently dark before entering the colony. Both breeding and non-breeding birds are thought to gather in these areas and engage in important social interactions. The Limestone Island gathering ground is located between Low Island and Limestone Island. Between 6 May and 23 June we conducted standardized 10-minute counts of birds on the gathering grounds (2 counts of 5 minutes each). Gathering ground counts were completed on 44 evenings this season. Counts were not completed on 5 days during this period (four due to weather and one due to staff availability). The highest count occurred on 13 May, with a total of 110 birds observed. This is similar to 2022 and 2021, when total highest counts were 120, on May 19 and May 6, respectively. Total counts in 2024 averaged (\pm SD) 18.4 ± 23.3 , compared to 30.3 ± 31.8 in 2022 and 20.7 ± 23.0 in 2021.

Summary: Population Trends

The breeding population of Ancient Murrelets on East Limestone Island has been declining over time. The number of departing chicks in funnels 5 and 6 declined by 56% between 2006 and 2009, likely due to the presence of raccoons in 2007 and 2009. Chick numbers increased slightly after 2009 and seemed to have stabilized in these two funnels, up until the 2015 season when there was a 67% decline in chick numbers from the previous year. Since 2015, there has been some annual fluctuation in chick numbers, but they have remained much lower than they were prior to 2015.

In 2015, it was speculated that the dramatic decline from 2014 to 2015 could have been a temporary poor breeding year due to high sea surface temperatures throughout the previous winter. With additional years of very low and decreasing chick numbers, we are concerned that the combination of poor feeding conditions, changes in habitat on East Limestone Island due to blowdown, and sporadic raccoon predation in the past, have worked together to decrease recruitment of new breeders to the East Limestone Island colony, and we are now seeing the result as a rapidly declining population on this island. We will continue to monitor ANMU population trends using a combination of chick departure data, ARU recordings and gathering ground counts.

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. As they are entirely dependent on the intertidal system throughout the year, 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 Gwaii Haanas this year, and the results from Laskeek Bay are summarized below. The results from Gwaii Haanas are detailed in the Gwaii Haanas Black Oystercatcher Survey report. We have been conducting extensive surveys of Black Oystercatchers in Gwaii Haanas for many years; in 2016 we switched to a cycle of conducting surveys in Gwaii Haanas every other year. However, the Gwaii Haanas BLOY surveyed was not completed in 2020, due to COVID-19 restrictions. With reduced restrictions in 2021, we were able to return to Gwaii Haanas for two BLOY surveys in 2021, and we completed two rounds of surveys in 2023. Methodology for shoreline surveys and territory visits are detailed in the Gwaii Haanas Black Oystercatcher Survey reports and will not be repeated here. Survey maps of the Laskeek Bay area are produced by Gwaii Haanas and included as an appendix in the Gwaii Haanas reports.

Site occupancy and reproductive success

Oystercatcher territories were visited in Laskeek Bay during 28 May – 12 June and 1-14 July. We visited and searched on foot all territories known to be occupied by breeding pairs in the last three survey years. Territories not active in the last three survey years were scanned during shoreline surveys, but not visited on foot. Shoreline surveys followed the same protocol developed for the Gwaii Haanas surveys and involved scanning shoreline areas from ~50m offshore at 11 km/hr to search for new territories. All shoreline segments were completed during both rounds of surveys (Figure 1).

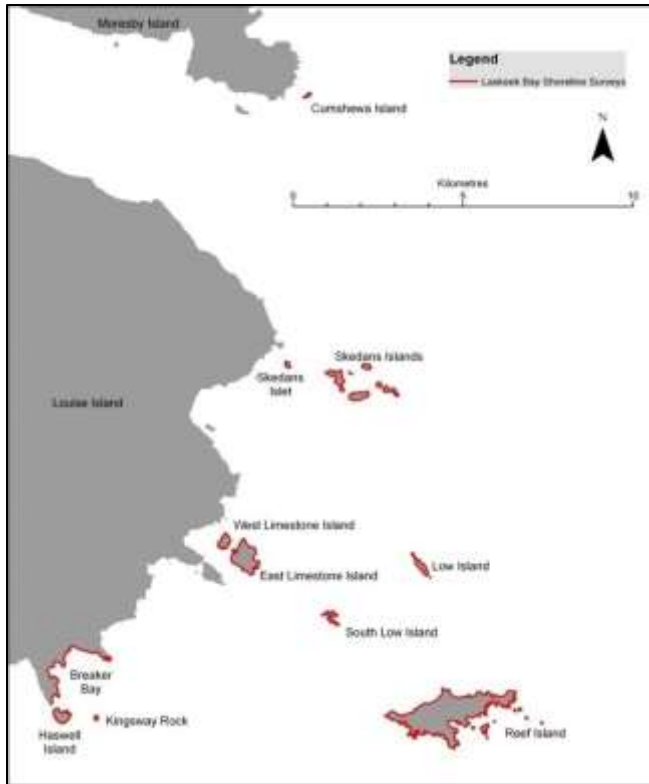


Figure 1. Shoreline segments surveyed for Black Oystercatcher breeding activity in Laskeek Bay (total survey length is 44 km).

In Laskeek Bay, 81 territories were surveyed, including 5 new territories. Of the 17 territories designated as dormant in 2022, 10 were scanned from the boat during the shoreline surveys and 7 were visited on foot (one because it was active in 2023, one was occupied, one had a pair present, and 4 were in close proximity to other territories that were being checked). There was one territory that was occupied in 2021 (last active in 2014) that was not checked on foot on either of the 2023 surveys, as the swell was too large to allow safe access, but the site was thoroughly scanned from the boat and no birds observed.

In Laskeek Bay, 47 territories were classified as occupied (territorial birds present and attending a fresh scrape) and 44 of these territories were active (evidence of eggs or chicks). Thirty-three territories were vacant of which 17 are now considered dormant. There was one territory with unknown status in 2023, as on the first survey, there were adults present, but the crew could not land due to rough conditions and on the second survey there appeared to be a fresh scrape, but no eggs, chicks, or adults present. During the first survey we found 71 eggs and 1 chick and during the second survey we found 28 eggs and 19 chicks.

Banding and re-sighted oystercatchers

In 2024, we continued our collaboration with David Green from Simon Fraser University, to band Black Oystercatchers in Laskeek Bay. These birds are banded with a metal band on the right leg and green plastic bands with white letters/numbers on both legs. Metal bands are usually permanent, while the coloured plastic bands tend to be lost over time. In 2023, 5 adults were banded (in 2022, 17 adults and 12 juveniles were banded).

All oystercatchers seen during the field season were checked for bands as this gives us information on the age and dispersal of these birds. In Laskeek Bay, there were 22 banded bird sightings during the first survey and 27 during the second survey (Table 1). Based on matching sightings of band combinations/territories, around 32 unique individuals were observed on the Laskeek Bay surveys. Of the 17 adults banded in 2022, 15 were resighted during at least one of the surveys, and the two others were identified during other fieldwork.

Table 1. Banded Black Oystercatchers re-sighted in Laskeek Bay in 2023.

Survey	Band Combo (L-R) ¹	Territory/Location Observed	Year Banded	Banded as Adult or Chick	Notes
1	Gr-Gr/M	WLI-1	2022	Adult	
1	Gr-Gr/M	WLI-1	2022	Adult	
1	UB-M	ELI-4	Unknown	Unknown	
1	UB-M	near REE-11	Unknown	Unknown	
1	Gr-Gr/M	REE-11	2022	Adult	
1	UB-M	REE-17	Unknown	Unknown	
1	Gr-Gr/M	REE-15	2022	Adult	
1	Gr-Gr/M (Y)	near SKE-15	2022	Adult	likely Y2, banded in 2022 at SKE-15 as adult
1	Gr-Gr/M (M)	SKE-15	2022	Adult	likely MA, banded in 2022 at SKE-15 as adult
1	Gr-Gr/M	SKE-3	2022	Adult	
1	Gr-Gr/M	SKE-2	2022	Adult	
1	Gr-Gr/M	SKE-19	2022	Adult	
1	UB-R/M	SKE-19	2019	Chick	
1	Gr-Gr	near REE-15	2022	Adult	
1	Gr-Gr/M	REE-12	2022	Adult	
1	UB-M	REE-1	Unknown	Unknown	
1	W-UB	SLW-5	Unknown	Unknown	
1	DB-R/M	near SLW-8	2004	Chick	
1	UB-M	KNG-4	Unknown	Unknown	
1	UB-M	KNG	Unknown	Unknown	
1	W-R/M	LOW-2	2003	Chick	
1	Gr-Gr/M	LOW-1	2022	Adult	
2	Gr-Gr	REE-12	2022	Adult	
2	Gr-Gr	REE-12	2022	Adult	
2	UB-M	REE-1	Unknown	Unknown	
2	W-R/M	SLW-5	2003	Chick	
2	Gr-Gr	near SLW	2022	Adult	
2	UB-M	KNG-8	Unknown	Unknown	
2	Gr-Gr	SKE-19	2022	Adult	

Survey	Band Combo (L-R) ¹	Territory/Location Observed	Year Banded	Banded as Adult or Chick	Notes
2	UB-R Gr-Gr/M	SKE-19	2019	Chick	Probably R/M
2	(P4) Gr-Gr/M	SKE-3	2022	Adult	banded at SKE-2
2	(MO) Gr-Gr/M	SKE-2	2022	Adult	banded at SKE-3
2	(YO) Gr-Gr/M	REE-11	2022	Adult	banded at REE-11
2	(P6) Gr-Gr/M	REE-11	2022	Adult	banded at REE-11 banded at REE-8 on 9 Jul
2	(MH) Gr-Gr/M	REE-17	2023	Adult	2023
2	(P0)	REE-12	2022	Adult	banded at REE-12
2	Gr-Gr/M (L5)	REE-12	2022	Adult	banded at REE-12
2	UB-M	north of REE-4	Unknown	Unknown	
2	UB-R/M Gr-Gr/M	east of REE-15	2019	Chick	
2	(LH) Gr-Gr/M	west of REE-15	2022	Adult	banded at REE-16
2	(LU) Gr-Gr/M	WLI-1	2022	Adult	banded at WLI-1
2	(MY)	WLI-1	2022	Adult	banded at WLI-1 recapture of bird banded by JP 28 Jun 2007 on Reef (REE-3)- old band number 1015-06973
2	UB-M	ELI-4	2007	Chick	
2	UB-M	Louise Island shore	Unknown	Unknown	
2	UB-M Gr-Gr/M	Louise Island shore	Unknown	Unknown	
2	(Y3)	LOW-1	2022	Adult	banded at LOW-1
2	W-R	LOW-4	2019 or 2003	Chick	Probably R/M
2	W-R/M UB-Gr/M	LOW-2	2019 or 2003	Chick	
2	(LT)	SKE-17	2022	Adult	banded at SKE-17

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

Oystercatcher Chick Diet

Oystercatchers feed their chicks hard-shelled invertebrates which they bring intact to the breeding territory. We collected prey remains from 16 territories in Laskeek Bay this year to quantify average diet composition fed to chicks. Limpets were the primary prey (75%), followed by mussels (14%), chitons (6%) and abalone (3%); Fig. 3). These three prey items made up 98% of the diet, consistent with what has been found in past years. In Gwaii Haanas, prey remains were

collected from 52 territories, where diet composition was similar to that of Laskeek Bay, although with a lower proportion of limpets and relative more mussels and abalone (Figure 2).

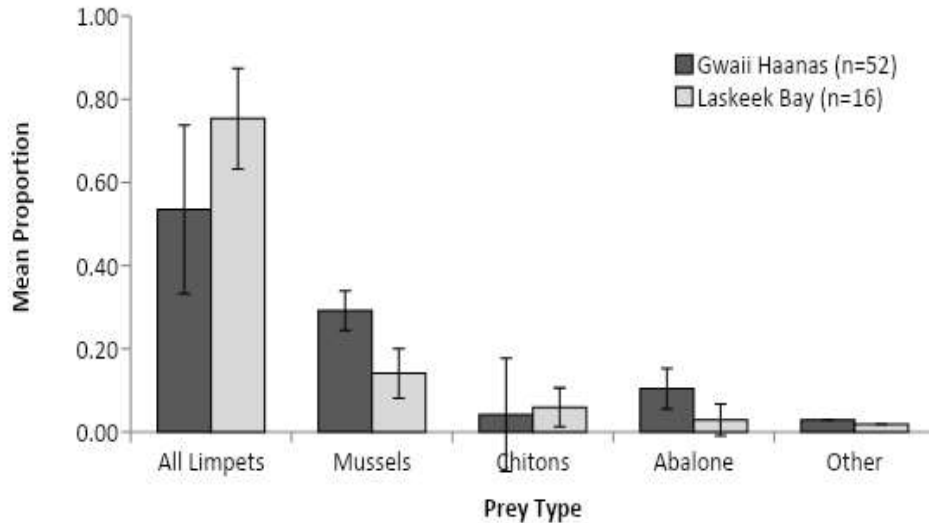


Figure 2. Black Oystercatcher chick diet from prey collections in Laskeek Bay and Gwaii Haanas in 2023. Error bars are \pm SD. 'Other' includes whelks, crabs, urchins, turban snails, barnacles, and isopods.

Northern Abalone has been documented in the diet of Black Oystercatchers in Gwaii Haanas since 2004 (Bergman et al. 2013) but our recent surveys indicate that the prevalence of abalone in their diet may be increasing. During 2004-2010, abalone made up 1-2% of prey remains sampled while in 2021 and 2023, abalone formed 10% and 3% of prey remains in Gwaii Haanas and Laskeek Bay, respectively. In 2023, abalone were found in the prey remains at three-quarters of territories in Gwaii Haanas, while in 2004-2010 there were present at half the territories. During this time, the average length of abalone collected in prey remains samples has remained quite stable. Bergman et al. (2013) found that oystercatchers were preferentially selecting abalone in the 50-60 mm size class, so we might expect that value to remain constant through time, even as the abundance and size distribution of available abalone changes.

Glaucous-winged Gulls *Larus glaucescens*

Since 1992, LBCS has been censusing gull colonies within Laskeek Bay (Figure 3). This year, we visited the known colonies on Kingsway Rock, Cumshewa Island, Reef Island, Low Island, and Lost Islands. Observations from on the water at the Skedans Islands indicated that gulls were not nesting there, so it was not surveyed on foot. Cumshewa, Reef, and Low were surveyed during Black Oystercatcher surveys, while at Kingsway and Lost we conducted surveys focused on the known colonies. At each of the colonies visited the number of active nests (those containing either eggs or chicks) was recorded as well as the number of empty nests. Lost Island, the largest colony in the area, had a total of 125 active nests (21 June) while Kingsway Rock had 68 nests (20 June). The total number of nests counted this season (193) was below the long-term average (\pm SD) of 252.7 ± 55.5 .

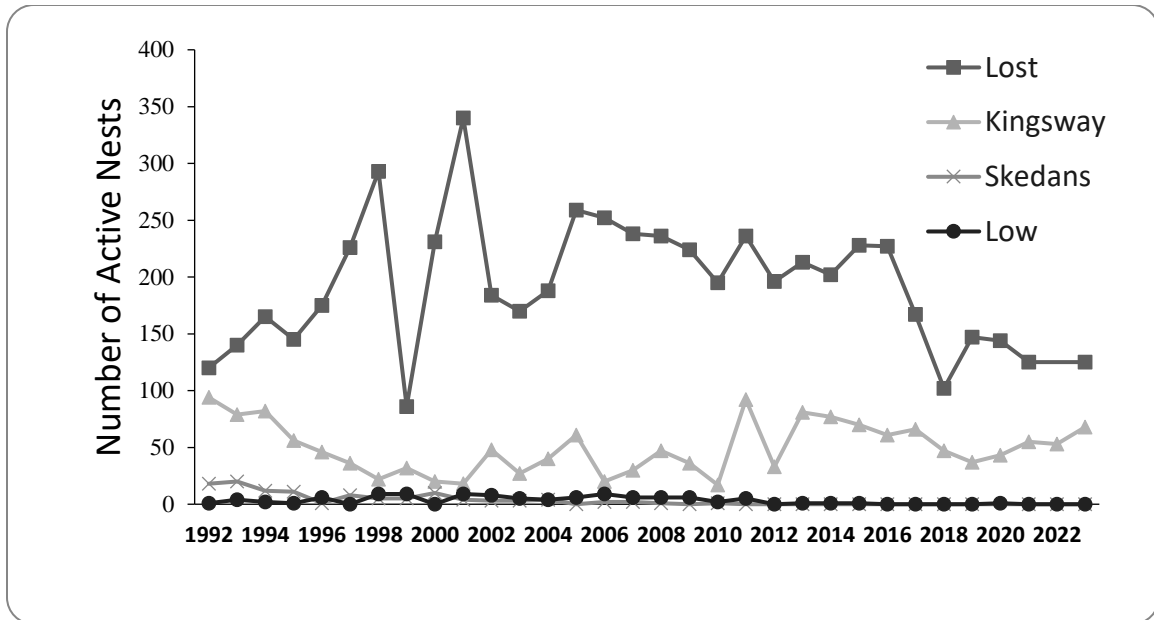


Figure 3. Glaucous-winged Gull nests containing eggs or chicks at four colonies in Laskeek Bay, 1992-2023 (note: Lost Islands were not surveyed in 2022).

Pigeon Guillemots *Cepphus columba*

There are 30 Pigeon Guillemot (PIGU) nest boxes at Lookout Point on the east side of East Limestone Island. Ten boxes were initially installed in 2001 with another 18 boxes being added in 2010. In 2019, 10 new boxes with a slightly different design were brought into the area. Eight of these boxes replaced old boxes in poor condition. In April 2021, many of the old boxes were replaced, retaining a total of 30 nest boxes in three areas on the cliffs at Lookout Point. Ten of these new nest boxes were equipped with cameras for a monitoring project we have begun in collaboration with the Canadian Wildlife Service (CWS) and partners in the Czech Republic.

Boxes were checked near the end of the season (18 July), to determine if they contained eggs or chicks. Of the 30 boxes, 27 were occupied; 24 contained chicks, two contained eggs, and one was occupied by two adults that appeared to be incubating. There was a total of 36 chicks and 3 eggs.

Pigeon Guillemot SNBox project

Our collaboration with Greg McClelland at CWS and researchers at the Czech University of Life Science Prague and the Czech Technical University in Prague to monitor nesting PIGU continued in 2023. We now have 10 nest boxes in which we can install video cameras and recording units. Despite the technical challenges associated with piloting a new system like this, we continue to record some exciting (and endearing) videos of PIGU family life. LBCS staff and CWS technicians have been watching the videos to catalogue PIGU behaviour, egg-laying and hatching dates, feeding behaviour, and more.

Cassin's Auklets and Fork-tailed Storm Petrels

Ptychoramphus aleuticus and *Oceanodroma furcata*

Small populations of Cassin's Auklets and storm petrels breed on Limestone Island. Like Ancient Murrelets, these species are nocturnal burrow nesters and are only active in the colony at night. Breeding activity on the island has fluctuated over the years, which is partly attributed to predation by introduced raccoons.

In past years, Cassin's Auklet and Fork-tailed Storm Petrel presence was monitored during nightly point counts, in conjunction with the Ancient Murrelet program. In 2019, an automated recording unit (ARU) was installed to record ANMU, FTSP, and CAAU vocalizations. Observations during the 2022 field season suggested that there was more potential FTSP breeding activity than detected in the past. In 2023, we were able to borrow 4 more ARUs from Gwaii Haanas so that we could install these along the southern shore of East Limestone Island.

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 Marbled Murrelet dataset within the province. LBCS is collaborating with CWS staff to publish an analysis of trends Marbled Murrelet survey data from Laskeek Bay over 30 years; this publication should be available in 2024.

Near-shore surveys

Near-shore surveys cover the inshore waters as far north as Cumshewa Island and south to Haswell Island. Five near-shore surveys were completed this year, on 16/17 May, 27/29 May, 11 June, 25 June, and 11/12 July. On these surveys we counted 19 species. Of these, Glaucous-winged Gull, Marbled Murrelet, Pigeon Guillemot, and Rhinoceros Auklet were observed on every survey. Ancient Murrelet, Bald Eagle, Pacific Loon, Pelagic Cormorant and White-winged Scoter were observed on most surveys, while American Crow (formerly Northwestern Crow), Black Oystercatcher, Brandt's Cormorant, Common Loon, Common Murre, Harlequin Duck, Iceland Gull, Short-billed Gull (formerly Mew Gull), Fork-tailed Storm-petrel, and Tufted Puffin were less frequently seen. A total of 79 and 93 Marbled Murrelets were counted on the 16/17 May and 27/29 May surveys, respectively.

Hecate Strait surveys

This survey takes us due east from Reef Island into Hecate Strait and then back towards the Skedans Islands. It allows us to record species that tend to stay farther from shore. No Hecate Strait surveys were completed in 2023.

Marine Mammals

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

Along with recording incidental sightings, we do standardized surveys of marine mammals during sea watches from Lookout Point, during at-sea surveys, and by doing a 5-minute scan and count of marine mammals from Cabin Cove each evening approximately two hours before sunset. The evening 5-minute count was initiated in 2014, and ends around 20 June, when the ANMU gathering ground count ends. The results of this season's total sightings are summarized in Table 2.

Table 2. Total counts of marine mammals from sea surveys, sea watches, and other sightings, 2012-2023 for Laskeek Bay area. Data from 2014 onwards include sightings during the 5-minute evening count. Sightings do not necessarily reflect the total number of unique individuals, as individuals may be recorded more than once.

Common name	Scientific name	2023	2022	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012
Northern elephant seal	<i>Mirounga angustirostris</i>	0	1	1	0	0	0	0	2	0	0	0	0
California sea lion	<i>Zalophus californianus</i>	0	0	1	0	1	0	0	0	0	4	0	0
Northern Fur Seal	<i>Callorhinus ursinus</i>	1	0	0	0	0	0	0	0	0	0	0	0
Humpback whale	<i>Megaptera novaeangliae</i>	337-344	32	56	15	122	36	22	112	13	347	12	14
Fin whale	<i>Balaenoptera physalis</i>	1	1	0	0	0	0	0	0	0	0	0	0
Grey whale	<i>Eschrichtius robustus</i>	0	11-12	1	3	5	1	2	3	0	0	1	1
Minke whale	<i>Balaenoptera acutorostrata</i>	3	7	0	0	2	2	2	9	4	3	6	2
Killer whale	<i>Orcinus orca</i>	33-35	43	75-80	8	36	36	45-60	47	50	26	16	13
Harbour porpoise	<i>Phocoena phocoena</i>	53	55-58	30	11	16	27	14-15	7	13	31	7	4
Dall's porpoise	<i>Phocoenoides dalli</i>	3	1	0	0	0	0	0	0	0	0	0	0
Pacific white-sided dolphin	<i>Lagenorhynchus obliquidens</i>	50-100	0	0	15	0	13	0	30	0	0	0	0

Humpback whales

In 2024, we saw the greatest number of Humpback whales observed since 2014, with about 340 whales seen during 79 separate sightings. As usual, most of the sightings occurred during May and early June, with about 330 humpback observations between 5 May and 8 June and only seven individuals recorded from 9 June to 21 July. Many of the humpbacks that we observed were on the eastern edge of Laskeek Bay, where it meets the open waters of the Hecate Strait. During early May we would sometimes observe 30-40 humpback whales in this area, with many engaging in flick feeding behaviour. We continue to obtain opportunistic photos of humpback whales and are working with the North Coast Cetacean Research Initiative (Ocean Wise) to identify the individual whales that use this area.

Killer whales

There were 14 sightings of killer whales in Laskeek Bay and during trips into Gwaii Haanas this season. We were able to take ID photographs during 8 of these encounters. Our photos will be submitted to DFO's Cetacean Research Program.

Steller's Sea Lions

There are several sea lion haul-outs in Laskeek Bay. The largest of these is on islets off the east end of Reef Island. There are also smaller winter haul-outs on the Skedans Islands, Cumshewa Rocks, and Helmet Island. We regularly count the number of individuals on the Reef and Skedans haul-outs. The maximum number counted this season for each of those locations was 271 individuals at Reef (27 May) and 85 at Skedans (16 May), which is very similar to 2022.

Other species

We spotted one Northern Fur Seal in 2023, near Vertical Point – an exciting first record for us! This was during a visit with Gidgalang Kuuyas Naay Secondary School in mid-June. We did not observe any Grey Whales in Laskeek Bay in 2023, although we did see some near Skidegate when we did our supply trip in early May. Our Minke Whale count was pretty typical, and we saw one Fin Whale again this year. We had over 50 sightings of Harbour Porpoises in 2023, similar to 2022, but much higher than previous years.

Wildlife Trees

LBCS has been monitoring cavity nesting birds on Limestone Island since 1990. Wildlife trees (dead standing snags) were monitored opportunistically from 1990-1994, 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 202 wildlife trees have been identified over our 34 field seasons.

This year we found a total of 22 active trees, occupied by five different species. Eight new wildlife trees were identified. Sixteen nests were occupied by Red-breasted Sapsuckers (RBSA), two by Chestnut-backed Chickadees, one by Hairy Woodpeckers, two by Tree Swallows, and one by Northern Saw-whet Owls (Table 3). The NSWOW nest found this year was the third nest for this species that has been found on East Limestone Island in over three decades of wildlife trees monitoring! This small owl is the only owl species that is known to breed on Haida Gwaii, and while it can often be heard calling during the winter and spring, not many nests have been located.

Table 3. Wildlife tree activity on East Limestone Island in 2023[†].

Tree #	Cavity Nester	Tree Species	Fledge Date (min)*	Fledge date (max)*
109	RBSA	Ss	10-Jun-23	13-Jun-23
132	CBCH	Ss	26-Jun-23	02-Jul-23
136	CBCH	Ss	15-Jun-23	17-Jun-23
165	RBSA	Ss	17-Jun-23	19-Jun-23
170	TRES	Ss	02-Jul-23	07-Jul-23
180	RBSA	Ss	17-Jun-23	19-Jun-23
182	RBSA	Hw	16-Jun-23	Unknown
183	TRES	Ss	14-Jul-23	Unknown
184	RBSA	Hw	13-Jun-23	17-Jun-23
186	RBSA	Ss	10-Jun-23	14-Jun-23
190	RBSA	Ss	19-Jun-23	23-Jun-23
192	RBSA	Ss	26-Jun-23	02-Jul-23
193	RBSA	Ss	19-Jun-23	Unknown
194	RBSA	Ss	17-Jun-23	19-Jun-23
195	NSWO	Hw	14-May-23	26-May-23
196	RBSA	Unknown	13-Jun-23	17-Jun-23
197	HAWO	Ss	24-May-23	27-May-23
198	RBSA	Ss	13-Jun-23	19-Jun-23
199	RBSA	Ss	17-Jun-23	26-Jun-23
200	RBSA	Ss	18-Jun-23	23-Jun-23
201	RBSA	Ss	17-Jun-23	23-Jun-23
202	RBSA	Ss	19-Jun-23	26-Jun-23

[†]RBSA = Red-breasted Sapsucker, HAWO = Hairy Woodpecker, CBCH = Chestnut-backed Chickadee, NSWO = Northern Saw-whet Owl, TRES = Tree Swallow, Ss = Sitka spruce, Hw = Western hemlock.
 *For min and max, fledging may have occurred on any day between the given dates.

Daily Bird Checklist

Throughout the field season, we keep a daily record of all bird species seen or heard within Laskeek Bay. The peak number of species was 39 on 9 May. There was a total of 66 species recorded over 76 days. Many species were recorded almost every day: Hermit Thrush, Pacific Wren, Glaucous-winged Gull, Pigeon Guillemot, Pelagic Cormorant, Bald Eagle, Black Oystercatcher, Townsend’s Warbler, Dark-eyed Junco, Western Flycatcher (formerly Pacific-slope Flycatcher), Golden-crowned Kinglet, Chestnut-backed Chickadee, Common Raven, Song Sparrow, Hairy Woodpecker, Red-breasted Sapsucker, and Orange-crowned Warbler.

Some of the less frequently observed species that were recorded this year included Caspian Tern, White-throated Sparrow, Pine Grosbeak, Barn Swallow, Horned Puffin, Brandt’s Cormorant, and Tufted Puffin

Raptors and Corvids

Every season, as with cavity nesting birds, we make a concerted effort through the season to keep track of other nesting birds on East Limestone Island, including Bald Eagles, Peregrine Falcons, and Common Ravens.

This year we were not able to definitively locate an active Bald Eagle nest. The first three Bald Eagle nests that were found on ELI have been abandoned and fallen over the years. Of the remaining six nests, five were not active in 2024. BAEA-6, first found in 2013, may have been active this year. The nest site is high in a Sitka spruce and difficult to view from the ground. Adults were seen and heard at the nest tree, with fresh prey remains found at the base of the tree, but we were unable to see a nest or chicks.

Peregrine Falcons were observed on about 30 days during the field season. There was a pair that was seen near the eyrie on several occasions, and sometimes exhibited territorial behaviour such as alarm calls. However, we did not observe chicks and could not confirm that they nested this year. This nest site was continuously used from 2016 to 2019, was vacant during 2020 and 2021, and in 2022 appeared to be occupied but no chicks were observed.

Common Ravens have nested and fledged young on ELI every year since 2006 (during 1991-2005 our records are not as consistent, but they did nest during some of those years). We do not know if the same pair has been on ELI for the past 16 years or if the individuals have changed during that time. In 2023, a pair nested in CORA-6, which is very close to the cabins on ELI. This nest was first active in 2021. In 2023, three young fledged on 20 May, and were seen frequently throughout the field season.

RESTORATION PROGRAM

In 2019, LBCS began a restoration project that will help East Limestone Island return to a state approaching a pre-deer era (based on what is seen on deer-free islands). A central plank in this plan is to encourage regular deer hunting on East Limestone Island, with the hope that this will substantially lower deer browsing pressure. Once regular deer hunting on the island has been established, we should be able to document the return of the native vegetation on East Limestone Island, creating an increase in biodiversity and a more resilient ecosystem. The main aspects of the monitoring program were implemented in the 2019 field season prior to the commencement of the regular hunting of deer on East Limestone Island.

This project has created an effective monitoring program for native vegetation, the browsing effects of deer, and songbird richness and abundance, as well as a monitoring program for the distribution and density of invasive alien plants.

Vegetation Plots

East Limestone Island contains habitat suitable for many types of grasses, forbs, ferns, shrubs and trees. This vegetation has changed over time due to the presence of the invasive Sitka Black-tailed Deer. In order to capture change in the vegetation structure as hunting pressure is established and deer numbers decrease, we have begun to record every plant species present, as well as estimate abundance and cover in 11 vegetation plots around the island; vegetation plots are located strategically in different areas of the island: Sitka Spruce/Western Hemlock forest (2 plots), Shoreline (4 plots—N, S, E, W), Alder forest East (1 plot), Alder forest South (1 plot), Cedar forest (1 plot) and blowdown (2 plots). The plots have a 10-meter radius (large plot) with a subplot (using the same center point as the large plot) of 3.6 m. The large plot is used to measure

species richness and the subplot is used to estimate abundance and cover. The information is recorded annually.

Songbird Point Counts

Many species of songbirds are found on East Limestone Island with different species occupying various habitats. The introduction of deer has negatively affected the abundance and distribution of flowering plants, limiting both foraging and nesting habitats for many songbirds. This has most likely led to lower levels of both songbird richness and abundance. We are now conducting point counts in all of the 11 vegetation plot areas (see above) to record the presence, location and abundance of various species of songbirds on the island, in order to monitor change in songbird distribution and abundance as deer hunting becomes a regular event.

In the 2023 field season, four sets of point counts were conducted in each vegetation plot. Each set of point counts was completed in one to three-day period, typically between 0600-1000. Dates for the point counts were 18-19 May, 30 May/2 June, 15 June, and 28-30 June. Twenty-five species of birds were recorded, with some of the most commonly recorded species being: Townsend's Warbler, Pacific Wren, Red Crossbill, Western Flycatcher (formerly Pacific-slope Flycatcher), Orange-crowned Warbler, Hermit Thrush, and Chestnut-backed Chickadee.

We have been collecting vegetation plot, songbird point count, and tree growth data for five years, and are currently in the process of organizing and summarizing that data.

Tree Growth

Sitka Black-tailed Deer have a marked effect on tree growth on East Limestone Island, the result being that it can take much longer for a tree on ELI to escape the browsing limit of the deer when compared to a place where deer are less abundant. In order to monitor and record the growth rate of trees that are within the browsing limit (<1.5m) of the deer, in 2019 ten saplings of three common tree species (Sitka Spruce, Western Hemlock, Western Red Cedar) on ELI that were <1.5m in height, were selected. The total height of the sapling and the longest lateral branch were measured and these measurements will be recorded annually. Unfortunately, some of the saplings (particularly the cedar!) that we are tracking disappear (likely eaten by deer). When this happens, we choose a nearby individual of the same species to begin monitoring, so that we continue to have 10 of each species. In 2022, also began measuring tree saplings of these species within two of our deer exclosures, so we have a sample of 10 of each species that are protected from deer browsing and we will be able to compare their growth rates to those outside the exclosures.

Invasive Plant Monitoring

Invasive plants are plants that have been introduced to an area from elsewhere and have the ability to reproduce rapidly. They often quickly take over habitat that would otherwise be available to native plant species. Invasive plants that have become established on East Limestone Island include Bull Thistle (*Cirsium vulgare*), Canada Thistle (*Cirsium arvense*), Prickly Sow-thistle (*Sonchus asper*), Wall Lettuce (*Lactuca muralis*) and Marsh Cudweed (*Gnaphalium uliginosum*).

After a three-year invasive plant removal project on ELI, it was found that the effort exerted did not provide the desired rewards. During the removal program, a number of plots were selected for invasive removal. Of these plots, ten were selected to be monitored without further removal (with some exceptions: seed heads of *Cirsium* species were, at times, clipped). The ten plots that were

selected had the most consistent records and contained the most common invasive plants on ELI. We continued to record the abundance and richness of invasive plants on these plots in 2023.

Introduced Mammals

*Sitka Black-tailed Deer *Odocoileus hemionus**

Deer were intentionally introduced to Haida Gwaii in 1878, and on several occasions between 1911 and 1925, to provide game meat for local people (Gaston et al. 2008). As 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 with the Research Group on Introduced Species (RGIS), which has carried out extensive research on this topic in Laskeek Bay as well as on the rest of Haida Gwaii.

RGIS has completed a four-year program, project BAMBI (Behavioral Adjustments to Mitigate Biodiversity loss), a study that looked at how the deer of Haida Gwaii have adapted to life in the absence of predators, and the role that fearless behaviour plays in helping deer maintain high densities on islands with severely browsed understories. This season, thermal motion-activated cameras were used to remotely track deer on East Limestone Island. In past years cameras were also set up on Reef Island, but since 2020 we have been deploying cameras just on ELI. This year on East Limestone Island, 11 deer monitoring cameras were set up around the island between 12 March and 19 July. We have had a volunteer begin the lengthy process of reviewing the deer camera photo archive, and we will continue this process as time permits.

Although project BAMBI is over, we continue to record sightings of tagged deer on East Limestone Island for RGIS. The date/time, location, tag colour/number, and sex are recorded along with any behavioral notes. In 2023, we did not see any tagged deer (one was seen in 2021), but we did find one tag that had fallen off a deer.

*Raccoons *Procyon lotor**

Raccoons were introduced in the early 1940s to provide local trappers with a source of employment (Gaston et al. 2008). Raccoons are one of the largest threats to ground and burrow-nesting seabirds on Haida Gwaii. With few defenses against mammalian predators, birds such as Ancient Murrelets, Cassin's Auklets and Fork-tailed Storm Petrels are very vulnerable to raccoon predation and typically experience rapid declines where these predators become established in colonies.

Raccoon predation is an ongoing concern on East Limestone Island and drops in Ancient Murrelet numbers have been closely correlated with raccoon presence. 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 East Limestone since 2009.

On 18-19 February 2023, we set up infrared game cameras to monitor for presence of raccoons on East and West Limestone Islands, as well as the Skedans Islands. The cameras were checked on 20-21 March 2023, with no raccoons detected. Evening raccoon surveys were conducted on 20

and 21 March, 2023 along the shorelines of West Limestone and Louise islands. Three adult raccoons were shot on Louise Island (under permit # NA23-786600, issued by the BC government).

Cameras were kept in Crow Valley and Boat Cove until the end of field season (18 July) and were monitored throughout the field season. No raccoon activity was detected by camera on East Limestone during the 2023 field season.

Red Squirrels *Sciurus vulgaris*

Squirrels were introduced to Haida Gwaii in 1950 to aid in cone gathering for the forest industry (Gaston et al. 2008). Squirrels may have been introduced to East Limestone Island directly at this time. Squirrels are now well established on East Limestone Island and are known to be a nest predator on various songbird species (Martin and Joron 2003).

Since 2007, we have been conducting squirrel surveys on East Limestone Island 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. Nine squirrel surveys were completed in the 2023 season.

Marine Plastics Monitoring

In 2016, we began documenting, collecting, and removing marine debris from several beaches in Laskeek Bay. In 2019, two beaches were selected to become long-term monitoring sites: the south beach on Reef Island and the Crow Valley beach on East Limestone Island. The type of survey conducted is an accumulation survey, which is based on National Oceanic and Atmospheric Administration (NOAA) protocols.

In partnership with Environment and Climate Change Canada, we have begun a marine plastics monitoring program. As part of this, we resumed marine debris monitoring at Reef Island and ELI in 2023. We also collected seawater samples to be analyzed for microplastics and we plan to expand this monitoring effort to other areas of Haida Gwaii.

CONCLUSION

This season was our 34th year of research, monitoring, and environmental education in Laskeek Bay. Since 1990, LBCS has focused on developing baselines and long-term data sets for the marine and terrestrial ecosystems of Laskeek Bay, as well as providing volunteers, students and visitors the chance to visit our research camp. We were very excited to welcome local school groups back to East Limestone Island in 2023, as well as volunteers, student interns and other visitors.

The lessons that we learn from our research on East Limestone Island are of great importance. In every monitoring program LBCS conducts, we are collecting quantifiable data that will allow us, and others, to conduct analyses that will produce information that can inform managers, researchers, and the general public. We hope that continuing our core long-term monitoring programs will help to document and understand broader scale changes.

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- Haida Gwaii Museum
- School District 50
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