2025

FIELD REPORT

SALISH SEA GULL PROJECT

Photo credit: Josh Green

Environment and Climate Change Canada
Environnement et Changement climatique Canada

Canada

2025
FIELD SUMMARY

Photo credit: Chantal Jacques and John Costello

Adult Glaucous-winged Gull with colour band combination blue over green (left leg) and blue over federal metal band (right leg) standing on a piling pole in Sooke, BC.

- Completed 6th year of research on gulls as indicators of the health of the Salish Sea.
- Conducted field work at 47 sites across coastal BC: 34 sites in the Salish Sea and 13 sites outside of the Salish Sea.
- Banded 114 Glaucous-winged Gulls with unique colour band combinations.
- Collected 59 health and 71 genetic blood samples from Glaucous-winged Gulls.
- Deployed GPS tracking tags on 22 adult Glaucous-winged Gulls.
- Banded and deployed GPS tracking tags on 8 adult Short-billed Gulls.

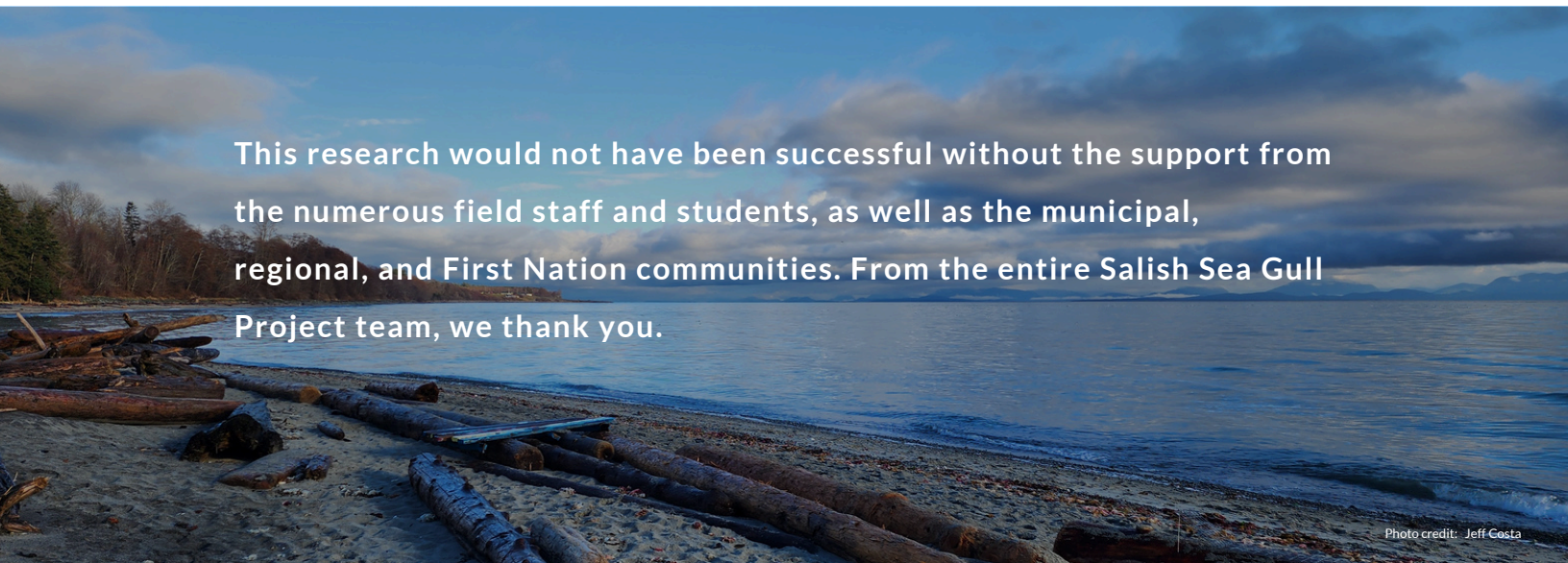
PROGRAM OVERVIEW

Gulls as Indicators of Marine Health

The Salish Sea is an important wintering area for many species of marine birds that is facing increasing pressure from urbanization, population growth, and marine transportation. The Salish Sea Gull Project is part of the Salish Sea Marine Bird Monitoring and Conservation Program to monitor marine birds as indicators of the health of the Salish Sea and to collect baseline data for conservation planning.

Gull species are protected under the Migratory Birds Convention Act of 1994 and are identified as a stewardship priority by Environment and Climate Change Canada (ECCC). Our research assesses the health of marine birds in this highly human-impacted area focusing on the survival rates, population structure, movements, habitats, diets, pathogens and diseases, as well as contaminant levels of gull species in the Salish Sea.

This project is a collaboration between ECCC and academia, led by Dr. Mark Hipfner (Wildlife Research Division, ECCC) in collaboration with Dr. Tony Williams (Centre for Wildlife Ecology, Simon Fraser University), Drs. Amy Wilson and Marie Auger-Methé (University of British Columbia), Dr. Theresa Burg (University of Lethbridge), as well as Dr. John Elliott and Kevin Kardynal (ECCC). In 2025, we coordinated field work engagement with Jeff Costa (Canadian Wildlife Service, ECCC) who led the Short-billed Gull research.



This research would not have been successful without the support from the numerous field staff and students, as well as the municipal, regional, and First Nation communities. From the entire Salish Sea Gull Project team, we thank you.

Photo credit: Jeff Costa

RESEARCH SPECIES

Common Wintering Gulls in the Salish Sea

The Glaucous-winged Gull (*Larus glaucescens*) is one of the largest species of gulls to occupy coastal habitats in both urban and natural areas in the northeastern Pacific from Oregon to Alaska. Along the coast of British Columbia, Glaucous-winged Gulls are abundant, generalist foragers that include variable amounts of both natural marine and human foods in their diets, making them excellent monitors and indicators of ecosystem health.

Photo credit: ECCC

Photo of an adult Glaucous-winged Gull, in breeding plumage.

The Short-billed Gull (*Larus brachyrhynchus*) is the smallest "white-headed" gull in North America. It was formerly known as the Mew Gull until 2021, when genetic analyses determined it should be separated into a distinct species from its counterpart in Europe and Asia (the Common Gull). In winter, the Short-billed Gull is present in high numbers throughout coastal British Columbia. They are also observed here all year but move inland away from the coast to breed on islets in freshwater lakes. However, there have been very few studies to understand its behaviour, as well as timing of seasonal and annual movements.

Photo credit: Alice Domalik

Photo of an adult Short-billed Gull, in winter plumage.

PROJECT OUTREACH

First Nation Engagement and Collaboration

With gratitude, we respectfully acknowledge that this work takes place on the traditional, ancestral and unceded territories of many Indigenous Peoples in Coastal British Columbia. As visitors and public servants, we have a responsibility to the land and to the people who have stewarded these lands since time immemorial.

We strive for meaningful engagement in hopes this project can provide opportunities to build deeper relationships and to support information sharing that is purposeful for stewardship and reconciliation.

This year, researchers met with Guardians and members from the Squamish Nation, Tla'amin Nation, Gwa'sala-Nakwaxda'xw Nations, Quatsino First Nation, ʼNa̱mgis First Nation, Pacheedaht First Nation, and K'ómoks First Nation. Thank you for welcoming us, exchanging stories, and providing invaluable insight along with assistance with the fieldwork.

We would like to express our sincerest gratitude to the many First Nations who reviewed our request, offered access to their lands, as well as their fieldwork assistance. To become involved in future field seasons, or if you would like more information on this project, please contact Mark.Hipfner@ec.gc.ca.

Photo credit: Anneka Van

PROJECT OUTREACH

Community Events

From 2020 – 2025, researchers have coordinated and presented updates on the Salish Sea Gull Project to communities and media through in-person presentations, virtual interviews, podcasts, exhibitor events, and field training (see Figure 1)

Thank you to the First Nations, municipalities, radio, tv, and film opportunities for welcoming us and providing a space for us to share our message far and wide. We genuinely appreciate your interest, time, and support.

Photo credit: Anneka Vanderpas

Anneka Vanderpas (Marine Outreach Coordinator, ECCC) at the White Rock Sea Festival, in August 2024.

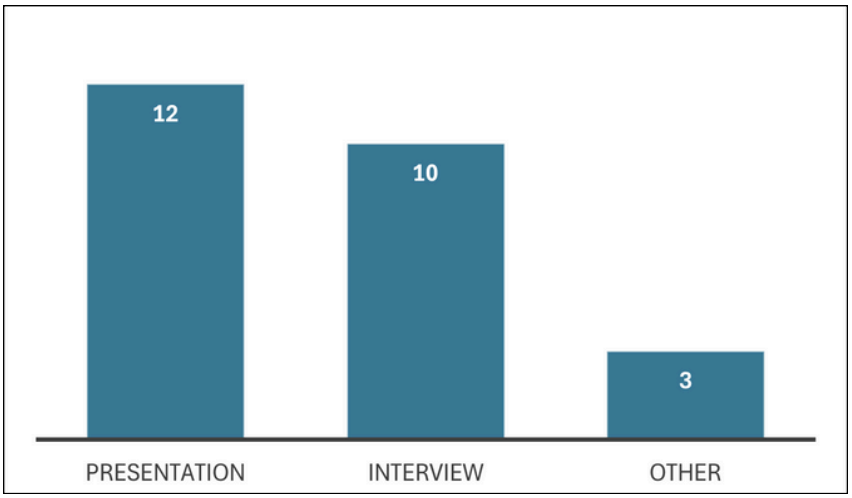
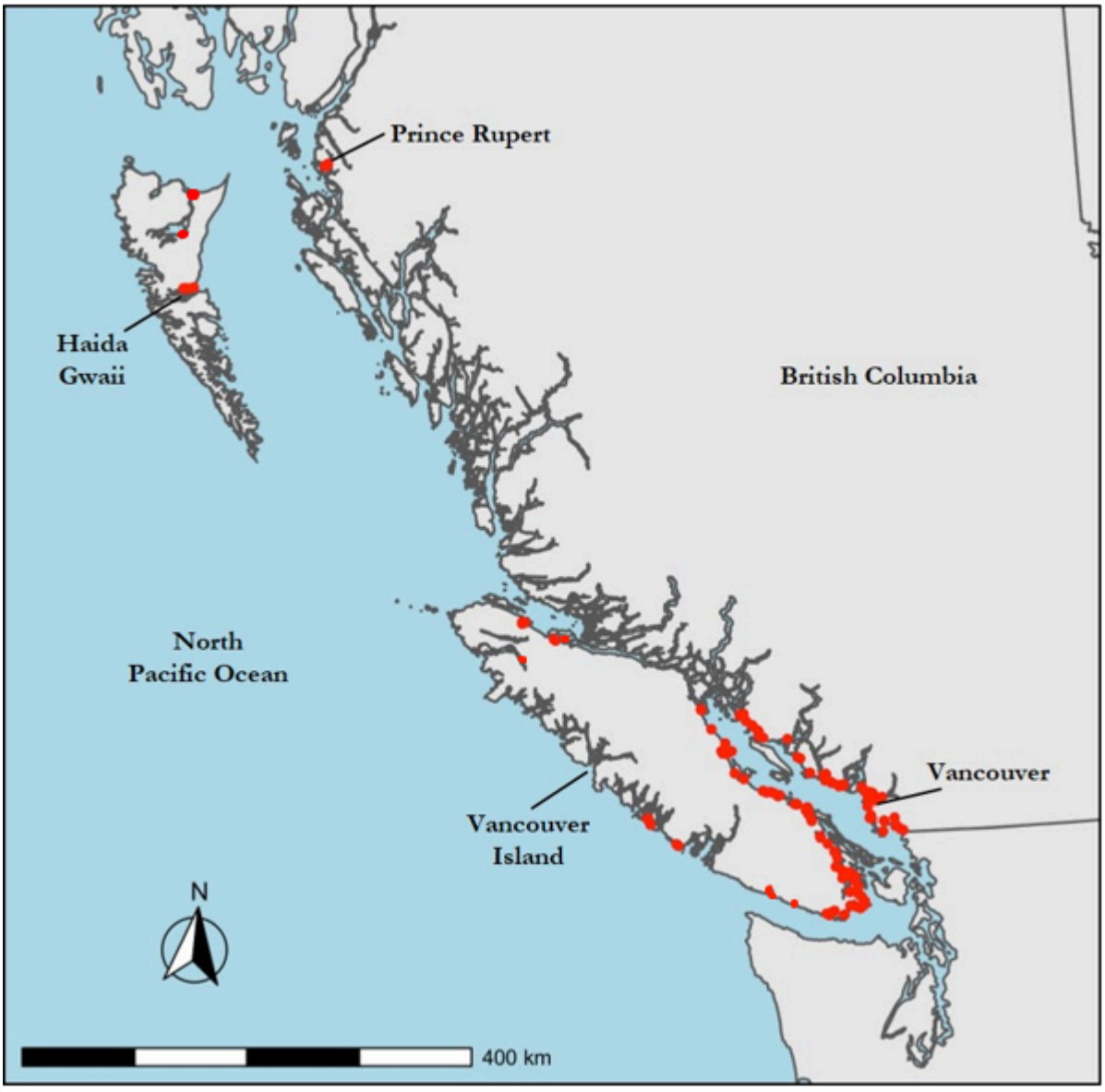


Figure 1. The Salish Sea Gull Project outreach by number and type from 2020 – 2025 (total n = 25). Presentations and interviews have been held in-person and virtually, while the other category encompasses exhibitions/events and training opportunities.

PROJECT AREA

Map of Sites



Map 1. Locations of the Salish Sea Gull Project winter 2020 - 2025 sampling sites in British Columbia (BC), Canada. Sampling sites are focused in the Salish Sea, along the eastern coast of Vancouver Island and southwestern coast of BC. Comparison sites outside of the Salish Sea are located along the west and north coasts of Vancouver Island as well as the north coast of BC, including Haida Gwaii.

FIELD METHODS

Site Selection and Sampling

From January to March 2025, ECCC conducted field research to assess the survival rates, movements, habitats, diets, pathogens and diseases, and contaminant levels of Glaucous-winged Gulls wintering in the Salish Sea and beyond. In addition, it was the first winter of research to study the behaviour, habitat use, and movements of Short-billed Gulls.

One team of researchers from ECCC's Wildlife Research Division focused their efforts on Glaucous-winged Gulls, while a separate team from the Canadian Wildlife Service piloted the Short-billed Gull research. Unlike the previous two winters, we did not visit the North Coast of BC (Prince Rupert and Haida Gwaii) due to timing considerations. However, we visited a total of 47 sites: 34 sites within the Salish Sea and 13 sites outside the Salish Sea, including Tofino, Ucluelet, Port Hardy, Port Alice, Alert Bay, Jordan River, and Port Renfrew (see Map 1, above). Sampling at the external sites enables us to compare the health of gulls under the different environmental conditions that prevail within vs. outside of the Salish Sea. In all geographic regions, we sampled gulls at natural beaches and urban areas to explore variation among habitat types.

Researchers used leg-hold noose line traps to capture 114 Glaucous-winged Gulls and 8 Short-billed Gulls in 2025 (see Table 1). For Glaucous-winged Gulls, we banded, measured and collected blood and feather samples for health, genetic, diet, as well as pathogen, parasite and contaminant analyses. Moreover, we banded, measured and collected a small blood sample for genetic analyses from Short-billed Gulls.

Table 1. Number of Glaucous-winged Gulls (GWGU) and Short-billed Gulls (SHOG) captured and banded by region in the winter 2025 field season.

REGIONS	SITES	GWGU	SHOG
Metro Vancouver	12	27	0
Sunshine Coast	8*	15	1
Juan de Fuca to Saanich Peninsula	13	30	0
Nanaimo to Campbell River	5*	15	7
Cowichan Valley	1	2	0
North Vancouver Island	4	12	0
West Vancouver Island	4	13	0
Totals	**47**	**114**	**8**

*Includes SHOG capture locations: 1 site visited in Powell River and 1 site visited in Comox.

FIELD METHODS

Site Selection and Sampling

Of the adult gulls captured, 22 Glaucous-winged Gulls and 8 Short-billed Gulls received a rechargeable solar GPS tag to track movements and habitat use over time. In the 2025 season, we collaborated with the University of British Columbia who provided the GPS tags for Glaucous-winged Gulls as part of their project investigating parasite loads and their effects on behaviour in gull species. Tags are meant to retrieve data for 2 – 5 years before the Teflon straps that hold them on deteriorate from environmental conditions and the tags fall off the bird. We also took a small blood sample from GPS tagged Glaucous-winged Gulls to directly connect movement data with blood sample analyses.

Photo credit: Sonya Pastran

An adult Glaucous-winged Gull with a leg-loop harness mounted rechargeable solar GPS tag and colour bands (white over grey on the left leg, and white over federal metal band on the right leg). This gull received a GPS tag in February 2024 and was re-sighted by an ECCC researcher from the Salish Sea Gull Project. Photos provide valuable information to sightings data, to verify colour band combination, as well as the status of the bird's physical condition.

Click here to see the Salish Sea Gull Project video by Environment and Climate Change Canada

COMMUNITY SCIENCE

Gull Colour Band Re-Sightings Form

Since 2022, each Glaucous-winged Gull and California Gull captured have been banded with a unique combination of three colour bands and a federal numerical metal band. Gulls are banded with two colour bands on their left leg and one colour band over a metal band on their right leg. The colour bands enable observers to recognize individual gulls and provide valuable re-sighting data when reported to the ECCC research team through the online form and/or the Canadian Bird Banding Office.

Data collected from the colour-band re-sighting form helps us understand the short-term and long-term habitat use and movements of gull species to inform management planning and emergency response preparedness. Over time, we can also develop an estimate of age-specific survival rates, the most important population-level demographic metric.

As of April 2025, we have received nearly 1000 sightings of colour-banded gulls – with almost 300 sightings reported within the last year! The form data has even allowed us to cross international borders, with several sightings and reports of colour-banded gulls from Washington and Alaska, USA. Sightings like yours have a tremendous impact on our research, and photographs of your sightings further the value of your reports as we can assess age-related conditions such as rate of molt as well as verify band colours.

Thank you to the community members and scientists who have and continue to contribute to the gull colour-band re-sightings form. Please feel free to share the poster with the live QR code and form link to report colour-banded gull sightings in your area!

Report sightings here:
https://forms.office.com/r/i9PG9zHCfs

Photo credit: Willow Naranjo

The infamous Westin Bayshore gull, as seen in downtown Vancouver on February 15, 2025.

COMMUNITY SCIENCE

Interesting Updates of Colour-Banded Gulls

To date, we have received over 50 reports of a colour-banded adult male Glaucous-winged Gull that frequently visits the balconies of a hotel in downtown Vancouver (see photo to the right). It was banded with yellow over green on its left leg and black over federal metal band on its right leg at Vancouver's Devonian Park on February 2, 2022. This gull's repetitive behaviour gives us key insights into the day-to-day movements and habits, and every report matters immensely for our research.

In March 2025, we received reports of a colour-banded juvenile Glaucous-winged Gull taking advantage of the herring spawn off the coast of eastern Vancouver Island near Lantzville, British Columbia (see photo below). It was banded with light blue over black on its left leg and black over federal metal band on its right leg in winter 2024 in nearby Nanaimo – highlighting the survival of this young gull to its second year, possibly in part due to the abundance of natural food locally available.

Report sightings here:
https://forms.office.com/r/i9PG9zHCfs

Photo credit: Martin Espina

Photo credit: Robert Walker

See a colour-banded gull?

Let us know!

Vous avez vu un goéland avec des bagues colorées ?

On veut le savoir !

- **Snap a photo (with colour bands on the legs visible).**
- **Take note of the time and location.**
- **Share your data with us and contribute to science!**

We acknowledge this work takes place within the unceded territory of many First Nations who have lived on this land since time immemorial.

- **Prenez une photo (avec les bagues de couleur visibles aux pattes).**
- **Notez l'heure et le lieu.**
- **Partagez vos données avec nous et contribuez à la science !**

Nous reconnaissons que ce travail se déroule sur le territoire non cédé de nombreuses Premières nations qui vivent sur cette terre depuis des temps immémoriaux.

In partnership with / En partenariat avec

SFU SIMON FRASER UNIVERSITY

UBC THE UNIVERSITY OF BRITISH COLUMBIA

University of Lethbridge

Environment and Climate Change Canada | Environnement et Changement climatique Canada

Canada

PRELIMINARY RESULTS

Field Data: Nearly 1000 Gulls Sampled

We have completed six years of the Salish Sea Gull Project winter sampling. In total we visited 347 sites in the Salish Sea and beyond, we sampled a total of 988 gulls, including 955 Glaucous-winged Gulls, 25 California Gulls, and 8 Short-billed Gulls. We colour-banded 708 individuals (684 Glaucous-winged and 24 California Gulls) and deployed GPS tags on 86 Glaucous-winged Gulls, 20 California Gulls, and 8 Short-billed Gulls (see Table 2).

Table 2. Totals for 6 years (2020-2025) of gull species sampled in the Salish Sea Gull Project. Targeted species included Glaucous-winged, California, and Short-billed Gulls.

YEAR	SITES	GULLS	GPS TAGS DEPLOYED
2020	26	64	14
2021	78	188	18
2022	64	197*	13*
2023	60	195*	10*
2024	72	222	29
2025	47*	122*	30*
Totals	**347**	**988**	**114**

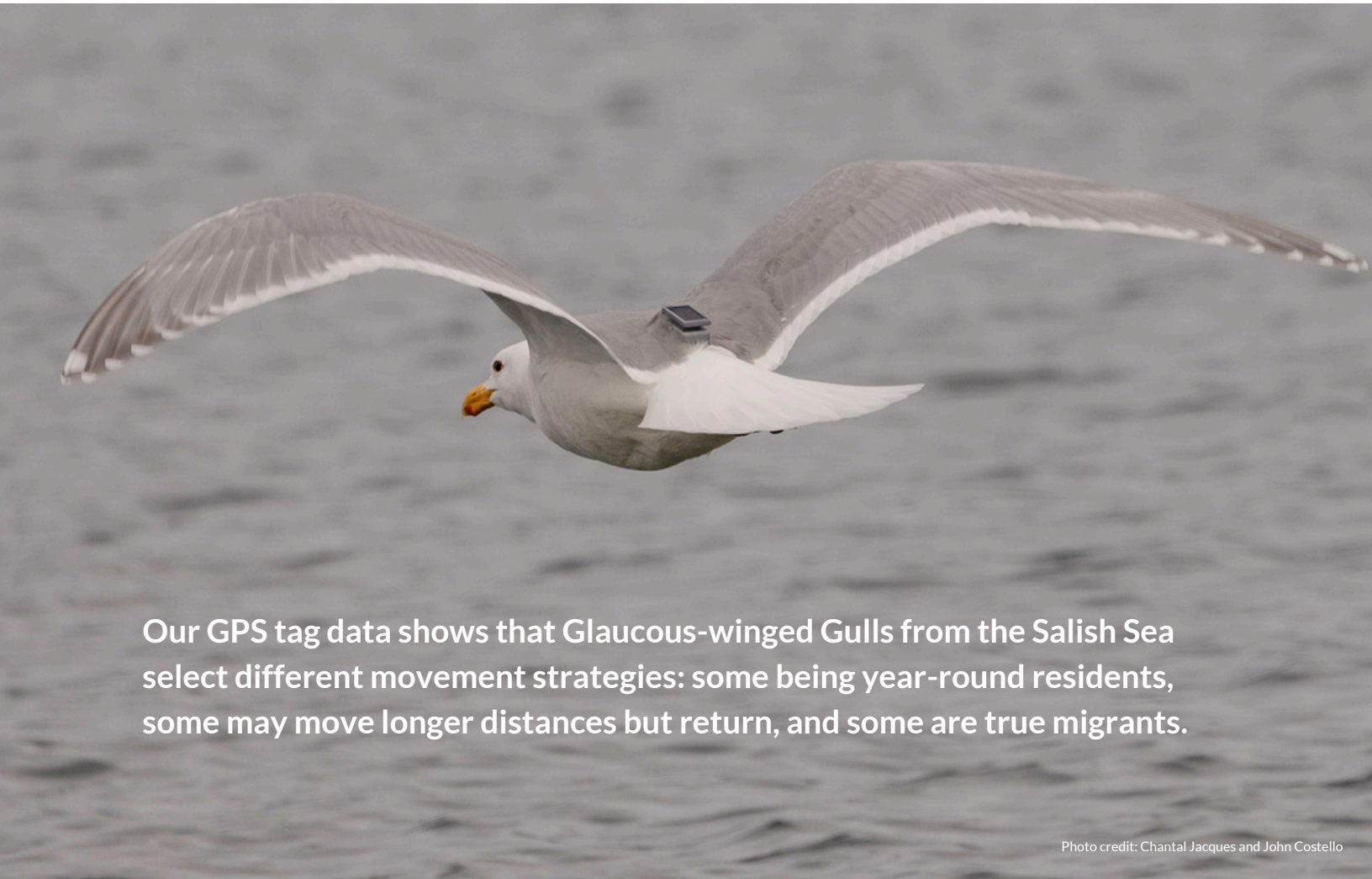
*In 2025, two sites were only visited for Short-billed Gull captures. In 2022 and 2023, 14 and 11 gulls captured were California Gulls, respectively. In 2025, 8 gulls captured were Short-billed Gulls. In 2022 and 2023, 10 GPS tags were deployed on California Gulls each year and otherwise deployed on Glaucous-winged Gulls. In 2025, 8 GPS tags deployed were on Short-billed Gulls.

Photo credit: Robert Walker

PRELIMINARY RESULTS

GPS Tracking Data: Faithful Residents and True Migrants

In the first five years, GPS tag tracking data shows that most (>75%) of the Glaucous-winged Gulls tagged here in winter are year-round Salish Sea residents. These year-round residents generally maintain small home ranges, but most also make short-distance movements to visit ephemeral food source events, such as herring spawns. However, some individuals make longer trips, moving outside of the Salish Sea, including to California, before returning to British Columbia to breed (n = 1), and travelling north to Alaska to breed (n = 3). Overall, our GPS tag data shows that Glaucous-winged Gulls from the Salish Sea select different movement strategies: some being year-round residents, some may move longer distances but return, and some are true migrants.



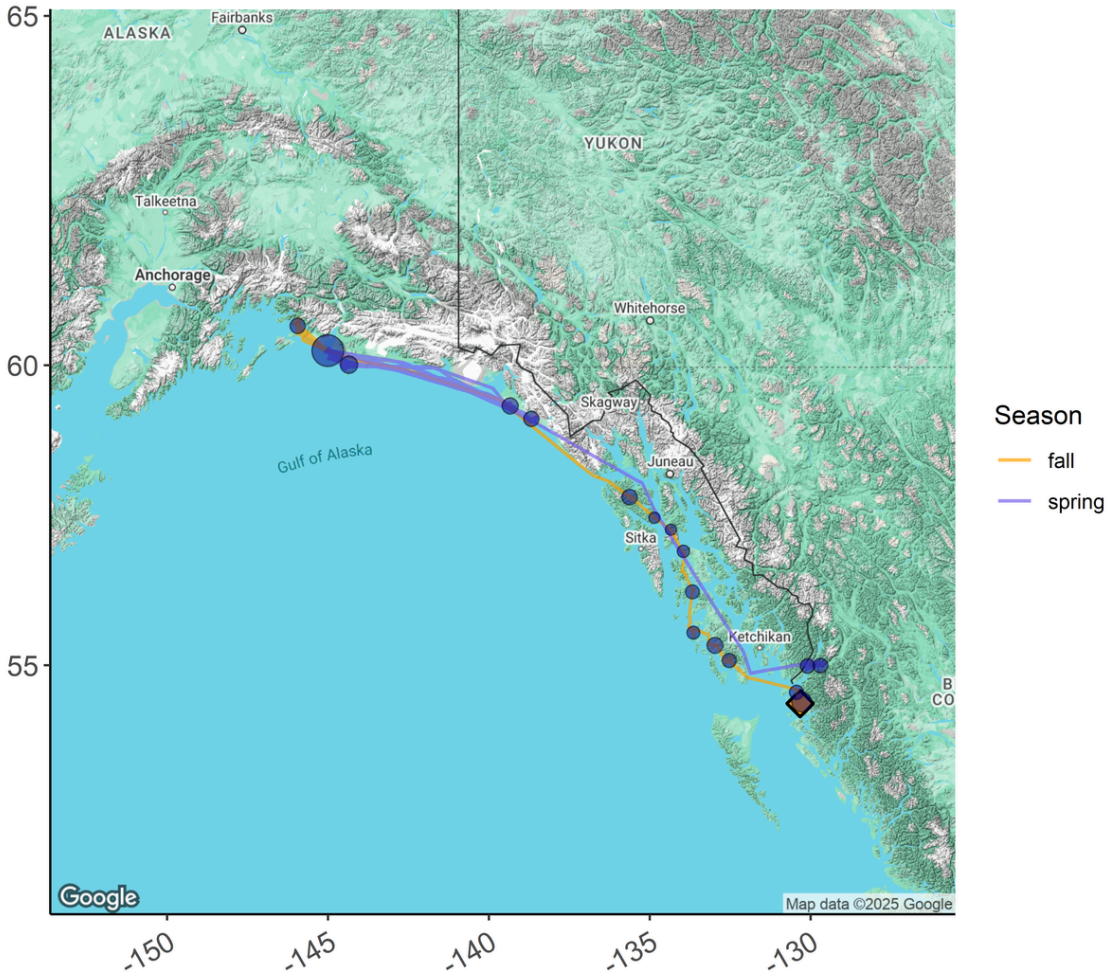
Our GPS tag data shows that Glaucous-winged Gulls from the Salish Sea select different movement strategies: some being year-round residents, some may move longer distances but return, and some are true migrants.

Photo credit: Chantal Jacques and John Costello

PRELIMINARY RESULTS

GPS Tracking Data: True Migrants

One gull GPS tagged in Prince Rupert in February 2024, with colour band combination black over yellow on its left leg, and red over federal metal band on its right leg, travelled approximately 1000km north to Cordova, Alaska shortly after capture. It spent a month travelling back and forth between Cordova and Yakutat – about a 300km distance one way. In the summer, it bred in the Cordova area before making its trip southward in the fall, following nearly a similar route along coastal inlets (see Map 2).

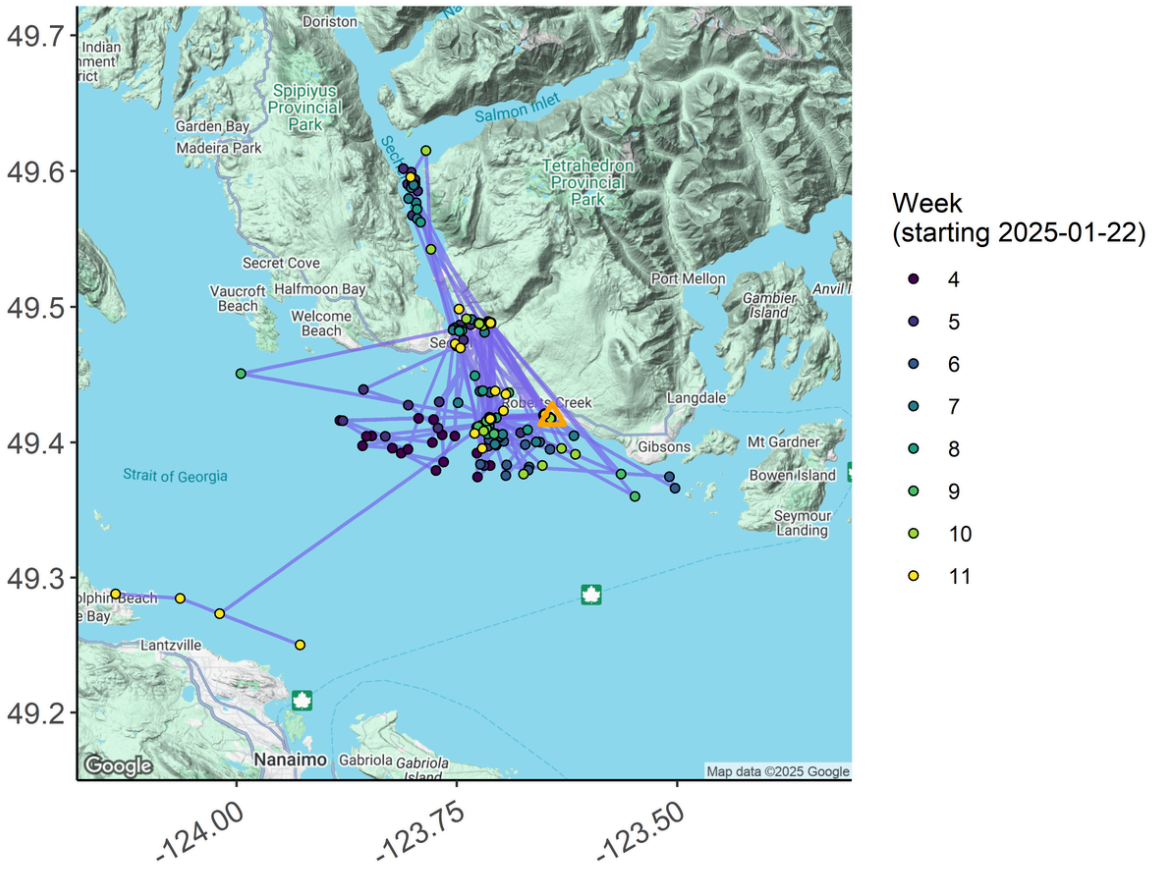


Map 2. A year-long journey (March 2024 – March 2025) of a Glaucous-winged Gull GPS tagged in Prince Rupert, BC in February 2024 (capture location shown as a diamond shape). The purple line describes the spring migration northward to breeding grounds in Alaska, and the orange line describes the return trip in the fall. Circle clusters represent stopover sites of at least 18 hours, where the larger the cluster point, the longer the bird spent in that region.

PRELIMINARY RESULTS

GPS Tracking Data: Faithful Residents

In comparison, a gull GPS tagged within the Salish Sea in January 2025 (colour band combination grey over black on its left leg and green over federal metal band on its right leg) has remained faithful to its capture region along the Sunshine Coast (see Map 3). Of note, in early March it made a short-distance migration across the Salish Sea to take advantage of the herring spawn in the Nanaimo area – a pattern we have observed in most other tagged gulls in the region.

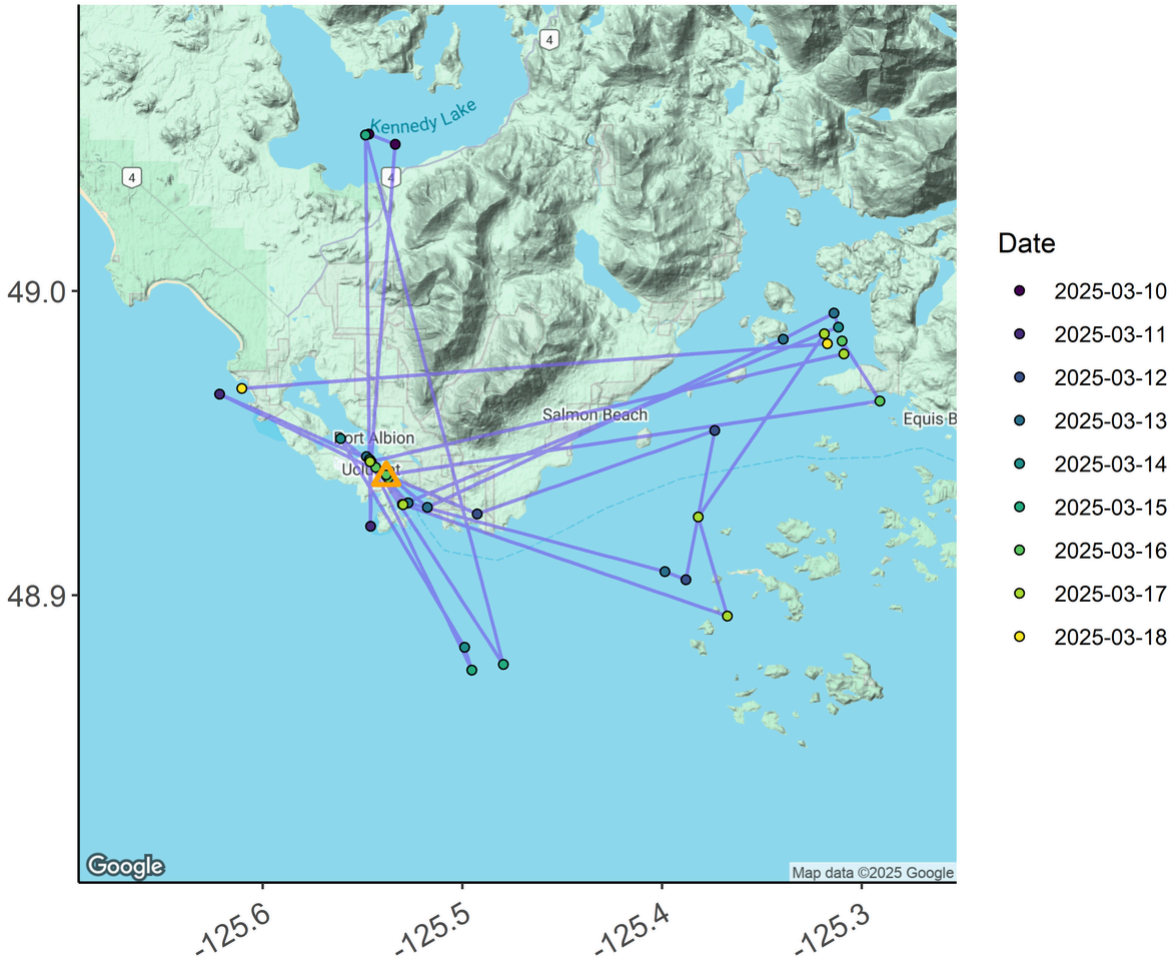


Map 3. Local and short-distance movements of a Glaucous-winged Gull GPS tagged in Roberts Creek, BC on January 22, 2025 (capture location shown as the orange triangle). The colour coded numbers and points in the legend refer to the number of weeks since the tag date, starting from darkest (purple) to lightest (yellow). Each point represents an hour.

PRELIMINARY RESULTS

GPS Tracking Data: Faithful Residents

In 2025, we GPS tagged 12 gulls outside of the Salish Sea. Movements from a Ucluelet gull with colour bands yellow over orange on its left leg and light blue over federal metal band on its right leg show this individual taking advantage of different habitat types. In only a one-week period, this gull spent time in town around seafood markets and harbours, while also utilizing nearby marine and freshwater environments (see Map 4).

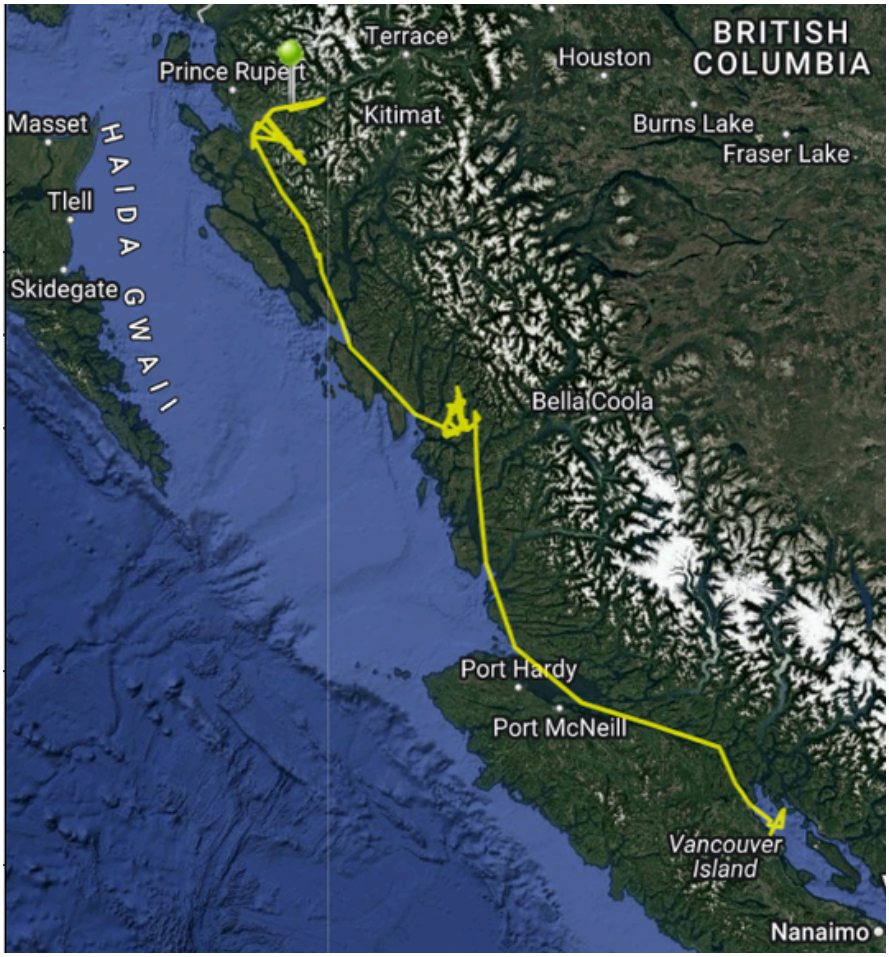


Map 4. Local and short-distance movements of a Glaucous-winged Gull GPS tagged in Ucluelet, BC on January 14, 2025 (capture location shown as the orange triangle). The dates in the legend are colour coded starting from darkest (purple) to lightest (yellow). Each point represents an hour.

PRELIMINARY RESULTS

GPS Tracking Data: Short-billed Gull Movements

In 2025, it was the first year studying the movements of Short-billed Gulls from the Salish Sea. Of special note, an individual GPS tagged in Comox on March 6 immediately travelled north, and in less than three weeks arrived in Prince Rupert (see Map 5).



Map 5. A three-week journey of a Short-billed Gull GPS tagged in Comox, BC on March 6, 2025. This map shows the raw data tracks that will be compiled and then analyzed along with seven other individuals to understand movements of this species across coastal BC and beyond.

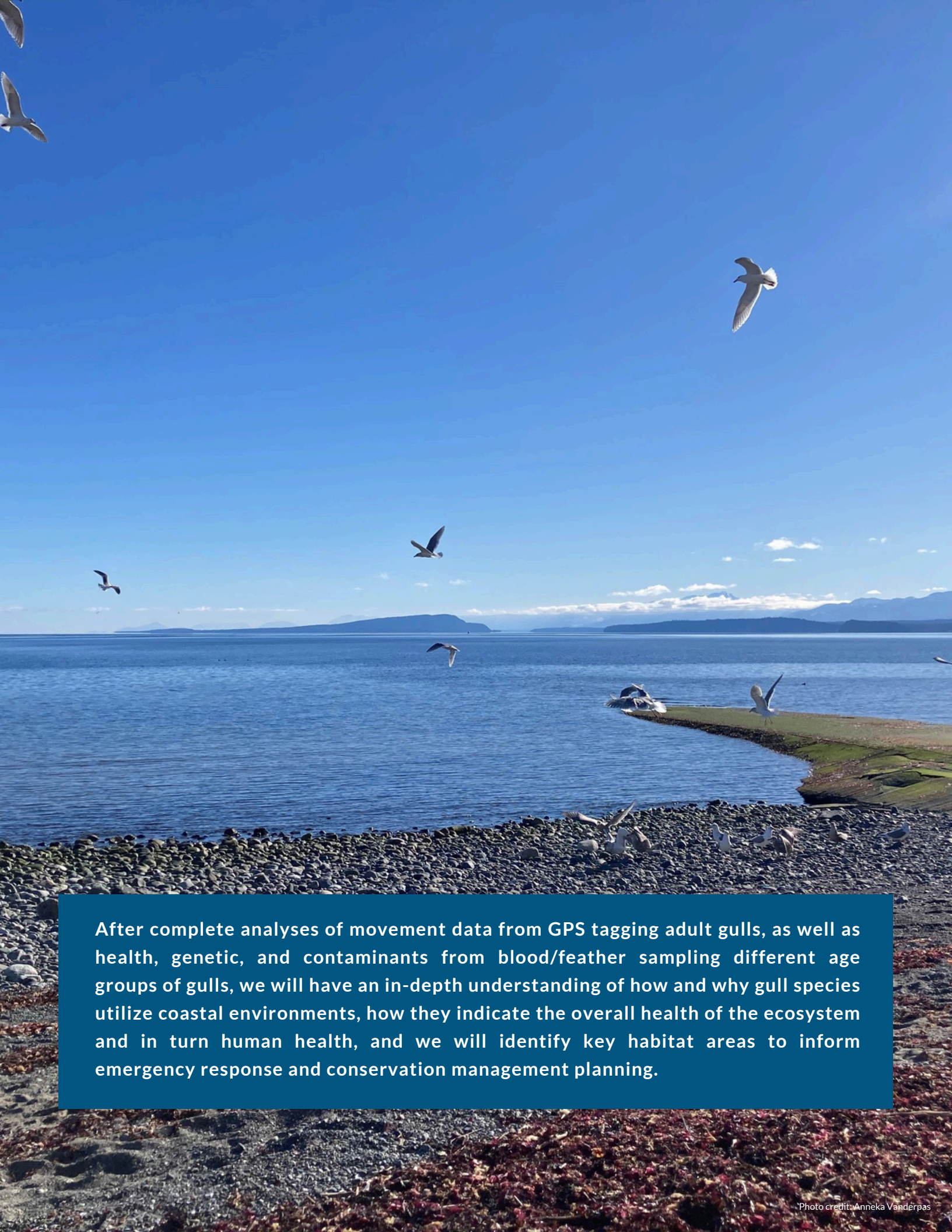
FUTURE FIELDWORK AND ANALYSIS

As original funding sources have ended, we were fortunate to complete a sixth year of winter fieldwork on gull species in the Salish Sea and beyond for movement, health, genetic, pathogen and disease, and contaminant analyses. We hope to pursue other collaborative approaches and funding sources to continue with this research – most importantly the colour-band and resighting program to derive rigorous estimates of age-specific survival and the factors that drive variation in this key demographic trait.

A five-year summary of health analyses is underway at Simon Fraser University in Dr. Tony Williams' laboratory led by MSc student Tessa Craig. Additional health analyses are being completed at the University of the British Columbia with Dr. Marie Auger-Methé and wildlife veterinarian Dr. Amy Wilson, as well as PhD student Shabnam Shadloo, focusing on rates of infection with *Toxoplasmosis gondii* and the effects of this pathogen on the behaviour of Glaucous-winged Gulls. Blood analyses will also look at the prevalence of Highly Pathogenic Avian Influenza (HPAI) in wintering gull species sampled pre- and post- significant outbreak events.

Other work currently underway includes isotopic analyses on blood and prey of wintering gull species by Kevin Kardynal (ECCC) at the Northern Wildlife Research Centre in Saskatchewan to inform our understanding of marine food-web structure in the Salish Sea. Additionally, with ECCC's Dr. John Elliott, we are investigating contamination of marine ecosystems with a suite of chemicals including heavy metals and the "forever chemicals" (PFAS) using gull blood samples collected within and outside of the Salish Sea, to inform public health risk. Dr. Theresa Burg's laboratory at the University of Lethbridge will complete genetic analyses from our dataset to determine population structure, rates of hybridization, and provenance (i.e. where they come from) of winter gull species in the Salish Sea.

Photo credit: Josh Green



After complete analyses of movement data from GPS tagging adult gulls, as well as health, genetic, and contaminants from blood/feather sampling different age groups of gulls, we will have an in-depth understanding of how and why gull species utilize coastal environments, how they indicate the overall health of the ecosystem and in turn human health, and we will identify key habitat areas to inform emergency response and conservation management planning.

Photo credit: Anneka Vanderpas

THANK YOU

The Salish Sea Gull Project research team would like to express their sincerest gratitude to the many people, groups, and communities for their support:

Thank you to the Council of the Haida Nation, Skidegate Band Council, Metlakatla First Nation, Lax Kw'alaams Band, ʼNa̱mgis First Nation, Gwa'sala-'Nakwaxda'xw Nations, Quatsino First Nation, Kwakiutl First Nation, Nanwakolas Council, Wei Wai Kum First Nation, K'ómoks First Nation, Songhees Nation, Tseycum First Nation, T'Sou-ke Nation, Pacheedaht First Nation, Tsawout First Nation, Tsartlip First Nation, Cowichan Tribes, Malahat Nation, Lyackson First Nation, Snuneymuxw First Nation, Ucluelet First Nation, Tla-O-Qui-Aht First Nation, Ahousaht First Nation and Maaqutusiis Hahoulthee Stewardship Society, Tla'amin Nation, shíshálh Nation, Musqueam Indian Band, Squamish Nation, Tsleil-Waututh Nation, Tsawwassen First Nation, and Semiahmoo First Nation for responding to our request and the opportunity to work within their traditional territories.

Thank you to the North Coast Regional District, Regional District of Mount Waddington, Capital Regional District, Cowichan Valley Regional District, Regional District of Nanaimo, Comox Valley Regional District, Strathcona Regional District, Alberni-Clayoquot Regional District, Metro Vancouver Regional District, Sunshine Coast Regional District, and the qathet Regional District for supporting our work in regional parks. Thank you to the Ministry of Water, Land and Resource Stewardship for the chance to work in the West and South Coast Conservation Lands of British Columbia.

Thank you also to the Vancouver Island municipalities: Port Renfrew, Sooke, Metchosin, Langford, Colwood, Esquimalt, View Royal, Victoria, Oak Bay, Saanich, North Saanich, Sidney, North Cowichan, Ladysmith, Campbell River, Nanaimo, Lantzville, Parksville, Qualicum Beach, Courtenay, Comox, Tofino, Ucluelet, Sayward, Port Hardy, Port McNeill, Port Alice, and Alert Bay. As well as Metro Vancouver, Sunshine Coast, and North Coast municipalities: West Vancouver, North Vancouver, Vancouver, District of North Vancouver, Richmond, Burnaby, Delta, White Rock, Surrey, Port Moody, Gibsons, Sechelt, Powell River, Prince Rupert, Port Edward, Masset, Daajing Giids, and Skidegate for the opportunity to work in local parks and beaches. Thank you as well to the Nanaimo Landfill, Victoria Landfill, Sechelt Landfill, and Vancouver Landfill for providing safety training and coordinating field days at your sites over the years.
Furthermore, we would like to thank the Raptors, also known as the Pacific Northwest Raptors Ltd., for their expertise. An additional thank you to Sara Couper with Idea Camp Communications and the Town of Qualicum Beach for their previous community engagement and outreach support.

This project was funded by the Government of Canada in response to recommendation 3 from the National Energy Board's (NEB) Reconsideration Report for the Trans Mountain Pipeline Expansion (TMX) Project. Anneka Vanderpas (ECCC) coordinated with Indigenous communities, municipalities, districts, and the Province of British Columbia. All work was conducted under the appropriate federal permits (Banding #10667F and Animal Care #25MH03).

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