2022 FIELD REPORT

SALISH SEA GULL PROJECT

A colour-banded adult Glaucous-winged Gull in flight.

Environment and Climate Change Canada
Environnement et Changement climatique Canada

2022 FIELD SUMMARY

- Completed third year of research on gulls as indicators of the health of the Salish Sea.

ECCC researchers photograph a colour-banded and GPS tagged Glaucous-winged Gull prior to release.

Field team working together to band, measure, and collect blood and feather samples from a captured gull.

- Fieldwork conducted at 56 sites within and 9 sites beyond the Salish Sea.
- Researchers colour-banded 183 Glaucous-winged Gulls and 14 California Gulls.
- Samples collected from 128 adult Glaucous-winged Gulls for ongoing physiological, genetic, and contaminant analyses.
- Deployed GPS tags on 3 adult Glaucous-winged Gulls and 10 adult California Gulls.

SALISH SEA MARINE BIRD RESEARCH AND CONSERVATION PROGRAM

Researchers working to capture Glaucous-winged Gulls in downtown Vancouver.

The Salish Sea Gull project is a five-year program to measure the survival rates, movements, habitats, diets, and contaminant levels of gulls across the Salish Sea in support of assessments of the health of this important ecosystem. The project is led by Dr. Mark Hipfner (Environment and Climate Change Canada, ECCC) in collaboration with Dr. Tony Williams (Centre for Wildlife Ecology, Simon Fraser University), Dr. Theresa Burg (University of Lethbridge), and researchers from ECCC's Science and Technology Branch.

HEALTHY COASTS AND OCEANS: MONITORING MARINE BIRDS WILL GIVE ECCC SCIENTISTS A BETTER UNDERSTANDING OF THE HEALTH OF THE MARINE FOOD WEB IN THE SALISH SEA.

FIELD METHODS

Glaucous-winged Gulls are conspicuous and abundant in and around the Salish Sea throughout the year. In winter, the region supports both year-round residents and migrants that breed outside the region. California Gulls are abundant winter residents in the Salish Sea that disperse to breed inland along lakes and rivers in the spring. Gulls of many species are recognized as effective indicators of the health of coastal ecosystems around the world.

From January to March 2022, two teams of ECCC researchers visited 56 sites within the Salish Sea and 9 sites beyond the Salish Sea in Port Hardy, Tofino, and Ucluelet (Map 1). Sampling at the latter nine sites will facilitate a comparison of environmental conditions within versus beyond the Salish Sea. Our sample sites encompassed various habitat types, including natural beaches, urban areas, as well as the Vancouver and Nanaimo Landfills.

Map 1. Sampling sites in winter 2022.

Colour-banded juvenile Glaucous-winged Gull. This individual's unique colour combination is yellow over metal on the right leg, and black over red on the left leg.

Adult and juvenile Glaucous-winged Gulls (183 in total) were captured using baited leg-hold noose line traps (Table 1). We banded captured birds with a colour band over a metal band on the right leg and two colour bands on the left leg (see above image example). This unique three-colour combination enables individuals to be easily identified. Colour-banded gull sightings can be reported to the Canadian Bird Banding Office and/or by completing this form for the ECCC research team.

Table 1. Number of Glaucous-winged Gulls captured and colour-banded by region, and the number of GPS tags deployed, in the winter 2022 field season.

REGIONS	SITES	GULLS	GPS TAGS DEPLOYED
Vancouver	14	38	0
Boundary Bay	9	28	0
Sunshine Coast	8	22	0
Sooke to Victoria	9	20	0
Saanich Peninsula	9	19	0
Nanaimo to Comox	5	14	0
North Island	2	14	0
West Island	7	19	3
Landfills	1	9	0
Totals	**64**	**183**	**3**

California Gull GPS tag harness attachment.

We measured and collected a small blood sample and a few feathers from Glaucous-winged Gulls (128 in total) for physiological, genetic, and contaminant analyses. Three adult Glaucous-winged Gulls were fitted with solar-powered GPS tags in the Tofino-Ucluelet area, to track their movements.

In March 2022 we expanded fieldwork to include California Gull sampling. We captured, measured, and colour-banded 14 adult California Gulls and deployed 10 GPS tags at the Nanaimo Landfill. We will use data from GPS tags to understand how ephemeral resources, such as herring spawn events, influence foraging patterns and migratory timing in this species.

California Gull at the Nanaimo Landfill.

PRELIMINARY RESULTS

Over 3 years of the project, we captured and processed 435 Glaucous-winged Gulls and deployed 34 GPS tags, of which 15 are still transmitting (Table 2). Molecular sexing indicates that our captures include a higher proportion of females (69%) than males (31%).

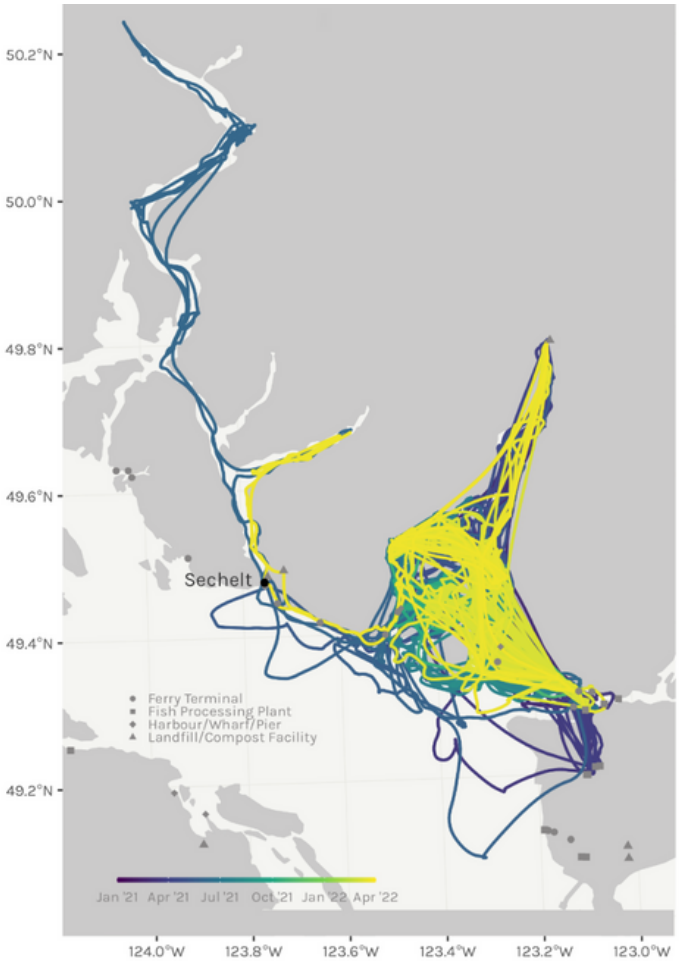
Ongoing analyses of physiological measures of health indicate that the general health of gulls wintering in the Salish Sea is comparable to that of other species of gulls measured elsewhere. Surprisingly, however, there appears to be little regional variation in the health of Glaucous-winged Gulls sampled at sites across the Salish Sea. Likewise, there was little variation in health indicators of gulls captured in different habitats (i.e., landfill, natural, urban, west coast of Vancouver Island). Long-term physiological monitoring will allow the detection of emerging threats and the impacts of human activities on the Salish Sea ecosystem.

Results of the GPS tagging exercises are also providing novel and important information. In winter, the gulls tend to remain within the general area where they were tagged. Of the 31 Glaucous-winged Gulls tagged in 2020 and 2021, 25 remained in the Salish Sea year-round (see Map 2 for an example GPS track), while six migrated outside the Salish Sea in the spring (see Map 3 for an example GPS track). Of the 10 California Gulls tagged in Nanaimo in 2022, all but one utilized the herring spawn near Denman and Hornby Islands in the Salish Sea before departing east for breeding colonies in Alberta, Saskatchewan, and Montana (see Map 4 for an example GPS track).

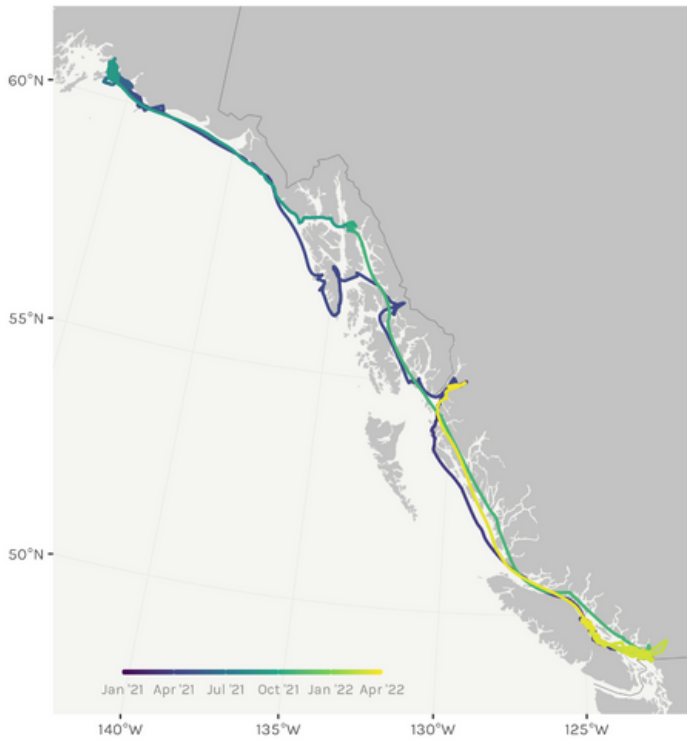
Table 2. Totals for the 3 years (2020-2022) of the Glaucous-winged Gull component of the Salish Sea Gull Project.

YEAR	SITES	GULLS	GPS TAGS DEPLOYED	GPS TAGS STILL TRANSMITTING
2020	26	64	14	4
2021	78	188	17	8
2022	64	183	3	3
Totals	**168**	**435**	**34**	**15**

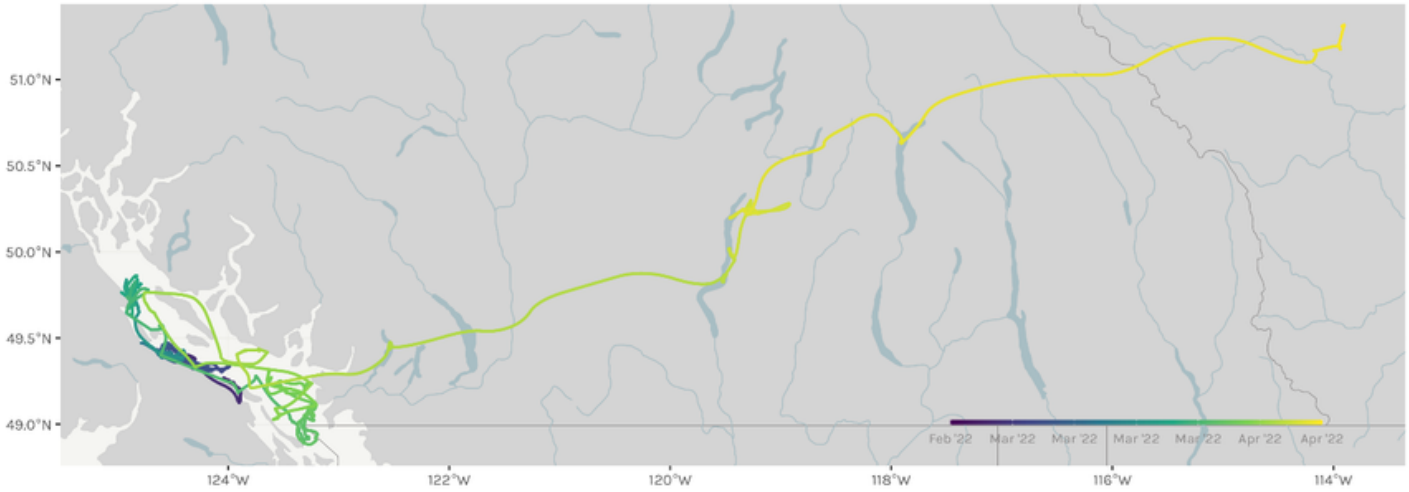
Researcher inspecting a GPS tag on an adult Glaucous-winged Gull prior to release.



Map 2. Year-round movements of a Glaucous-winged Gull tagged in Horseshoe Bay.



Map 3. Year-round movements of a Glaucous-winged Gull tagged at the Vancouver Landfill.



Map 4. Movement over 3 months of a California Gull tagged at the Nanaimo Landfill. The gull settled, probably to breed, on MacDonald Lake near Calgary.

FUTURE FIELDWORK AND ANALYSES

Analyses of blood samples to assess the physiological health of Glaucous-winged Gulls continues at Simon Fraser University, as do contaminant analyses at the ECCC laboratory in Ottawa, and genetic analyses at the University of Lethbridge. Results will shape future management and conservation planning. We will conduct detailed analyses of GPS tag data for Glaucous-winged and California Gulls to understand movements, habitat use, site fidelity, foraging patterns, and migratory timing. We plan to re-visit sampling sites within the Salish Sea and on the west and north coasts of Vancouver Island in winter 2023. We will colour-band additional Glaucous-winged Gulls, deploy additional GPS tags on California Gulls, and further examine inter-annual variation on wintering gull physiology and toxicology.

THANK YOU

Salish Sea Gull Project

The Salish Sea Gull project would not have been successful without support from the following groups:

Thank you to the Tla'amin Nation, T'Sou-ke First Nation, Tsleil-Waututh Nation, Tsawwassen First Nation, Cowichan Tribes, Lyackson First Nation, Snuneymuxw First Nation, Ucluelet First Nation, Ahousaht First Nation and Maaqutusiis Hahoulthee Stewardship Society, 'Namgis First Nation, and Kwakiutl First Nation for the opportunity to work within their traditional territories.

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Dr. Mark Hipfner
Mark.Hipfner@ec.gc.ca

Alice Domalik
Alice.Domalik@ec.gc.ca