

Sea Duck Joint Venture
Project# 166 Annual Project Report
FY23 (October 1, 2022 – September 30, 2023)

Project Title: Advancing Trans-boundary Sea Duck Conservation Actions: Scoter Habitat Use and Movement Patterns in the Salish Sea SDJV Project #166

Principal Investigators:

Joseph Evenson, Waterfowl Survey and Sea Duck Specialist, Washington Department of Fish & Wildlife; Joseph.evenson@dfw.wa.gov

Megan Ross, Wildlife Habitat Biologist, Canadian Wildlife Service, Environment and Climate Change Canada; megan.ross@ec.gc.ca

Partners:

Kyle Spragens, Waterfowl Section Manager, Washington Department of Fish & Wildlife; Kyle.Spragens@dfw.wa.gov

Matthew Hamer, Assistant Waterfowl Biologist, Washington Department of Fish & Wildlife; Matthew.Hamer@dfw.wa.gov

Sean Boyd, Science and Technology Branch (ECCC); sean.boyd@ec.gc.ca

Project Description: In order to influence and guide sea duck conservation planning and actions on landscape-level transboundary issues such as aquaculture, conflicting species management (e.g. salmonid habitat and food web enhancements, Pacific Herring management and status), environmental assessments (e.g. oil/gas/other shipping, coastal and port development) and to assess effects and response to oil spills, there is an increasing need to produce coherent and relevant species data. Recent advancements in implantable GPS-quality devices offer the ability to refine and target our knowledge towards identifying critical habitat features and time periods for Surf Scoters in the Salish Sea.

Project Objectives: 1) Deploy a minimum of 60 GPS-GSM transmitters (approximately 30 per year over 2 seasons) on Surf Scoter, 2) Create detailed spatial data products that can be used to identify critical habitat features to inform marine spatial planning, emergency preparedness and response, and other relevant conservation planning initiatives in the Salish Sea, 3) Establish relationships with regionally relevant interpretive centers using data collected from marked Surf Scoter.

Preliminary Results:

Objective 1 – The Project Team successfully exceeded the deployment goals with a final project deployment of 65 Surf Scoters and 33 White-winged Scoters. During the first field season (Year 1), the Project Team and collaborators secured 37 Ornitela OrniTrack-I30 4G transmitters for

deployment. The Project Team conducted capture efforts in both British Columbia and Washington waters of the Salish Sea. Each capture crew were assisted by surgical implantation expertise of Dr. Malcom McAdie in British Columbia and Dr. Joe Gaydos in Washington. Between November 29, 2021 and December 10, 2021, a total of 67 Surf Scoters were captured and banded (47 in BC and 20 in WA), with 28 Surf Scoters, that met thresholds for implant per banding permits requirements, were deployed with GPS-GSM transmitters (19 in BC and 9 in WA). Post-deployment mortalities were monitored by both crews, but in both deployment areas mortality exceeded 35% of deployed surf scoters. The capture period during November 2021 in both BC and WA were followed by an intense sequence of Atmospheric River events that were centered upon this region of the Pacific Northwest and are one of the anticipated products of a La Niña weather pattern, the second consecutive during the 2021-2022 winter. This was a tremendous undertaking with 21 individuals involved in the BC crew and 23 individuals involved in the WA crew, including staff, volunteers, and other partners. The second field season (Year 2) was completed on December 7, 2022, with successful deployment of 61 Ornitela OrniTrack-I30 4G transmitters deployed in the Salish Sea, including 28 (12 in BC and 16 in WA) total Surf Scoters and 33 (15 in BC and 18 in WA) total White-winged Scoters. Within Washington-waters 34 transmitters were deployed between November 8-18, 2022, with Dr. Scott Ford performing all surgical implants in Washington, and 27 transmitters deployed in BC-waters between November 21 to December 7, 2022, with Dr. Malcolm McAdie again performing all surgical implants in British Columbia. During Year 2 efforts, with approval by the SDJV-Continental Technical Team, both Surf and White-winged Scoters were selected for implant, bringing total project deployments to 65 Surf Scoters and 33 White-winged Scoters. Scoter mortality was significantly lower in British Columbia following year-2 deployments, and was similar between Surf and White-winged Scoter deployments (Table 1a). However, in Washington, Surf Scoter mortality was again around 31%, and similar between male and females. This contrasted with White-winged Scoter with only 6% post-deployment mortality, and no recorded mortalities in the eight female White-winged Scoters (Table 1b).

Objective 2 – As of September 26, 2023, the transmitters deployed as a result of this project have collected a total of 33,020 GPS-locations from Surf Scoters, and 43,440 GPS-locations from White-winged Scoters for a grand total of 76,460 GPS-locations from scoters marked along transboundary waters of the Salish Sea. All project data has been loaded to Movebank for storage, access, and distribution. As of September 26, 2023, there are six male Surf Scoters, one female and four male White-winged Scoters that have returned to cell network range and are actively downloading spring migration and summer locations (Table 2, Figure 1). Preliminary spatial data analyses have demonstrated the incredible improvement of GPS-quality location data, and application to inform various regional efforts interested in specifics related to habitat use and movements, including examples of the appropriateness of winter survey assumptions of limited movement during the time of assessment (Figure 2), differences of spatial use between diurnal and nocturnal tendencies (Figure 3), or importance of regional events such as herring spawn where more than 50% of BC deployed surf scoters visited the spawn event in Baynes

Sound, movement of scoters was often before date first recorded by surveys, and individuals visited more than one spawn site. Preliminary information and project awareness has been shared by request with several regional groups in both British Columbia and Washington. During December 8-9, 2022, three members of the project team attended a collaborative transboundary meeting held by Birds Canada related to [SDJV Project No. 169](#), where Team-member Ross provided an update on transmitter deployments and potential applications of the data collected across the Salish Sea, regardless of political boundaries. On September 27, 2023, Project Team member Spragens was requested to give a presentation to a workshop for the Global Oiled Wildlife Response Service (GOWRS) about waterfowl in the Salish Sea where this dataset allowed irreplaceable examples of the complexity of shared boundaries and migratory birds, with representatives from Washington, California, British Columbia, United Kingdom, Germany, Belgium, Brazil, New Zealand, and South Africa. Final summaries will be provided in the project final report due January 28, 2024, to allow as many scoters to download data upon return to the Salish Sea.

Objective 3 – In an effort to educate the public on this effort and to dispel some of the concerns around capture and handling of wild birds, the SeaDoc Society produced an episode for their series Salish Sea Wild that highlighted the capture and procedures, led by Dr. Joe Gaydos, Director of the SeaDoc Society and veterinarian for the Washington efforts in winter 2021-2022. View this episode (Season 3, Episode 3) at: <https://www.seadocsociety.org/salish-sea-wild>. Preliminary discussions have occurred between the WDFW-Waterfowl Section and individuals at the Padilla Bay National Estuarine Research Reserve near Anacortes, Washington and the Dungeness River Nature Center in Sequim, Washington to display interactive migration maps for visitors to the Salish Sea to see their sites connection to migration routes and breeding regions in North America. Final products are still being considered, and will be shared as part of the final project report due January 28, 2024.

Table 1a. British Columbia deployed scoter summary between November 21, 2022 and December 7, 2022.

Deployments		Total	M	F
WWSC		15	10	5
SUSC		12	11	1
Mortalities		Total	M	F
WWSC		1	0	1
SUSC		1	1	0

% Mortalities		Total	M	F
WWSC		7%	0%	20%
SUSC		8%	9%	0%

Table 1b. Washington deployed scoter summary during November 2022.

Deployments		Total	M	F
WWSC		18	10	8
SUSC		16	7	9
Mortalities		Total	M	F
WWSC		1	1	0
SUSC		5	2	3
% Mortalities		Total	M	F
WWSC		6%	10%	0%
SUSC		31%	29%	33%

Table 2. Summary of Surf Scoter and White-winged Scoter GSM-GPS deployments in British Columbia and Washington during 2021 and 2022. Total locations, Most Recent Location date, and Status were updated as of September 26, 2023 and are anticipated to increase as more scoters return to the Salish Sea region during fall and winter 2023.

ID	Species	Cohort	Deployment Region	# locations	Deployment Date	Most Recent Location	Status
226222	SUSC	AHYF	WA	991	11/9/2022	5/2/2023	
226226	SUSC	AHYF	WA	24	11/9/2022	11/12/2022	
226234	SUSC	AHYF	WA	1199	11/11/2022	5/5/2023	
226242	SUSC	AHYF	WA	1066	11/15/2022	5/10/2022	
215261	SUSC	AHYF	WA	1298	11/16/2022	5/9/2023	
215256	SUSC	AHYF	WA	16	11/16/2022	11/17/2022	
226244	SUSC	AHYF	BC	602	11/24/2022	2/16/2023	
215264	SUSC	ATYF	WA	117	11/30/2021	12/26/2021	
215255	SUSC	ATYF	WA	24	11/30/2021	12/4/2021	
215246	SUSC	ATYF	BC	92	12/3/2021	12/18/2021	
215238	SUSC	ATYF	BC	845	12/4/2021	5/19/2022	
215242	SUSC	ATYF	BC	196	12/4/2021	1/9/2022	
215245	SUSC	ATYF	BC	38	12/4/2021	12/9/2021	
215230	SUSC	ATYF	BC	867	12/4/2021	5/12/2022	
215240	SUSC	ATYF	BC	59	12/8/2021	12/17/2021	
215244	SUSC	ATYF	BC	238	12/8/2021	1/16/2022	
215235	SUSC	ATYF	BC	69	12/8/2021	12/26/2021	
215237	SUSC	ATYF	BC	16	12/8/2021	12/10/2021	
215233	SUSC	ATYF	BC	6	12/10/2021	12/11/2021	
226235	SUSC	HYF	WA	16	11/10/2022	11/12/2022	
215243	SUSC	SYF	BC	656	12/8/2021	4/17/2022	
<i>subtotal Surf Scoter Females</i>				<i>8435</i>			
224718	SUSC	AHYM	WA	3660	11/9/2022	4/27/2023	
226230	SUSC	AHYM	WA	30	11/10/2022	11/13/2022	
226231	SUSC	AHYM	WA	1185	11/10/2022	9/25/2023	ACTIVE
226233	SUSC	AHYM	WA	1433	11/10/2022	9/16/2023	ACTIVE
226228	SUSC	AHYM	WA	1071	11/10/2022	4/3/2023	
215253	SUSC	AHYM	WA	33	11/16/2022	11/19/2022	
215251	SUSC	AHYM	WA	1483	11/16/2022	9/21/2023	ACTIVE
226249	SUSC	AHYM	BC	853	11/23/2022	9/26/2023	ACTIVE
226251	SUSC	AHYM	BC	1073	11/24/2022	5/10/2023	
225920	SUSC	AHYM	BC	5762	11/25/2022	1/26/2023	
225918	SUSC	AHYM	BC	510	12/5/2022	5/8/2023	
225917	SUSC	AHYM	BC	718	12/5/2022	9/20/2023	ACTIVE
226230	SUSC	AHYM	BC	146	12/7/2022	12/28/2022	

225252	SUSC	AHYM	BC	525	12/8/2022	4/29/2023	
215248	SUSC	AHYM	BC	619	12/8/2022	3/8/2023	
215259	SUSC	ATYM	WA	23	11/30/2021	12/7/2021	
215262	SUSC	ATYM	WA	49	11/30/2021	12/7/2021	
215258	SUSC	ATYM	WA	66	12/1/2021	12/23/2021	
215231	SUSC	ATYM	BC	45	12/4/2021	12/12/2021	
215228	SUSC	ATYM	BC	910	12/4/2021	6/13/2022	
215250	SUSC	ATYM	WA	303	12/8/2021	2/19/2022	
215254	SUSC	ATYM	WA	33	12/8/2021	12/14/2021	
215229	SUSC	ATYM	BC	693	12/9/2021	4/8/2022	
215241	SUSC	ATYM	BC	887	12/10/2021	11/8/2022	
215239	SUSC	ATYM	BC	49	12/10/2021	12/18/2021	
215234	SUSC	ATYM	BC	39	12/10/2021	12/18/2021	
215236	SUSC	ATYM	BC	340	12/10/2021	4/17/2022	
215232	SUSC	ATYM	BC	425	12/10/2021	4/17/2022	
226245	SUSC	SYM	BC	1309	11/25/2022	9/21/2023	ACTIVE
226250	SUSC	SYM	BC	313	12/6/2022	5/15/2023	

subtotal Surf Scoter Males 24585

226223	WWSC	AHYF	WA	7436	11/9/2022	4/17/2023	
226220	WWSC	AHYF	WA	1178	11/9/2022	5/6/2023	
226225	WWSC	AHYF	WA	1292	11/9/2022	5/16/2023	
226221	WWSC	AHYF	WA	1090	11/9/2022	5/9/2023	
226237	WWSC	AHYF	WA	983	11/15/2022	5/1/2023	
215257	WWSC	AHYF	WA	6123	11/15/2022	2/23/2023	
215249	WWSC	AHYF	WA	235	11/16/2022	12/24/2022	
225914	WWSC	AHYF	BC	793	11/22/2022	4/24/2023	
226246	WWSC	AHYF	BC	957	11/25/2022	9/19/2023	ACTIVE
225923	WWSC	AHYF	BC	359	11/25/2022	4/5/2023	
225919	WWSC	AHYF	BC	136	12/5/2022	12/30/2022	
225915	WWSC	AHYF	BC	800	12/6/2022	5/8/2023	

subtotal White-winged Scoter Females 21382

226229	WWSC	AHYM	WA	1354	11/10/2022	7/24/2023	
226232	WWSC	AHYM	WA	1227	11/10/2022	7/16/2023	
226240	WWSC	AHYM	WA	729	11/15/2022	3/6/2023	
226241	WWSC	AHYM	WA	1151	11/15/2022	9/19/2023	ACTIVE
226238	WWSC	AHYM	WA	1225	11/15/2022	5/16/2023	
226239	WWSC	AHYM	WA	1306	11/15/2022	5/22/2023	
226236	WWSC	AHYM	WA	1033	11/15/2022	9/16/2023	ACTIVE
215247	WWSC	AHYM	WA	488	11/15/2022	2/28/2023	
226243	WWSC	AHYM	WA	1119	11/15/2022	5/2/2023	
226254	WWSC	AHYM	WA	49	11/15/2022	11/21/2022	
225926	WWSC	AHYM	BC	738	11/21/2022	5/8/2023	

225925	WWSC	AHYM	BC	487	11/22/2022	4/22/2023	
226248	WWSC	AHYM	BC	1366	11/22/2022	9/7/2023	ACTIVE
225916	WWSC	AHYM	BC	1045	11/22/2022	9/15/2023	ACTIVE
225922	WWSC	AHYM	BC	999	11/22/2022	5/15/2023	
225924	WWSC	AHYM	BC	434	11/25/2022	5/3/2023	
225913	WWSC	AHYM	BC	689	12/6/2022	4/24/2023	
226247	WWSC	AHYM	BC	994	12/8/2022	5/24/2023	
225921	WWSC	AHYM	BC	930	12/8/2022	8/7/2023	
225927	WWSC	ATYM	BC	3478	11/23/2022	1/30/2023	
226227	WWSC	HYF	WA	1217	11/10/2022	6/5/2023	

subtotal White-winged Scoter Females 22058

subtotal Surf Scoter GPS-locations 33020

subtotal White-winged GPS-locations 43440

TOTAL SCOTER PROJECT GPS-locations 76460

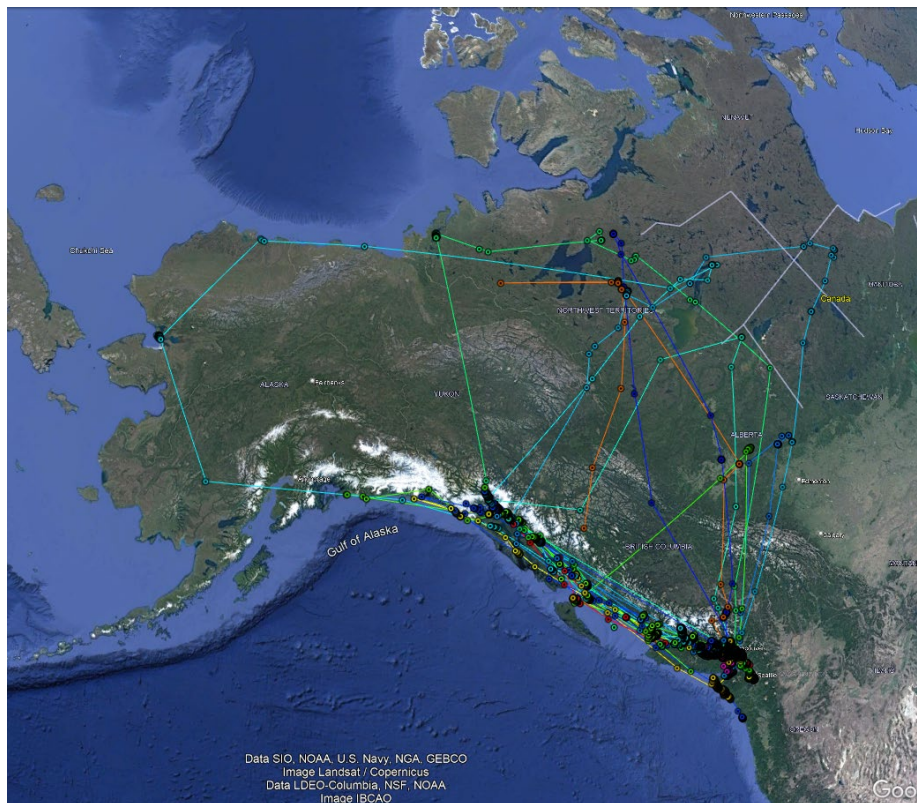
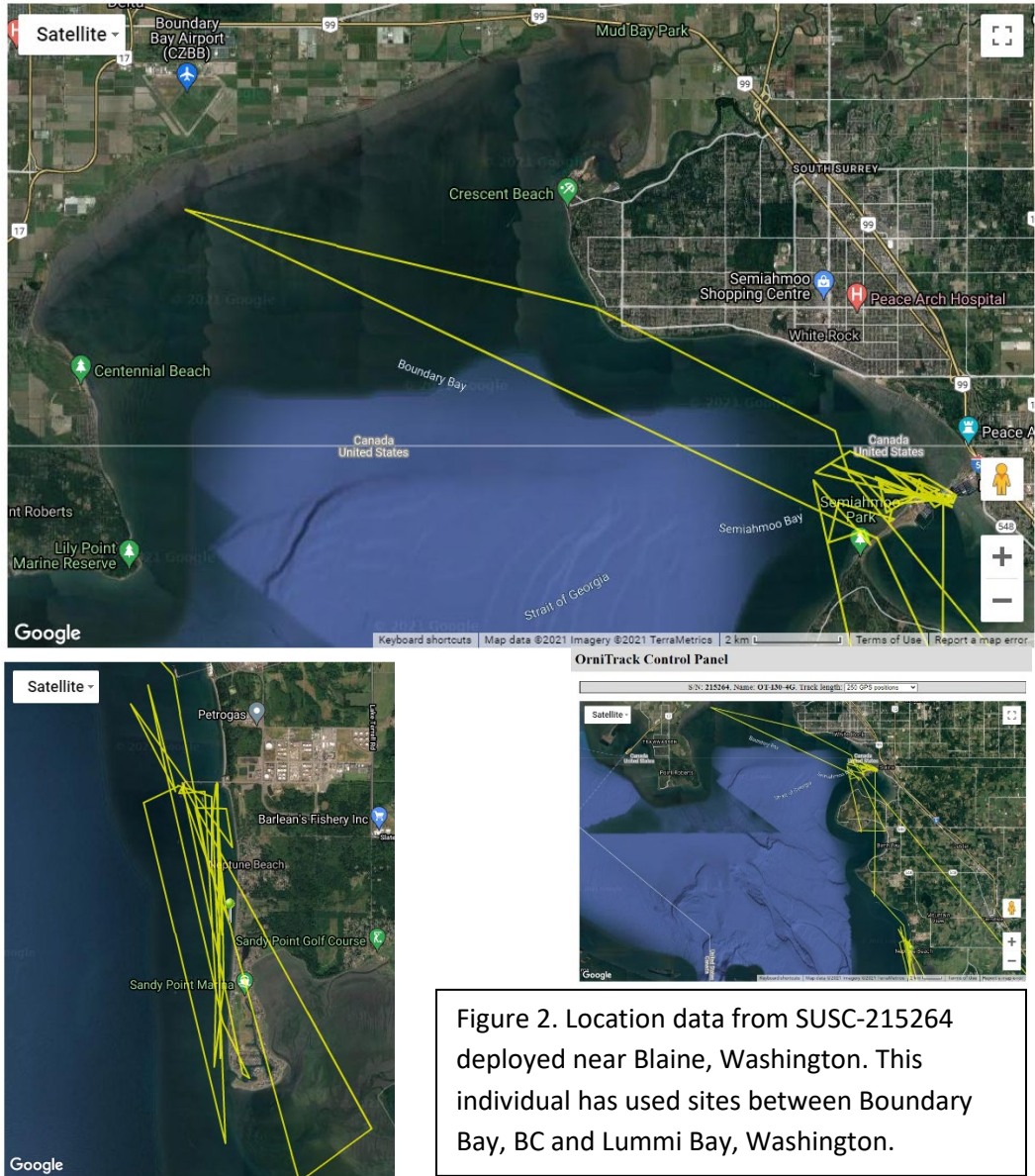


Figure 1. Combined scoter map displaying the extent of all Salish Sea marked scoters, including eleven active scoters (six Surf Scoters, five White-winged Scoters).

Example 1:



Example 2:

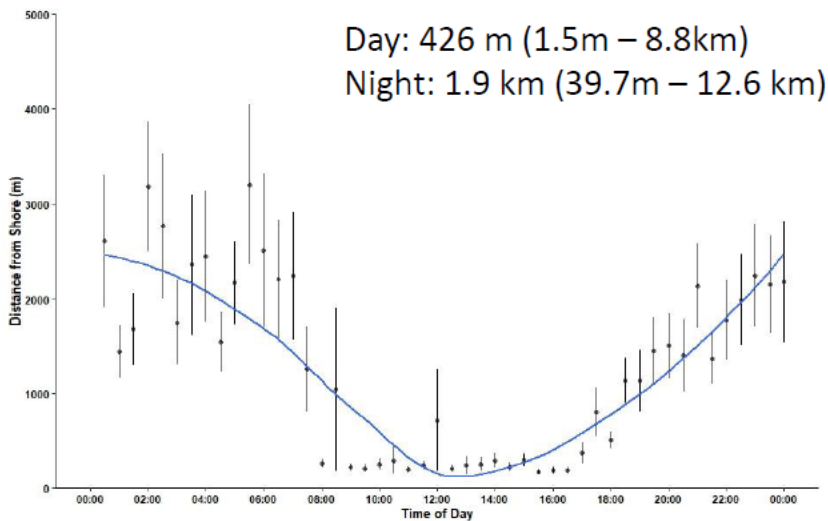
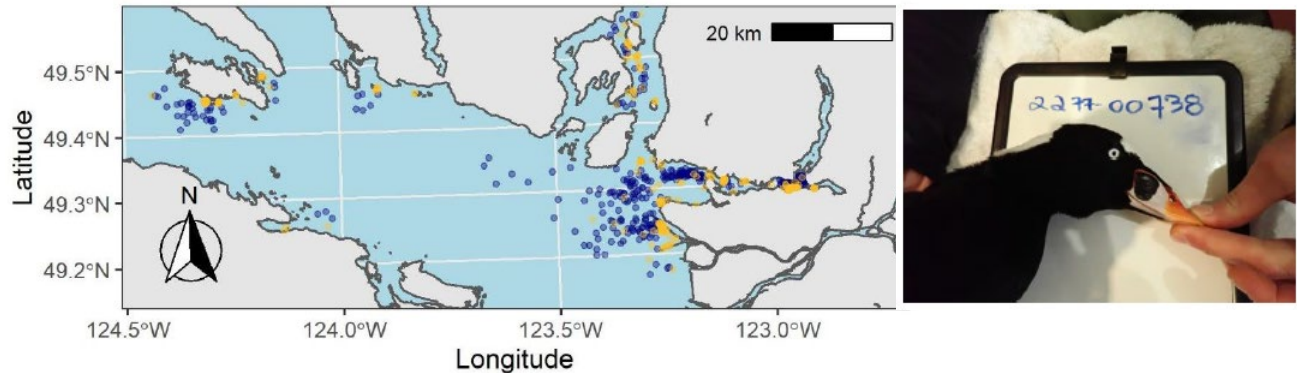


Figure 3. Location data from SUSC-227700738 deployed in British Columbia. Map displays diurnal (day = yellow) versus nocturnal (night = purple) locations of received GPS-locations. Graph illustrates tendency of closer to shore during diurnal, but further offshore during nocturnal long assumed, but not verified.

Project Status: The Project Team has completed all captures and deployed all scoter transmitters related to this project. Project Team has conducted preliminary assessments of the more than 76,000 GPS-locations collected to date, but with 11 active scoters and the anticipation of more returning here in the next two months, are preparing the analytical framework, but awaiting the full datasets before producing final spatial data products to be utilized with regional planners and outreach/education centers. All project data has been uploaded to Movebank and will be made available upon completion of final project write up. Final project report will be provided January 28, 2024.