Sea Duck Joint Venture
Progress Report – September 2009

Project Title: Population delineation and wintering ecology of Surf Scoters in Southeast Alaska (SDJV Project # 108).

Principal Investigators:
Dan Esler, Centre for Wildlife Ecology, Simon Fraser University, 5421 Robertson Road, Delta, BC, V4K 3N2; desler@sfu.ca; (604) 940-4652

David Ward, Alaska Science Center, U. S. Geological Survey, 1011 E. Tudor Road, Anchorage, AK 99503; dward@usgs.gov, (907) 786-7097

Jerry Hupp, U.S. Geological Survey, Alaska Science Center, 1011 East Tudor Road, Anchorage, AK, 99503; jhupp@usgs.gov; (907) 786-7096

Corey VanStratt, Centre for Wildlife Ecology, Department of Biological Sciences, Simon Fraser University, 8888 University Drive, Burnaby, BC V5A 1S6; csv5@sfu.ca; (778) 782-5618

Project Description:
Population delineation and wintering ecology of surf scoters have been studied in detail through much of their range. A conspicuous gap exists for Southeast Alaska, which is near the northern end of their winter distribution. Because Southeast Alaska is an important wintering habitat for a sizeable number of Pacific Surf Scoters, we have marked birds with satellite transmitters (PTTs) to quantify links among annual cycle stages and define management units. In addition, we have conducted detailed studies of wintering ecology that will be directly comparable to work at more southerly wintering sites, allowing a full consideration of latitudinal variation in wintering ecology of the species. This work will provide data to evaluate factors influencing population dynamics and identify important habitats of this declining species.

Objectives:
Our research is addressing the following, specific questions:

1) What is foraging effort by wintering scoters in Southeast Alaska, does it vary by age and sex cohort, and how does it compare to other wintering sites?

2) How does survival vary across cohorts and wintering regions?

3) How does body mass compare to that in other wintering areas?

4) How far do individuals move during winter and what habitats do they use?

5) How do age and sex composition vary by habitat, and compare to other wintering regions?

6) What are the key migration routes, migration chronology, and affiliation to specific breeding and molting sites for scoters that winter in southeast Alaska?

7) What rate and scale of site fidelity do surf scoters show throughout the annual cycle, and how does this influence definition of management units?

Preliminary Results:

We conducted the first full winter of fieldwork for this study in the vicinity of Juneau, Alaska, between 18 November 2008 and 1 April 2009. Surf scoters were captured between 18 November and 2 December 2008 at three different locations. A total of 99 surf scoters was captured (Table 1); sex was determined based on plumage and cloacal characteristics, and age class was estimated based on bursal depth. After banding each scoter with a uniquely-numbered USFWS tarsus band, we measured morphometric features (diagonal tarsus, culmen, bill width, feather-free bill, wing chord, wing stub length, and ninth primary length). Body mass was measured (± 1g) to compare variation in mass among sex and age classes. To address questions pertaining to survival and foraging effort, 50 VHF radio transmitters were attached to surf scoters (Table 1). These transmitters were affixed using a subcutaneous prong and glue method (25 single-prong and 25 double-prong); we intend to evaluate whether there are differences in survival or radio retention between birds that receive single-prong transmitters and those that receive double-prong transmitters. Fecal samples were taken from scoter holding kennels, and these have yet to be analyzed for composition. In cooperation with a local hunter, morphometrics and mass were obtained for an additional 36 surf scoters.

Ten PTT transmitters were surgically implanted in 5 AHY male surf scoters and 5 AHY female surf scoters. Five (2 male, 3 female) of these birds died (survived for 2, 8, 26, 100 and 208 days after surgery), 3 (2 male, 1 female) disappeared due to transmitter failure and/or mortality (transmitters active for 3, 7, and 247 days after surgery before disappearance) and 2 (1 male, 1 female) remain active as of 14 September 2009 (298 and 300 days after surgery). Four birds migrated north during the breeding season (2 females and 1 male migrated to the Northwest Territories and 1 male migrated to the Yukon Territory, Canada), 2 of which we are still tracking. We will ascertain wintering site fidelity based upon the remaining birds.

Table 1. Summary of numbers of surf scoters captured and marked with VHF radio transmitters near Juneau, AK, fall 2008.

	AHY M	AHY F	HY M	HY F	TOTAL
# captured	28	16	37	18	99
# VHF radios	13	9	17	11	50

Mortality of VHF-marked birds was notably high, especially among HY birds (Table 2). Mortality signals were detected for 21 VHF-marked scoters. Of these, 15 radios were retrieved and 3 were located but not retrieved, as they were underground in mink dens. Of the 3 transmitters that were not retrieved or located, 2 were heard on mortality signal once from the ground and not heard from again, and 1 was heard from an aerial telemetry flight and not heard from again upon searching the area. An intact carcass was never found for any of these birds, and only rarely were there any remains other than feathers. It is unknown whether birds were

killed by predators or if they were scavenged after death, but based upon transmitter condition and predation sign, 13 of the 18 located transmitters were likely either preyed upon or scavenged. One AHY male was shot by a hunter and the transmitter was returned. The remaining transmitters could either have been shed or the birds could have been preyed upon and/or scavenged. Additionally, of these 21 transmitters, 10 were attached using the double-prong method and 11 were attached using the single-prong method; the marked bird that was shot by the hunter had a transmitter attached with a double-prong. This suggests that single- versus double-prong attachment does not influence survival.

In most cases, absolute dates of mortality are not known, but dates that transmitters were first heard on mortality are normally distributed throughout the winter months (Nov = 2, Dec = 7, Jan = 6, Feb = 4, Mar = 2). The weather was especially hard in the Juneau area during this study season; average temperatures for each month were below freezing from December 2008 through March 2009. January 2009 marked a record for monthly snowfall at the Juneau Airport monitoring station, with 191.01 cm; the average for January is 73.41 cm (http://pajk.arh.noaa.gov/cliMap/climap.php). This harsh weather could have affected scoter survival, particularly for the HY cohort. We do not suspect that radios influenced survival, but that observed mortality rates were representation for that year.

Table 2. Summary of surf scoter mortalities and/or VHF transmitter loss near Juneau, AK, between 18 November 2008 and 1 April 2009.

	AHY M	AHY F	HY M	HY F	TOTAL
# mortality signals	3	1	11	6	21

Additionally, 4 VHF-marked surf scoters were heard for 3 times or less (AHY female = 1; HY male = 2; HY female = 1). These missing birds could have died, shed their transmitters, or moved away from the study site. While movements of VHF-marked scoters were monitored on a local scale, movements of one of the PTT-marked birds indicated that they may move great distances during the winter season. This PTT-marked bird (AHY female) moved south from the study site to Petersburg, AK during mid-January. During late January, she moved to the south end of Kupreanof Island, AK, and then during mid-February, she flew to the outer coast of Washington, USA. This marked bird then spent the rest of the winter on the outer coast of Washington and northern Oregon before flying north to an interior site about 130 km west of Kelly Lake, Northwest Territories, Canada, between late-May and mid-June.

Throughout the season, we monitored diurnal foraging effort of surf scoters during 1-hour observation periods; protocol was identical to that used to monitor foraging effort in the Strait of Georgia, BC and in Baja California, Mexico to allow direct comparisons among sites and across latitudes. We logged 361 hours of diurnal observation periods over 33 individuals. Additionally, we monitored the nocturnal foraging effort of surf scoters during 30-minute observation periods; we logged 102 nocturnal observation periods over 22 individuals. Preliminary analysis reveals that surf scoters in the study area rarely dive at night and that their foraging effort (as measured by mean % time underwater hr^{-1}) during the winter is lower than that of surf scoters wintering further south in British Columbia, Canada, and Baja California, Mexico (Figure 1). Near Juneau, AHY and HY male surf scoters spent 12.5% and 12.1% of

their time underwater hr^{-1}, respectively, while AHY and HY females spent 16.3% and 22.0% of their time underwater hr^{-1}, respectively. Overall, surf scoters at the study site spent an average of 13.6% of their time underwater hr^{-1} in a foraging dive. Preliminary analysis of morphometrics and mass also reveals that surf scoters wintering in Southeast Alaska may be larger and heavier than birds wintering further south.

Age and sex surveys were conducted in Juneau on 16 and 17 March 2009 and in Petersburg on 19 March 2009. The survey route was identical to the route used during March 2008 in Juneau and Petersburg and followed the same protocols used in other areas (Strait of Georgia, BC, Puget Sound, WA, and Baja California, Mexico) to allow direct comparisons among sites and across latitudes. Overall, 1213 individuals (302 in the Juneau area and 911 near Petersburg) were observed and classified as either HY male, AHY male, or female. From these data, we have calculated ratios of HY:AHY males and males:females. In Juneau, these ratios were 0.11 and 1.36, respectively, and these were 0.02 and 1.29, respectively, near Petersburg. While the ratios are similar to those calculated in 2008, many more scoters were observed in Juneau during the 2008 survey (1360 in 2008 vs. 302 in 2009).

Agency support during the 2008-2009 field season was phenomenal; the USFWS provided personnel assistance, vehicles throughout the season, and office, storage, and moorage; the USDAFS provided bunkhouse accommodations, heated garage space for our boat throughout the winter, and maps; NOAA provided well-plowed areas for monitoring from the TSMRI at Lena Point and moorage at the ABL. The USGS provided both personnel and financial support. Additionally, Eaglecrest Ski Area on Douglas Island granted free lift access to listen for birds from the top of Pittman's Ridge and Mr. Chad Hood allowed us to take measurements of the scoters he had hunted.

Project Status:

Additional data summaries and analyses, especially of the foraging data, will be conducted and presented in the 2010 annual progress report. Preparations for the second field season are well underway; personnel is being arranged for capture sessions and monitoring and standard operating procedures are being finalized; both PTT and VHF radio transmitters have been ordered. The aforementioned agencies have been contacted to procure their assistance for a second season.

We are confident that the objectives of this study are being met and that the data collected will shed light on the factors affecting the distribution and population dynamics of surf scoters, especially at the peripheries of their wintering range.

Project Funding Sources (US$).

SDJV (USFWS) Contribution	Other U.S. federal contributions	U.S. non-federal contributions	Canadian federal contributions	Canadian non-federal contributions	Source of funding (name of agency or organization)
$31,564					SDJV
	$59,560				USGS
	$17,500				USFWS
	$ 6,000				USFS
				$38,000	SFU-CWE

Total Expenditures by Category (SDJV plus all partner contributions; US$).

ACTIVITY	BREEDING	MOLTING	MIGRATION	WINTERING	TOTAL
Banding (include only if this was a major element of study)					
Surveys (include only if this was a major element of study)					
Research				**$152,624**	

Figure 1. Mean % time underwater hr^{-1} of VHF radio-marked surf scoters across five sites; the Juneau, AK site is at the northern periphery of the Pacific wintering range, while the Bahia San Quintín (BSQ), Baja California, and Laguna Ojo de Liebre (ODL), Baja California Sur, Mexico sites are at the southern periphery of the Pacific wintering range. Baynes Sound and Malaspina Inlet, British Columbia, are the two sites representative of the Pacific wintering range core.