Sea Duck Joint Venture
Annual Project Summary for Endorsed Projects
FY 2005 – (October 1, 2004 to Sept 30, 2005)

Project Title: No. 63: Population delineation, winter/spring habitat use, migration ecology and harvest of Surf Scoters (*Melanitta perspicillata*) from the southern portion of their winter range

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Project Description: Understanding population structure (i.e., identifying population segments that are demographically distinct) is critical for addressing the precipitous decline in the Surf Scoter populations. Without documenting the geographic scale at which dynamics of population segments are independent, surveys cannot be interpreted at the scale of distinct subpopulations, which results in poor resolution for discerning causes of overall declines. Similarly, the inference from local research projects (e.g., documenting survival, production, contaminants, etc.) is unknown without some indication of the population segment to which the results apply. Thus, identification of "management units" is a logical and important first step for effective conservation efforts for scoters.

Thousands of Surf Scoters winter along the west coast of Baja California, which represents the southern extent of their wintering range, but we know little about their ecology (e.g., movements, foods, harvest, habitats use) in the region. Moreover, there is virtually no information on linkages between scoters wintering in Mexico and subsequent migration routes, staging areas, or breeding sites. Scoters that winter in Mexico may represent a separate component of the breeding population and differ in their migration chronology, routes, and staging areas from more northerly wintering populations.

In February 2005 a pilot study was initiated to test the feasibility of capturing and marking scoters with VHF and satellite transmitters in Baja California and gain insight into the delineation of the winter population structure, migration routes and patterns, and breeding distribution of Surf Scoters in the Pacific Flyway.

Objectives: The objectives were to: 1) describe key migration routes, timing of movements, and affiliations with breeding and molting areas; 2) assess habitat use patterns and diet; 3) evaluate age and sex structure of the wintering population; and, 4) estimate harvest in Mexico and assess the potential importance of sport and subsistence hunting on regulating the wintering population.

Preliminary Results:

Radio Telemetry

In mid-February we captured 21 Surf Scoters with floating mist nets and marked 5 adult females with implantable satellite transmitters and 8 adults (3F, 5M) and 6 juveniles (3F, 3M) with implantable VHF transmitters at San Quintin Bay, Baja California. Of these marked birds, 12 (63%) provided good location data for determination of habitat use patterns and migration movements (e.g., Figure 1) while 7 (37%: 2 PTT- and 5 VHF-marked birds) died within 60 days of release. Although the mortality rate in our study was high, it was within the range of data collected from other radio telemetry studies of Surf Scoters made in Alaska (15-50%; Rosenberg pers. comm.), in Washington (20-35%; Evenson pers. comm.) and California (10-35%; Takekawa and Wainwright-De la Cruz pers. comm.), but higher than in British Columbia (<15%; Iverson et al. 2005). An advantage to working in Baja California is the low rates of predation and scavenging of large waterbirds (Ward pers. obs.); thus, we were able to retrieve 6 of 7 dead birds and their radios (2 PTT- and 4 VHF-marked birds).

Movement patterns of scoters were subsequently monitored in the San Quintin Bay and adjacent areas through March 2005. Radio-marked birds primarily used the bay during daylight hours and nearly all moved <3 km offshore at night. Surf Scoters fed during day (91% of detections) in channels and intertidal eelgrass (*Zostera marina*) beds. Feeding was documented at night and accounted for about 20% of individuals. This observation of nighttime differs from that of a more northerly wintering area, British Columbia, where virtually no nighttime feeding was found ($\leq$2% of detections; Lewis et al. 2005).

Northward movement of radio-marked Surf Scoters was first detected on 19 April with the departure of two satellite-marked scoters. Other radio-marked birds followed over the next couple of weeks as all but one radio-marked bird departed from San Quintin Bay by 1 May. The timing of northward migration was about 2-3 weeks later for radio-tagged birds from San Quintin Bay than from San Francisco Bay. Stopovers of >2 day per site for the San Quintin surf scoters were detected along the coasts of Baja California, California (particularly in Tomales Bay), Oregon, Washington (Birch Bay) and British Columbia (Figure 1). One satellite bird moved to Great Slave Lake, Northwest Territories, an area where Surf Scoters are known to nest. This bird was later observed on the breeding grounds by M. Wilson (University of California-Davis), but no nest was located. No other radio-marked birds were detected in potential breeding areas. Links to molting areas along the coast of Oregon and in southeast Alaska were also Links

were also established between a birds wintering in San Quintin Bay and molting sites in southeast Alaska (near Petersberg) and coastal Oregon (not shown in Figure 1).

Population Structure

Observations of birds (in flight) entering the bay each morning indicated that adults accounted for about 70% of the population in the bay and females were more abundant than males in all age classes during early spring (Table 1). Unlike more northerly wintering areas, where males generally dominated (e.g., 1.9 males to females in British Columbia; Iverson et al. 2004) and juveniles comprised a small proportion of the population (e.g., 0.10 juvenile males to total males in British Columbia; Iverson et al. 2004), we detected fewer males than females (0.70 males to every female) and nearly 3 times more juveniles than adults (0.28 juvenile males to total males) at San Quintin Bay. Similar age and sex patterns were also observed in San Diego Bay during early April. These data provide further support for a latitudinal gradient in the age composition of Surf Scoters during winter that was first proposed by Iverson et al. (2004). Our data also suggests the possibility of geographical variation in sex compositions of Surf Scoters. Although more data are needed, the southern portion of the winter range may support a younger more female-dominated population and as such, may play an important role in the recruitment process for the Pacific Flyway population of Surf Scoters.

	Adult Females	First-year Females	Total Females	Adult Males	First-year Males	Total Males
%	38	20	59	30	12	41
n	110	58	168	85	33	118

Table 1. Percentage of adult and first-year Surf Scoters observed at San Quintin Bay, Baja California, February 2005.

Harvest

Bag checks were made at San Quintin Bay, the most important waterfowl hunting area in Baja California. Ninety-five hunters were checked between 1 January and 28 February yielding 4 hunter-killed Surf Scoters (2-AM, JM, JF). Two of the birds (i.e., the 2-AM) were shot specifically for trophy mounts by 2 Mexican sport hunters while the others were shot incidental to a hunt for other waterfowl. Interviews with sport hunters and outfitters suggest that hunting of surf scoters at San Quintin Bay is low.

Diet

Preliminary observations suggest that scoters feed primarily on crustaceans, particularly crabs, in San Quintin Bay. However, a more complete determination of the diet of scoters will be made later in the year through examinations of stomachs of dead birds and results of stable isotope analyses of fecal, blood, and tissue samples taken from captured and hunter-killed scoters.

Project Status:

This study accomplished its primary objectives of demonstrating that Surf Scoters, particularly adult females, could be successfully captured, marked, and tracked in Baja California. With the deployment of a small number of transmitters, linkages were made between birds wintering areas

in Baja California and staging areas in California, Oregon, Washington and British Columbia and a nesting area in the Northwest Territories. Tissue and blood samples were also collected from captured and hunter-killed birds and delivered to cooperators for studies of migration strategies (Anderson, Univ. of Wyoming; Esler, SFU, and Takekawa, USGS-San Francisco) and genetic diversity and population delineation (Talbot, USGS-ASC). Finally, we obtained interesting new information on age and sex structure (i.e., younger and more female-dominated population), movements (late spring migration), and behavior (e.g, nighttime feeding) of Surf Scoters in the southern portion of their wintering range. This region may play an important role in recruitment process for scoters in the Pacific Flyway.

This study will continue during the upcoming winter, as satellite and VHF radios will be active through winter and spring 2006, respectively. During this time, we will continue our effort on monitoring the return of the radio-marked birds to Baja California to assess habitat use, diet, and movements of Surf Scoters at San Quintin Bay.

Beyond the scope of this 1-year pilot study, we plan to build on our successes and seek additional funding to expand the project to other areas of Baja California and increase sample sizes of radio-marked Surf Scoters. With additional field seasons of the Pacific Flyway coordinated monitoring program we can gain a more complete delineation of the winter population structure, migration routes and patterns, and breeding distribution of Surf Scoters in the Pacific Flyway.

Literature Cited:

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Iverson, S. A., W. S. Boyd, D. Esler, D. M. Mulcahy, and T. D. Bowman. 2005. Comparison of the effects and performance of four radio transmitter types for use with scoters. Wildlife Society Bulletin: in press.

Lewis, T.L., D. Esler, W.S. Boyd, and R. Zydelis. 2005. Nocturnal foraging behavior of wintering surf scoters and white-winged scoters. Condor 107: 637-647.

Project Funding Sources (US$):

SDJV	Other US Federal Contribution	US Non Federal Contribution	Mexico Non Federal Contribution	Canadian Federal Contribution	Canadian Non-Federal Contribution	Source of Funding Agency
25,345						SDJV
	45,450					USGS-ASC
	3,000					USGS-SFB
			8,400			DUMAC
SDJV- Sea Duck Joint Venture			6,800			CICESE
USGS-ASC- U.S. Geological Survey-Alaska Science Center			2,000			ESSA
USGS-SFB- U.S. Geological Survey-San Francisco Bay		1,000				Local Conservationist
DUMAC- Ducks Unlimited de Mexico		2,000				WDFW
CICESE-Center for Scientific Investigations and Higher Education, Ensenada		2,000				UCD
ESSA- La Compania de Exportadora de Sal S. A., Baja California					3500	SFU
WDFW-Washington Department of Fish and Wildlife						
UCD- University of California-Davis						
SFU- Simon Frasier University						

Total Expenditures by Category (US$):

Activity	Breeding	Molting	Migration	Wintering	Total
Banding					
Survey					
Research				99,495	99,495
Communication					
Coordination					

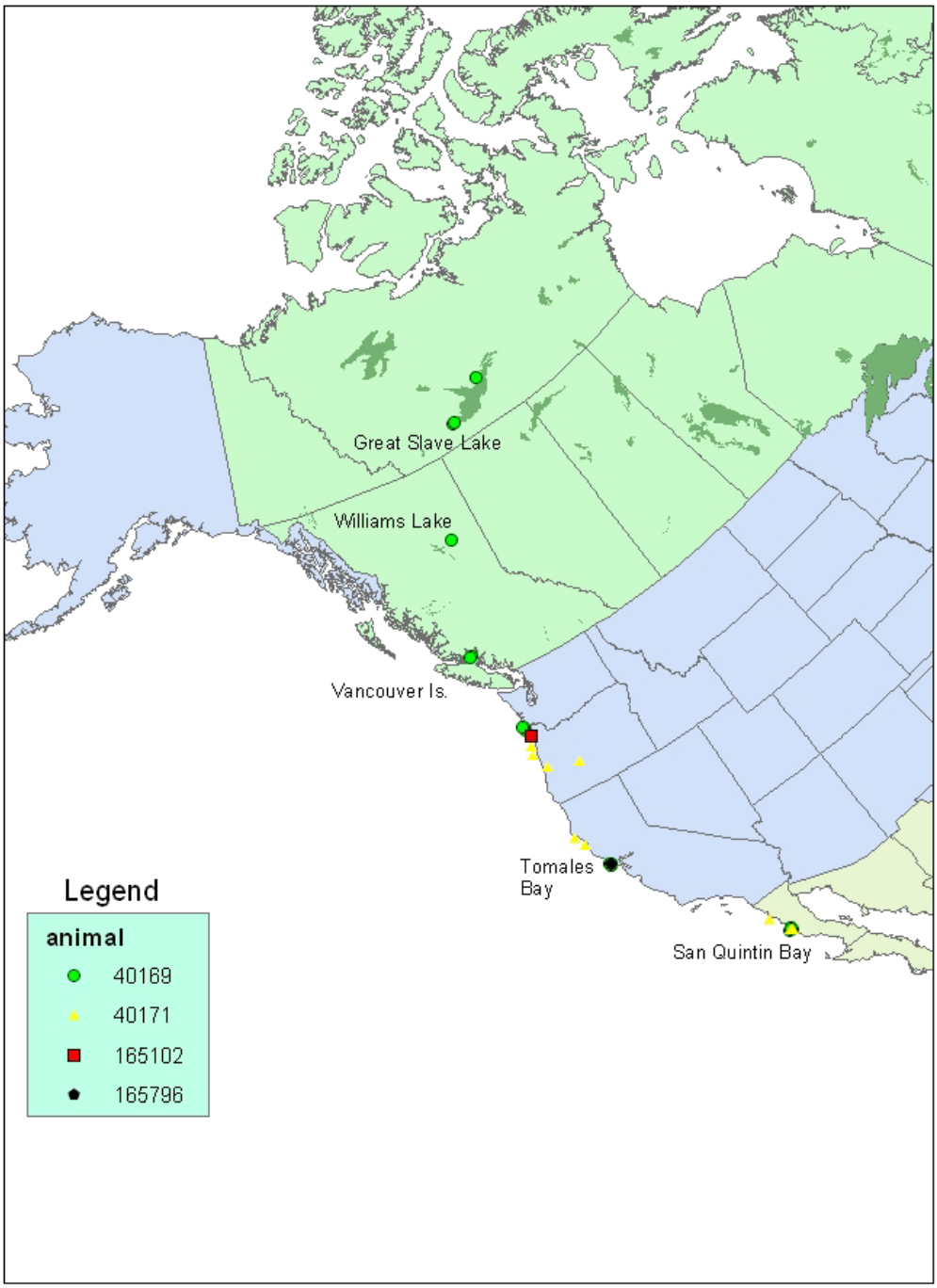

Figure 1. Locations of radio-marked Surf Scoters during spring migration and breeding.