Project Title: Scoter life history and ecology: Linking satellite technology with traditional knowledge to conserve the resource. Close-Out.

Project Number:	01273 CLO
Restoration Category:	Subsistence, Research
Proposers:	Dan Rosenberg Alaska Dept. of Fish and Game 333 Raspberry Road Anchorage, Alaska 99503
Lead Trustee Agency:	ADFG
Cooperating Agencies:	USGS-BRD, USFWS
Alaska SeaLife Center:	No
Project Duration:	Two years
Cost FY 01:	$49,600.
Cost FY 02:	$1,000.
Cost FY 03:	$0
Geographic Area:	Prince William Sound
Injured Resource/Service:	Subsistence, Scoters

ABSTRACT

This project will complete the Scoter satellite telemetry and traditional ecological knowledge project /273. A final report and manuscripts will be prepared, reporting on the findings of this 3-year project.

INTRODUCTION

This project will complete a 3-year project studying the life history and distribution of surf scoters (*Melanitta perspicillata*) and white-winged scoters (*M. fusca*) that winter or migrate through Prince William Sound (PWS) and integrate this information with traditional ecological knowledge collected from community members within the study area. In the first year (FY98) we initiated a pilot project to test the feasibility of catching scoters in PWS. In late-April and early-May, 1998 we marked ten surf scoters with surgically implanted satellite transmitters (Rosenberg and Petrula 1999a). We expanded the project in FY99 by using EVOS funding to obtain additional matching funds. In FY99 we marked 15 surf scoters and 10 white-winged scoters. Experiencing high post-surgical mortality rates in FY98 and FY99 we modified the project in FY00 and transported wild captured surf and white-winged scoters to the Alaska SeaLife Center in order to observe the effects of implants in a predator free environment. Healthy birds were released to the wild prior to spring migration.

This was the first study to use satellite telemetry in scoters. Satellite telemetry is providing information that allows us to define breeding, molting, and wintering areas of this important subsistence resource. We have identified nesting areas in the Northwest and Yukon territories, and interior Alaska; molting areas in the Northwest Territories and western Alaska, and wintering areas in PWS, the Alaska Peninsula, southeast Alaska, and British Columbia. We have also identified the timing of migration, migration routes, and the importance of PWS herring spawn to scoters throughout the Gulf of Alaska. This information is already being incorporated into the interpretation of and future planning for long-term population trend surveys in Alaska and Canada.

We have created an Internet site that provides information on this project, the life history of scoters, and weekly movements of satellite transmitted birds (Rosenberg and Petrula 1999b). As we will continue to receive information from transmitters deployed in FY00, we will continue to update this web site. Movements of marked birds will be updated regularly. The web site received over 2,000 visits in FY99-FY00.

Prior to this study, little was known about the seasonal distribution, timing of migration, and migration routes of scoters anywhere in North America. Affiliations between breeding and wintering areas were unknown, compounding meaningful integration of the existing survey data. The susceptibility of seaducks to contaminants is also a concern to resource managers and subsistence consumers. Determining distribution is the first step in assessing breeding, wintering, and molting ecology. Breeding, molting, and wintering sites have been identified throughout Alaska and western Canada.

Because satellite transmitters may still be transmitting data beyond the end of FY00, funds are budgeted for downloading and processing of data through Service Argos Inc. and web site maintenance. We will prepare a final report and manuscripts for publication in peer reviewed journals.

NEED FOR THE PROJECT

A. Statement of Problem

Scoters are an important subsistence resource to the people living in the communities of PWS and LCI (James Fall, ADF&G, pers. comm., Gary Kompkoff, Tatitlek IRA, pers. comm.) These species of seaducks comprise the large majority of the sea duck harvest in the communities of Tatitlek, Chenega Bay, Port Graham, and Nanwalek (Scott et al. 1996). Residents of the communities affected by the *Exxon Valdez* Oil Spill remain concerned about the abundance of their traditional food resources and maintaining their cultural ties to their traditional use of fish and wildlife (*Exxon Valdez* Oil Spill Trustee Council, 1999).

Scoters are among the least studied of North American waterfowl (Godfrey 1989, Savard and Lamothe 1991, Henny et al. 1995, Savard et al. 1998). Little is known about the ecology, breeding areas, molting areas, and migration routes of these species anywhere in North America (Bellrose 1976; Herter et al. 1989; Goudie et al. 1994, Savard et al. 1998). Basic ecological information is lacking for scoter populations that use PWS.

Since 1977, scoters in Alaska have been estimated to decline by as much as 40% (Hodges et al. 1996). Between 1973 and 1989 estimated winter populations of scoters in PWS declined from 56,600 to 14,800 birds. An estimated 1,000 scoters died as a direct result of the *Exxon Valdez* oil spill (John Piatt, pers. comm.). The large decline in PWS between 1972-1973 and 1989 may be a result of long-term oscillations in ocean temperatures in the Gulf of Alaska (Piatt and Anderson 1996) or effects from exposure to contaminants. Several studies have shown scoters and other sea ducks to bioaccumulate trace metals and organochlorines from their environment (Vermeer and Peakall 1979, Henny et al. 1991, Olendorf et al. 1991, Henny et al. 1995).

In winter, scoters feed in intertidal and subtidal zones, areas susceptible to contaminants (Vermeer and Peakall 1979). They feed primarily on bivalves, especially mussels (Crow 1978, Vermeer 1981), but in spring they may switch to a diet composed primarily of herring roe (Vermeer 1981, Goudie et al. 1994, Bishop and Green 1999). Mussels and intertidal sediments in PWS showed increases in petroleum hydrocarbon concentrations directly attributable to *Exxon Valdez* oil (Short and Babcock 1996), and oil in mussel beds in PWS and the Kenai Peninsula persisted for several years after the spill (Babcock et al. 1996). Further, the PWS herring stocks suffered a dramatic decline in 1993 and stocks have remained depressed (Morstad et al. 1997). The large increase in sea otter populations since the mid-1900's may have led to increased competition for food between scoters and otters (Nanwalek residents, pers. comm.). Quite likely, any decline results from a combination of factors such as food and habitat changes, contaminants, or climate change.

Human activities, such as hydroelectric development (Savard and Lamothe 1991), estuarine pollution (Ohlendorf et al. 1991), or introductions of exotic species (Bordage and Savard 1995) on the breeding, wintering, or molting areas potentially have profound affects on abundance or distribution of a population. The lack of information on distribution and migration patterns can prevent the identification of potential harmful environmental exposures or alterations and make it extremely difficult to determine possible causes of population declines. Location of and links

between breeding grounds, migration routes, and timing of migration are important factors used to evaluate contaminant uptake or loss in a migratory species as well as changes to food resources and other environmental changes (Henny et al. 1991). Nesting is considered one of the weakest links in the life cycle, especially with regard to contaminant effects (Henny et al. 1995).

B. Rationale/Link to Restoration

Although scoters are known to breed throughout much of Alaska and Canada (Gabrielson and Lincoln 1959; Godfrey 1986), until this project (Rosenberg and Petrula 1999) nothing was known about specific populations and the affiliations between winter, breeding, and molting areas. The few studies that have identified molting sites have not made the link between these and winter and breeding areas (Johnson and Richardson 1982, Dau 1987).

Exposure of migratory waterfowl to contaminants or other mortality factors may occur during migration, nesting, molting, or at wintering areas. Knowing the location of breeding grounds, migration routes, and winter areas, and the timing of migration will allow us to direct sampling and monitoring efforts at specific population segments. Scoter populations are susceptible to natural and man-made disturbances over a wide and inaccessible geographic area.

The traditional marking of birds with metal leg bands has had little success with sea ducks because so few birds are killed in the harvest. The vast geographic range of the birds (Rosenberg and Petrula 1999a, Rosenberg and Petrula 1999b) makes conventional telemetry impractical and costly. Satellite telemetry studies offer the best method for identifying migration routes, staging areas, and breeding, molting, and wintering sites. We will also report on the findings of the FY00 field season. In FY00 we held birds at the Alaska SeaLife Center in an effort to understand the reasons for the high rates of mortality experienced in these birds from implanting satellite transmitters. Finding a solution to the high rate of mortality experienced by implanting satellite transmitters in sea ducks in winter and spring in marine environments will allow for the continued use of this valuable technology.

Restoration requires assessment of population health and definition of impediments to recovery. The information in this report will help resource managers understand factors that affect population dynamics in surf scoters, interpret survey data, design better surveys, and develop management strategies to ensure the long-term health and welfare of the population. Without an understanding of the underlying events that influence population change, we can not prescribe specific activities to conserve or enhance the population.

C. Location

No new fieldwork will be conducted in FY01. As satellite transmitters will continue to function we will continue to receive and process data on scoter movements and distribution. Community involvement will be focused in the villages of Tatitlek, Chenega Bay, Nanwalek, and Port Graham.

COMMUNITY INVOLVEMENT AND TRADITIONAL ECOLOGICAL KNOWLEDGE

This program will continue to exchange information with residents of the communities of Prince William Sound and lower Cook Inlet. In FY98 and FY99 the principal investigator exchanged information and attended workshops in Tatitlek, Chenega Bay, Nanawalek, Seldovia, and Port Graham. The principal investigator was a member of the planning team for the youth-elders subsistence conference in Cordova and presented findings of this study at the conference and at the EVOS annual workshop. The principle investigator has also made presentations and exchanged information and ideas at community facilitator meetings in Anchorage.

The project will continue to inform and coordinate our community involvement activities, including the collection of indigenous knowledge with Dr. Henry Huntington, TEK specialist Chugach Regional Resources Commission; Hugh Short, Community Coordinator, EVOS Restoration Office; Rick DeLorenzo and Joshua Hall, Chugach School District; and the Subsistence Division of the Alaska Department of Fish and Game.

Project personnel will adhere to the protocols for including indigenous knowledge in the restoration process presented in Appendix C of the Invitation to Submit Restoration Proposals for Federal FY 2001. Boat and air charter contracts, and other services will be contracted from local sources when possible.

PROJECT DESIGN

A. Objectives

FY 01:

1) Analyze data from FY00 field season;

2) Incorporate data in current Geographical Information System developed for these studies;

3) Prepare final report including all information gathered from 1998-2000;

4) Update and maintain Web site; and

5) Prepare 2-3 manuscripts for publication in peer reviewed journals. Where appropraite manuscripts will be incorporated into the final report.

Publications:

The following is a list of publications. The actual number that will be submitted for publication in FY 01 will depend upon time and budget constraints.

Identifying links between breeding, wintering, and molting areas of surf scoters and white-winged scoters using satellite telemetry. Auk or Can. Field Naturalist.

Effects and performance of implantable satellite transmitters in surf and white-winged scoters. Waterbirds or J. of Field Ornithology.

Behavioral effects of internal and subcutaneous transmitters on captive scoters. Wildfowl.

Mortality and hematology associated with captivity in scoters. J. of Wildl. Diseases.

Using floating mist-nets to capture wintering seaducks in coastal waters. J. of Wildl. Manage.

Morphological measurements of spring staging scoters in Alaska. Wildfowl.

Traditional ecological knowledge, satellites, and migratory species: complementary approaches to ecological understanding. Proceedings of the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention). Capetown, South Africa.

B. Methods

Analysis will follow methods in previous annual reports (Rosenberg and Petrula 1999a, Rosenberg and Petrula 2000, in prep.).

C. Cooperating Agencies, Contracts, and Other Agency Assistance

Contracts with Service Argos, Inc. for collecting and processing of satellite transmitted data will continue. No other contracts will be solicited for this report.

SCHEDULE

A. Measurable Project Tasks for FY 01

October-December:	Data entry and analysis. GIS and map preparation. Maintain Web site. Begin final report and manuscript preparation.
January-March:	Attend EVOS Restoration Workshop. Continue data analysis and report and map preparation. Maintain Web site
April 15:	Submit final report and manuscripts.

B. Project Milestones and Endpoints

<u>FY01</u>

October-March: Finish final report and prepare manuscripts for publication.

FY02

October-March: Publish manuscripts.

C. Completion Date

All project objectives will be met following FY02.

PUBLICATIONS AND REPORTS

A final report of FY98-FY00 activities will be submitted to the Restoration Office before April 15, 2001. Manuscripts for peer reviewed journals will be submitted for publication prior to November 1, 2001.

PROFESSIONAL CONFERENCES

A paper on the results of this project will be presented to the North American Waterfowl Symposium, October 11-15, 2000, in Saskatoon, Saskatchewan.

NORMAL AGENCY MANAGEMENT

The work proposed here is not part of normal agency management and is related specifically to research addressing oil spill restoration concerns. No similar work has been conducted, is currently being conducted, or is planned using agency funds.

COORDINATION AND INTEGRATION OF RESTORATION EFFORT

Results will be compared and integrated with other EVOS Trustee sponsored research where appropriate, including project /052B Traditional Ecological Knowledge.

PROPOSED PRINCIPAL INVESTIGATORS

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PERSONNEL QUALIFICATIONS

Dan Rosenberg has been a waterfowl biologist for The Alaska Department of Fish and Game (ADF&G) since 1985. From 1980-1983 Mr. Rosenberg conducted field research in Alaska as a waterfowl biologist for the U.S. Fish and Wildlife Service and from 1983-1984 as a Habitat Biologist for ADF&G. Mr. Rosenberg received a Bachelor of Science degree in Wildlife Management from Humboldt State University, Arcata, CA in 1979.

Mr. Rosenberg has conducted harlequin duck population (age and sex structure) and production surveys in Prince William Sound since 1994 as the Principle Investigator of a Trustee sponsored restoration project. Mr. Rosenberg is currently the principal investigator on EVOS Trustee sponsored project \273 Surf Scoter Life History and Ecology: Linking Satellite Telemetry with TEK to Conserve the Resource. He has conducted extensive waterfowl population monitoring and habitat assessment surveys on the Copper River delta, Stikine River delta, Kenai wetlands, upper Cook Inlet, Aleutian Islands, and Kodiak Island. As project leader, Mr. Rosenberg has assessed impacts to waterfowl and wildlife populations from hydroelectric development, urban expansion, habitat alterations, chemical pollutants, timber harvest, and surface mining.

OTHER KEY PERSONNEL

Mike Petrula, Wildlife Biologist, ADFG. Field logistics, surveys, data analysis, and report preparation. Mr. Petrula has an MS degree in wildlife Biology from the Univ. of Alaska, Fairbanks. He has been working on EVOS projects \427 Harlequin Duck Recovery Monitoring and \273 Surf Scoter Life History and Ecology: Linking Satellite Telemetry with TEK to Conserve the Resource.

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2001 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2000 - September 30, 2001

Budget Category:	Authorized FY 2000	Proposed FY 2001
Personnel	$84.2	$38.4
Travel	$8.4	$3.5
Contractual	$67.7	$2.3
Commodities	$27.1	$0.0
Equipment	$0.6	$0.0
Subtotal	$188.0	$44.2
General Administration	$17.4	$5.9
Project Total	$205.4	$50.1
Full-time Equivalents (FTE)	1.4	0.5
Other Resources		

LONG RANGE FUNDING REQUIREMENTS

			Estimated FY 2002		
			$1.0		

Dollar amounts are shown in thousands of dollars.

Comments:
Close Out for Project /273 Scoter life history and ecology: Linking satellite technology with traditional knowledge . No field work is proposed for this project in FY01. No money is allocated for NEPA compliance. Page costs for publication in peer reviewed journals is not included because manuscripts may not appear in print in FY01. Page costs for publication are included in FY02. Funding to travel to villages to comply with "Protocols for Including Indigenous Knowledge in the Exxon Valdez Oil Spill Restoration Process" has been restored to this revised budget at the request of the Restoration Office. Unused funds allocated to Service Argos for satellite downloading for FY00 will be credited to FY01 to make up the difference in estimated costs.

FY01

Project Number: 01273
Project Title: Scoter life history and ecology: Linking satellite technology with traditional knowledge - Close Out
Agency: Alaska Department of Fish and Game

Prepared:4/5/00,rev.6/23/00,rev7

2001 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2000 - September 30, 2001

Personnel Costs:		GS/Range/ Step	Months Budgeted	Monthly Costs	Overtime	
Name	Position Description					
D. Rosenberg	WBIII, Principle Investigator	18J	6.5	5.9		
	Subtotal		6.5	5.9	0.0	
					Personnel Total	

Travel Costs:	Ticket Price	Round Trips	Total Days	Daily Per Diem	
Description					
North American Waterfowl Symposium -Saskatchewan, Canada	1.0	1	6	0.1	
Conference Registration Fee					
Anchorage-Tatitlek by air	0.4	1	2	0.1	
Anchorage-Chenega by air	0.4	1	2	0.1	
Anchorage -Port Graham/Nanwalek by air	0.3	1	2	0.1	
Airport parking, taxi fare, EVOS Workshop parking.					
				Travel Total	

FY01

Project Number: 01273
Project Title: Scoter life history and ecology: Linking satellite technology with traditional knowledge - Close Out
Agency: Alaska Department of Fish and Game

Prepared:4/5/00,rev.6/23/00,rev7.

2001 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET
October 1, 2000 - September 30, 2001

Contractual Costs:	
Description	
Photo processing, Conference presentation products Satellite telemetry data downloading. 5 Transmitters at $406/Transmitter	
When a non-trustee organization is used, the form 4A is required. **Contractual Total**	
Commodities Costs:	
Description	
Commodities Total	

FY01

Project Number: 01273
Project Title: Scoter life history and ecology: Linking satellite technology with traditional knowledge - Close Out
Agency: Alaska Department of Fish and Game

Prepared:4/5/00,rev.6/23/00,rev7/13/00

2001 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2000 - September 30, 2001

New Equipment Purchases:	Number of Units	Unit Price	
Description			
NONE			
Those purchases associated with replacement equipment should be indicated by placement of an R.		**New Equipment Total**	

Existing Equipment Usage:	Number of Units	
Description		

FY01

Project Number: 01273
Project Title: Scoter life history and ecology: Linking satellite technology with traditional knowledge - Close Out
Agency: Alaska Department of Fish and Game

Prepared:4/5/00,rev.6/23/00,rev7/19/00