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GEM PROPOSAL SUMMARY PAGE

(To be filled in by proposer)

Project Title:	Harlequin Duck Population Dynamics in Prince William Sound: Measuring Recovery
Project Period:	FY 04
Proposer(s):	Dan Rosenberg, Alaska Dept. Fish and Game
Study Location:	Prince William Sound

Abstract: This project will address the effects of lingering oil in nearshore habitats of Prince William Sound on populations of harlequin ducks. We will conduct winter boat surveys to test if harlequin ducks have recovered from the effects of the EVOS by comparing population structure and trends between oiled and unoiled treatments in four areas (2 oiled, 2 unoiled) of PWS. Similar structure and trends between oiled and unoiled areas will indicate populations have recovered or are in a position to recover. Work will be complimentary to studies addressing cytochrome P450 induction and over winter survival of female harlequin ducks to give a complete picture of the effects of lingering oil. We will also test for geographic differences in population structure and trend for oiled and unoiled treatments. This is a continuation of surveys begun in 1997. Up to 3 years of surveys are proposed with the results of each year determining the need for continuation.

Funding:	EVOS Funding Requested:	FY 04	$ 37.1	
		FY 05	$	
		FY 06	$	TOTAL: 37.1
	Non-EVOS Funds to be Used:	FY 04	$ 32.0	
		FY 05	$	
		FY 06	$	TOTAL: 32.0

Date: June 12, 2003

(NOT TO EXCEED ONE PAGE)

Harlequin Duck Population Dynamics in Prince William Sound: Measuring Recovery

GEM RESEARCH PLAN

I. NEED FOR THE PROJECT

A. Statement of Problem

Harlequin duck (*Histrionicus histrionicus*) populations in Prince William Sound (PWS) have not recovered from the effects of the *Exxon Valdez* Oil Spill. Lingering oil in the intertidal, combined with higher rates of exposure, lower female survival, and lower population growth rates in oiled areas relative to unoiled areas suggest a lack of recovery (*Exxon Valdez* Oil Spill Trustee Council 2002).

Harlequin ducks occur year-round in intertidal zones of PWS (Isleib and Kessel 1973). At least 1,298 harlequin ducks were estimated to have died as a direct result of oil exposure following the Exxon Valdez oil spill (J. Piatt pers. comm.). Oil spill studies of harlequin ducks in western Prince William Sound (PWS) from 1990-93 found consistently low numbers of birds during the breeding season, little breeding, low productivity, and an apparent decline in post-breeding molting birds (Patten et al. 1998a, Patten et al. 1998b). In 1995, six years after the Exxon Valdez oil spill there was no sign of recovery (Exxon Valdez Oil Spill Trustee Council 1996).

As of 1997, populations were declining in oiled areas while increasing in unoiled areas although population structure (age and sex ratios) was similar between treatments (Rosenberg and Petrula 1998). Similar population structures, a positive finding, indicated that the population was in a position to recover. However, ducks in oiled areas exhibited elevated levels of cytochrome P4501A induction, indicating continued oil exposure, and adult female winter survival was lower in oiled than unoiled areas (Trust et al. 2000, Esler et al. 2000). Lower survival rates may be related to continued oil exposure (Peterson 2001). Collectively, these studies suggest that oil exposure, female survival, and population dynamics are linked and provide strong evidence that harlequin ducks had not recovered from the effects of the *Exxon Valdez* oil spill.

Meanwhile, results of longer-term monitoring surveys (Lance et al. 2001) were equivocal with respect to the effects of oil contamination on the population level of harlequin ducks. Evidence of recovery was observed in the winter population but not in summer. Different sampling schemes made comparisons difficult with more specialized harlequin duck monitoring surveys.

More recent studies indicate improving conditions. Winter population monitoring indicated no trend in oiled areas with a slightly increasing trend in unoiled areas from 1997–2002 (Rosenberg and Petrula in prep.) and measurements of cytochrome P4501A levels and female survival rates from 2000–2003 were similar between oiled and unoiled areas (D. Esler, pers. comm.). However, lingering oil still remains in the environment raising the possibility of continuing low-level chronic effects (Short et al. 2001).

Sea duck populations, in general, are composed of relatively long-lived birds with delayed sexual maturity. Productivity may be limited to a few favorable years and population levels may change slowly. In addition, harlequin ducks are highly philopatric to breeding, molting, and wintering sites (Robertson and Goudie 1999, Robertson et al. 2000). This is an adaptive strategy in natural situations and predictable environments. It is not favorable in the face of dramatic environmental perturbations or changing land-use practices nor does it favor rapid recovery and colonization of new undisturbed sites. This strong philopatry may result in continued exposure to lingering oil. Population monitoring provides a direct approach to assess recovery.

Long-term population stability depends on high adult survival coupled with a few years of successful reproduction. Initial high losses of adults, especially females, may result in a long and slow recovery period, especially if initial causes of mortality are still influential.

B. Relevance to GEM Program Goals and Scientific Priorities

Harlequin ducks occur year-round in the nearshore environment, feed on benthic invertebrates, exhibit site-fidelity, are relatively long-lived, and are widely dispersed in the Gulf of Alaska. They are the only benthic feeding avian species present in abundance year-round in PWS. These characteristics make them unique among nearshore avian predators and ideal candidates for monitoring ecosystem change.

Harlequin ducks have not recovered from the effects of the *Exxon Valdez* oil spill. Lingering oil is still present in the nearshore environment (Carls et al. 2001, Short et al. 2001) and has the potential to interfere with physiological processes (Holland -Bartels et al. 1999). Two main hypotheses have been presented to explain population declines: (1) ingested oil or contaminated prey is continuing to cause higher mortality rates and/or (2) initial mortality caused significant losses to the western PWS population, which may result in a protracted recovery period.

Identifying and establishing mechanisms of population change depends on an historical knowledge of the status of the resource prior to environmental perturbations and an understanding of the inter-annual variability among years in periods of relatively little perturbations in the larger physical system. Thus, our ability to detect departures from natural variation is necessary if we are to accurately evaluate the effects of major environmental perturbations whether natural or human-caused. This requires numerous samples, distributed through space and time. We are focusing on relatively long-lived avian predators that tend to show less natural variability. With time-series data on harlequin duck abundance and distribution in concert with abiotic and biotic ecosystem changes we will improve our ability to interpret the affects of natural or man-induced processes and understand the mechanisms of population change.

For the past 5 years, ADF&G has been monitoring harlequin duck and other sea duck wintering populations in Kachemak Bay, Alaska and we plan to expand this to other areas in the Gulf as funding becomes available. This will leverage GEM resources. In addition all sea ducks, loons, and sea otters will be recorded on transects.

II. PROJECT DESIGN

A. Objectives

1. Compare population structure (number of breeding pairs, subadult males, adult males, and females) between treatments (oiled and unoiled survey areas).

2. Compare density estimates for oiled and unoiled treatments.

3. Compare annual changes in density and population structure for oiled and unoiled treatments.

4. Compare annual changes in density and population structure *within* oiled and unoiled treatments.

5. Compare results with prior EVOS Harlequin Duck Recovery Monitoring studies

6. Add to our knowledge of harlequin duck life history

7. Integrate data with other long-term monitoring surveys to detect long-term changes in marine ecosystems

This study will test the following hypotheses:

1. Objective 1.
   H_o: The ratio of males to females; total ducks to subadult males; and breeding pairs to total ducks is the same for oiled and unoiled populations during March.

   H_1: The ratio of males to females; total ducks to subadult males; and breeding pairs to total ducks is different for oiled and unoiled populations during March.

2. Objective 2. No hypothesis is being tested.

3. Objective 3.
   Ho: The rate and direction of population change between years is the same for oiled and unoiled survey sites.

   H_1: The rate and direction of population change between years is different for oiled and unoiled survey sites.

4. Objective 4.
   H_o: The rate and direction of population change between years is the same within oiled and unoiled survey sites.

   H_1: The rate and direction of population change between years is different within oiled and unoiled survey sites.

5. Objective 5. No hypothesis is being tested.

6. Objective 6. No hypothesis is being tested.

7. Objective 7. No hypothesis is being tested.

This study is directly linked to the recovery objectives for harlequin ducks in the EVOS Restoration Plan (Exxon Valdez Oil Spill Trustee Council 2002). This project will provide winter population trends, compare population structure, and provide an index of recruitment between oiled and unoiled areas, allowing us to assess recovery of harlequin duck populations from the EVOS. It will also provide insight into geographic differences within PWS. In the short-term it will help us understand the effects of lingering oil and in the long-term help identify mechanisms of population change in the nearshore environment.

Information from this project will aid in the development of a population model. This will allow researchers to predict rates of population change and predict trends. While some of this information has been collected for PWS populations (Rosenberg and Petrula 1998, Holland-Bartels et al.1999) and harlequin ducks in North America (Goudie et al. 1994, Robertson and Goudie 1999), many specifics are still lacking, including long-term data on productivity, recruitment, dispersal, and subadult survival.

Results of this work will have a direct bearing on assessing the status and outlook for this resource and help guide agency programs and policies related to public uses, including subsistence and recreational hunting, land-use practices, and wildlife viewing.

B. Procedural and Scientific Methods

We propose up to three additional years of winter boat surveys in order to compare population trends and structure with data from four winter surveys conducted from 1997–2002. We will survey oiled and unoiled areas identified in project \427 (Rosenberg and Petrula 1998) plus the additional oiled and unoiled areas added by project \407 (Rosenberg and Petrula in prep.). This will increase statistical power to detect recovery, improve our ability to assess changes in the marine ecosystem, and quantify geographic variation within PWS. Repeat surveys will be conducted at selected sites to improve estimates of variance.

Surveys will be conducted in late-winter. Surveys in oiled and unoiled areas will not be conducted simultaneously because this is a period of relative stability in both numbers and movements of harlequin ducks. This is a continuation of Project /407 conducted from 2000–2002.

All sea ducks, loons, and sea otters will be recorded on transects. For harlequin ducks, observations will be recorded by sex and males will be divided into two age groups using predetermined criteria (Rosenberg and Petrula 1998). Surveys will be conducted from open skiffs up to 20 feet long. Each skiff will have two observers. Surveys will be conducted from within 30 meters of shore along predetermined routes. Distance to shore will be peridically verified by use

of electronic rangefinders. A pace and course will be chosen that will assure complete coverage of the survey area and maximize the opportunity to see ducks. All transects will be mapped and all observations will be recorded by date and location (GPS).

C. Data Analysis and Statistical Methods

Population composition and annual changes in density will be compared to test whether harlequin duck populations are exhibiting similar growth trends or the oiled (injured) population is exhibiting a different direction or rate of change. We will continue to test whether low reproductive success in oiled areas has resulted in changes in population age and sex structure. The proportion of first-year males to total males will be used as a measure of past reproductive success. Surveys will be used to detect changes in abundance and compare the direction and rate of change between years for the four survey areas and two treatments. Data from winter surveys in 1997, 2000–2002 will be incorporated into the analysis and data from 1995-19997 surveys (spring, summer, fall) will be used when applicable.

Survey Coverage

Shoreline length (km) of transects will be calculated from the Alaska Department of Natural Resources PWS_ESI ARC/INFO GIS database. Shoreline length of small islands not included in the PWS_ESI ARC/INFO GIS database was calculated using the U.S. Forest Service CNFSHORE ARC/INFO GIS database.

Population Structure

We will use a generalized logit model (Agresti 1990) to test for annual differences among locations (WPWS, SWPWS, EPWS, MONT) and between treatments (oiled and unoiled) for the following ratios: (1) males to females; (2) sub-adult males to adult males; and 3) sub-adults (both sexes) to adult females. A test of the hypothesis of no interaction among main effects (year, location, treatment) is based on a likelihood ratio test (Stokes et al. 1995). Non-significant interaction terms are excluded from the model and a reduced model will be used to test for significant year, location, or treatment effect. We will use the natural logarithm of ratios (logit) to interpret differences among years and locations and between treatments. Harlequin ducks classified as unknown are not included in the ratio analysis. Counts will not be adjusted to compensate for variation in survey coverage among years because we used relative measures of abundance.

Trend Analysis

Data will be analyzed in a hierarchical fashion at four spatial scales: (1) transect, (2) region, (3) location and (4) treatment using simple linear regression. We will use density to compare trends in abundance among locations and between treatments. To estimate the rate of change at the transect level we regress density against year to generate a slope and variance. Regions are composed of transects in the same geographical vicinity. A mean slope for each region will be calculated by weighting the slopes for each transect by the average number of ducks. We average (unweighted) regional rates of change to obtain locational rates of change. At the broadest spatial scale, treatment, the average rate of change will be calculated by averaging (unweighted) the locational rates of change.

For each of the four spatial scales we compare the average rate of change (ANOVA) to identify differences within the study area. For consistency with prior studies (Rosenberg and Petrula 1998) a two-sample t-test will be used to test for differences in the rate of change in density between treatments. We will calculate the power to detect differences in slopes between treatments.

Absolute Measures

When calculating annual variation in the number and composition of harlequin ducks, we will adjust our counts to include only those birds located in areas of comparable survey coverage, thereby adjusting for differences in survey effort. The number of harlequin ducks classified as unknown varied among our surveys. To avoid erroneous interpretation when comparing the absolute abundance of specific components of the population, we will partition unknown birds among the appropriate age and sex categories based on observed proportions.

Power Analysis

For each transect we fit a simple linear regression model (y = density, x = year) to obtain an estimate of the rate of change in duck densities (birds/km). A hierarchical ANOVA was used to test for differences in the rate of change between locations. The model used was:

Rate of Change = overall mean + location + region (location) + transect (region location)

The power of the test was then calculated for several differences in slope between treatments and is presented below comparing our original EPWS and WPWS study areas.

Difference in slope	0.30	0.4	0.5	0.52	0.6	0.7	0.8	0.9	1.0	1.1
power (α= 0.10)	0.16	0.22	0.29	0.31	0.37	0.46	0.55	0.63	0.72	0.79
power (α= 0.05)	0.08	0.12	0.17	0.18	0.22	0.29	0.37	0.45	0.53	0.61

For EPWS and WPWS we observed a significant difference in the rate of change in density (difference in mean slopes = 0.52, p-value = 0.085) but it was marginal. Thus, we would

correctly reject the null hypothesis that there is no difference in the rate of change between EPWS and WPWS 31% of the time when the slopes differed by at least 0.52 (α=0.10). We also observed a significant difference in the rate of change in density (difference in mean slopes = 0.23, p-value = 0.027) when comparing all oiled areas (EPWS, MONT) with all unoiled areas (WPWS, SWPWS).

Under either of these circumstances we have low power to detect change because of variability of slope estimates as result of transect to transect movement within treatments. However, EPWS was more uniform in growth, that is all transects were more similar in growth rates whereas WPWS had lower growth rates and more variation on a transect by transect basis. Variation was even greater for Montague Island and SWPWS. These relatively small difference in slopes and high variability of a few transects reduces power. As growth rates equilibrate and we approach recovery it becomes increasingly difficult to increase power to detect those differences given the amount of inherent variability. By adding the Montague and SWPWS survey areas geographical variation increased and further reduced power. We anticipate overcoming this obstacle and increasing power by conducting repeat surveys at selected sites.

D. Description of Study Area

The proposed project will be conducted in the oil spill area of western Prince William Sound and unoiled eastern PWS between Valdez and Cordova and northern Montague Island. March surveys will repeat areas surveyed in /427 Harlequin Duck Recovery Monitoring (Rosenberg and Petrula 1998) plus additional survey sites in PWS will be located on Montague Island, following the sampling scheme of project \025 Nearshore Vertebrate Predator Project (Holland-Bartels et al. 1999), and southwestern PWS.

Transects in the spill area will be located on Knight Island, Applegate Island, Foul Bay, Falls Bay, Crafton Island, Chenega Island, Green Island, Naked Island, and Bainbridge, Evans, Danger and Latouche islands. Surveys in non-oiled areas will include portions of Hinchinbrook Island, Simpson Bay, Sheep Bay, Port Gravina, Landlocked Bay, Bligh and Busby islands, Galena Bay and Valdez Arm, and Montague Island.

E. Coordination and Collaboration with Other Efforts

This project is complimentary to EVOS Project /423 Patterns and Processes of Population Change in Selected Nearshore Vertebrate Predators. Coordination is ongoing with the above project including sample collection, site coordination, and information sharing (Dan Esler, Dan Rizzolo, USGS and Tuula Hollmen, Alaska SeaLife Center). It is also complimentary to ADF&G's sea duck surveys in Kachemak Bay, Alaska (Petrula and Rosenberg In prep.) and ADF&G/Sea Duck Joint Venture/National Fish and Wildlife Foundation project on population delineation of harlequin ducks in PWS (Rosenberg and Petrula In prep. B).

ADF&G personnel will conduct all data collection and analysis. Winter surveys and contracts for vessel support for winter surveys will be coordinated with related EVOS projects. Private sector contracts for winter vessel support will be solicited.

This project will be integrated with ongoing studies or findings of past studies including project \427 Harlequin Duck Recovery Monitoring; and project \159 Prince William Sound Marine Bird and Mammal Surveys. Information exchange has been on-going with marine bird and mammal surveys (Dave Irons, USFWS).

III. SCHEDULE

A. Project Milestones

Objective 1. Compare population structure (number of breeding pairs, subadult males, adult males, and females) between treatments (oiled and unoiled survey areas).
To be met by March 2004 (field work).

Objective 2. Compare density estimates for oiled and unoiled treatments.
To be met by March 2004 (field work).

Objective 3. Compare annual changes in density and population structure for oiled and unoiled treatments.
To be met by October 2004 (report)

Objective 4. Compare annual changes in density and population structure *within* oiled and unoiled treatments.
To be met by October 2004 (report)

Objective 5. Compare results with prior EVOS Harlequin Duck Recovery Monitoring studies.
To be met by October 2004 (report)

Objective 6. Add to our knowledge of harlequin duck life history.
To be met by October 2004 (report)

Objective 7. Integrate data with other long-term monitoring surveys to detect long-term changes in marine ecosystems
To be met by October 2004 (report)

This is proposed as a possible multi-year monitoring program designed to assess the recovery of an injured species. Each project objective will be assessed annually for oiled and unoiled areas then compared with each other and with data collected in subsequent years.

B. Measurable Project Tasks

FY 04, 1st quarter (October 1, 2003-December 31, 2003)

October: Project funding approved by Trustee Council. Interagency coordination. Plan logistics and personnel for winter surveys. Contract for vessel support.

FY 04, 2nd quarter (January 1, 2004-March 31, 2004)

January 12-16 (tentative): Annual GEM Workshop. Hire seasonal technicians. Prepare field equipment. Finalize field logistics. Conduct winter surveys in PWS.

FY 04, 3rd quarter (April 1, 2004-June 30, 2004)

Create databases, GIS. Analyze field data and begin report preparation. Maintain equipment.

FY 04, 4th quarter (July 1, 2004-September 30, 2004)

Finish analyses and final report/manuscripts submitted to Trustee Council Office.

IV. RESPONSIVENESS TO KEY TRUSTEE COUNCIL STRATEGIES

A. Community Involvement and Traditional Ecological Knowledge (TEK)

A Traditional Ecological Knowledge report was prepared as part of EVOS Restoration Project 427 Harlequin Duck Recovery Monitoring (Rosenberg and Petrula 1998). As we have done in the past we will continue to coordinate with the villages of Tatitlek (Gary Kompkoff) and Chenega Bay (Pete Kompkoff and Kate McLaughlin) on our activities and possibilities for community involvement. No funds are being requested for local hire or equipment or vessel support.

B. Resource Management Applications

The Alaska Department of Fish and Game, has a statutory mandate to manage and protect wildlife and their habitats on state and private lands for the benefit of Alaskans. Migratory bird management requires good scientific information to detect population change, prevent habitat degradation, and manage public uses of migratory birds and their habitats. Numbers of several sea duck species are declining throughout much or all of their range including Alaskan breeding populations (Goudie et al 1994, Hodges 1996). Little is known about the status of wintering populations in the Gulf of Alaska. The ADF&G Statewide Waterfowl Program is responsible for adopting migratory bird hunting regulations (sport and subsistence) within the Pacific Flyway under the federal framework, and commenting on permits for mariculture and wetland, development within the nearshore environment, adjacent commercial and recreational activities, and oil spill contingency plans. This study will provide ADF&G with information to improve its management capabilities. Contact Tom Rothe or Dan Rosenberg, ADF&G.

V. PUBLICATIONS AND REPORTS

An annual report will be presented by September 30, 2004. Publications will be prepared for peer-review journals in lieu of final report when possible and will depend upon the duration of the project.

VI. PROFESSIONAL CONFERENCES

North American Sea Duck Conference and Workshop, Sea Duck Joint Venture. 2004. Date and location to be determined. Presenter.

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Professional History

Wildlife Biologist. Alaska Department of Fish and Game, Anchorage, AK. 1985–Present.
Habitat Biologist. Alaska Department of Fish and Game, Anchorage, AK. 1983–1985.
Wildlife Biologist. U.S. Fish and Wildlife Service, Anchorage, AK. 1980–1983.
Adjunct Faculty. Anchorage Community College, Anchorage, AK. October 1984 - May 1987.

EDUCATION

Humboldt State University, Arcata, CA. March 1979.
Bachelor of Science degree - Wildlife Management.
Boston University, Boston MA. 1969 - 1972. Liberal Arts.

AWARDS

ADF&G Employee of the Year, 1991.
Alaska Outdoor Council, Waterfowl Conservationist of the Year, 1993

SELECTED PUBLICATIONS

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COLLABORATORS

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Tim Bowman – U.S. Fish and Wildlife Service, Office of Migratory Birds, Anchorage, Alaska.
Dan Esler - Simon Fraser Univ., Vancouver, BC
Tuula Hollmen, DVM – Alaska SeaLife Center, Seward, AK
Henry Huntington, Huntington Consultants, Eagle River AK
William Larned - U.S. Fish and Wildlife Service, Office of Migratory Birds, Soldotna, Alaska.
Mark Lindberg – Associate Professor, University of Alaska Fairbanks, Department of Biology and Wildlife, Fairbanks.
Edward Mallek – U.S. Fish and Wildlife Service, Office of Migratory Birds, Fairbanks, Alaska.
Dan Mulcahy, DVM - U. S. Geological Survey, Alaska Biological Science Center, Anchorage, AK
Russ Oates – U.S. Fish and Wildlife Service, Office of Migratory Birds, Anchorage, Alaska.
John Pearce – U.S. Geological Survey, Molecular Ecology Laboratory, Alaska Science Center, Anchorage, Alaska.
Deborah Rudis – U.S. Fish and Wildlife Service, Ecological Service, Juneau, Alaska.
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Academic Credentials:

M.S. Wildlife Biology University of Alaska Fairbanks 1994
B. S. Animal Science Tennessee Technological University 1978

Professional Credentials:

Wildlife Biologist II Alaska Department of Fish and Game 1996 – present

Publications:

Petrula, M. J. and D. H. Rosenberg. *in prep.* Small boat and aerial survey of waterfowl in Kachemak Bay, Alaska 1999-2003.

_____ and T. C. Rothe. *in review*. Migration chronology, route and winter and summer distribution of Pacific Flyway Population lesser sandhill cranes. Proc. North Am. Crane Workshop 9:000-000.

_____. 2002. Dusky Canada goose production survey on the west Copper River Delta. Unpbl. Rep. Alaska Department of Fish and Game, Division of Wildlife Conservation, Anchorage, Alaska.

_____. 2002. Population status of Middleton Island Canada geese. Unpbl. Rep. Alaska Department of Fish and Game, Division of Wildlife Conservation, Anchorage, Alaska.

_____. 1994. Nesting ecology of ducks in interior Alaska. M. S. thesis. University of Alaska, Fairbanks, Alaska.

Rosenberg, D. H. and M. J. Petrula. 2000. Scoter life history and ecology: Linking satellite technology with traditional knowledge. Restoration Project 99273. Annual report. Exxon Valdez Oil Spill Trustee Council, Anchorage, Alaska.

_____ and _____. 1998. Status of harlequin ducks in Prince William Sound, Alaska after the *Exxon Valdez* oil spill, 1995-1997. Restoration Project 97427. Final Report. Exxon Valdez Oil Spill Trustee Council, Anchorage, Alaska.

Collaborators:

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Sandy Talbot - United States Geological Survey, Biological Resources Division, Molecular Ecology Laboratory, Alaska Science Center, Biological Science Office, Anchorage, Alaska..

Harlequin Duck Population Dynamics in PWS: Measuring Recovery

Metadata Descriptors of Quantitative Characteristics for Taxonomic Sampling

Observer
Boat
Date
Transect start and finish time and GPS
Time of observation
Wind Speed/Direction
Visibility
Wave Height

Transect number
Flock No.
No. Males
No. Females
No. Pairs
No. Sub-adult males
No. Unknown
Total Harlequins
Latitude in Decimal Degrees
Longitude in Decimal Degrees
Water depth (m)
No. Sea otters
No. Loons
No. other waterfowl by species

EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL
DETAILED BUDGET FORM FY 04 - FY 06

Budget Category:	Proposed FY 04	Proposed FY 05	Proposed FY 06		TOTAL PROPOSED	
Personnel	$8.6				$8.6	
Travel	$0.3				$0.3	
Contractual	$23.3				$23.3	
Commodities	$1.8				$1.8	
Equipment	$0.0				$0.0	
Subtotal	$34.0				$34.0	
General Administration (9% of Subtotal)	$3.1				$3.1	
Project Total	$37.1				$37.1	

Cost-share Funds:
In this box, identify non-EVOS funds or in-kind contributions used as cost-share for the work in this proposal. List the amount of funds, the source of funds, and the purpose for which the funds will be used. Do not include funds that are not directly and specifically related to the work being proposed in this proposal.

P**ersonnel: ADF&G will share salary cost. Salary for Principal Investigator (3.0 months) and Senior Biologist (2.5 months) will be provided by ADF&G from the agency's budget. Total = $32.0**

FY 04-06

Date Prepared: 16-Jun-03

Project Number:
Project Title: Harlequin Duck Population Dynamics
Agency: Alaska Department of Fish and Game

FORM 3A
TRUSTEE
AGENCY
SUMMARY

***EXXON VALDEZ* OIL SPILL TRUSTEE COUNCIL**
DETAILED BUDGET FORM FY 04 - FY 06

Personnel Costs:		GS/Range/	Months	Monthly		Personnel
Name	Description	Step	Budgeted	Costs	Overtime	Sum
2 F&G Tech.	F&W Tech. Ill, Field Tech	11F	2.0	3.8	1.0	8.6
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
	Subtotal		2.0	3.8	1.0	
					Personnel Total	$8.6

Travel Costs:	Ticket	Round	Total	Daily	Travel
Description	Price	Trips	Days	Per Diem	Sum
Whittier parking, 2 vehicles- 15 days					0.2
Whittier Toll - 2 vehicles and trailers					0.1
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
				Travel Total	$0.3

FY 04

Project Number:
Project Title: Harlequin Duck Population Dynamics
Agency: Alaska Department of Fish and Game

FORM 3B
Personnel
& Travel
DETAIL

EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL
DETAILED BUDGET FORM FY 04 - FY 06

Contractual Costs:	Contract Sum
Description	
Boat and outboard motor repair and maintenance	2.0
Photo processing, presentation productions	0.2
Air charter for field support 4 hrs @ $270/hr	1.0
Trailer and boat moorage Whittier	0.1
Vessel support for March surveys 15 days @1300/day	19.5
Truck Leasing Costs	0.5
If a component of the project will be performed under contract, the 4A and 4B forms are required. **Contractual Total**	$23.3

Commodities Costs:	Commodity Sum
Description	
Boat fuel 350 gallons @ $2.00/gal	0.7
Boat supplies- replacement parts, props, fuel lines, fuel filters, water filters, battery, absorbent rags, oil, emergency provisions	0.8
Field survey supplies- rite-in-rain notebooks/paper, nautical charts, batteries,	0.3
Commodities Total	$1.8

FY 04

Project Number:
Project Title: Harlequin Duck Population Dynamics
Agency: Alaska Department of Fish and Game

FORM 3B
Contractual
&
Commoditie

EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL
DETAILED BUDGET FORM FY 04 - FY 06

New Equipment Purchases:	Number	Unit	Equipment
Description	of Units	Price	Sum
NONE			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
		New Equipment Total	$0.0

Existing Equipment Usage:	Number	Inventory
Description	of Units	Agency
17 ft. Boston Whaler	1	ADFG
10x40 binoculars	4	ADFG
Spotting Scopes	2	ADFG
Survival Suits	2	ADFG
Outboard Motors/various hp	6	ADFG
Garmin GPS	3	ADFG
Marine VHF radios	4	ADFG

FY 04

Project Number:
Project Title: Harlequin Duck Population Dynamics
Agency: Alaska Department of Fish and Game

FORM 3B
Equipment
DETAIL

Harlequin Duck Population Dynamics in Prince William Sound: Measuring Recovery

Budget Justification

All requests are for survey activities in Prince William Sound based on market rates for commodities, fuel, vessel charter etc. to conduct a winter survey with a support vessel and 2 skiffs and a 4-person survey crew. Volume and cost estimates for Maintenance, fuel, and supplies etc. are based on past survey expenditures.

We will need a crew of 4, necessitating the hiring of 2 technicians. They will be employed for 1 month each (2 weeks of survey time and 1 week of mobilization and demobilization and data entry).

Limited staffing and funding precludes ADF&G from undertaking these surveys as part of normal operations and in the past ADF&G has not conducted marine bird surveys in PWS as part of its normal waterfowl management functions. ADF&G is offering to partner to study the effects of lingering oil from the EVOS by providing staff salaries, an ADF&G in-kind contributions of a boat, and office equipment and supplies.