PROPOSAL SIGNATURE FORM

THIS FORM MUST BE SIGNED BY THE PROPOSED PRINCIPAL INVESTIGATOR AND SUBMITTED ALONG WITH THE PROPOSAL. If the proposal has more than one investigator, this form must be signed by at least one of the investigators, and that investigator will ensure that Trustee Council requirements are followed. Proposals will not be reviewed until this signed form is received by the Trustee Council Office.

By submission of this proposal, I agree to abide by the Trustee Council's data policy (*Trustee Council Data Policy**, adopted March 17, 2008) and reporting requirements *(Procedures for the Preparation and Distribution of Reports***, adopted June 27, 2007).

PROJECT TITLE: Prince William Sound Marine Bird Surveys, Synthesis and Restoration

Printed Name of PI: Dr. David B. Irons

Signature of PI: _____ Date April 20, 2009

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Signature of co-PI: _____ Date April 20, 2009

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* www.evostc.state.ak.us/Policies/data.cfm
** www.evostc.state.ak.us/Policies/reporting.cfm

FY10 INVITATION
PROPOSAL SUMMARY PAGE

Project Title: **Prince William Sound Marine Bird Surveys, Synthesis and Restoration**

Project Period: October 1st 2009 to September 30th 2011

Proposer(s): Dr. David B. Irons and Dr. Kathy Kuletz, Migratory Bird Management, U. S. Fish and Wildlife Service, david_irons@fws.gov, (907) 786-3376

Study Location: Prince William Sound, Alaska

Abstract: We propose to conduct small boat surveys to monitor abundance of marine birds in Prince William Sound, Alaska, during March and July 2010. Ten previous surveys have monitored population trends for marine birds and mammals in Prince William Sound after the *Exxon Valdez* oil spill. We will use data collected in 2010 to examine trends from summer and from winter to determine whether populations in the oiled zone are increasing, decreasing, or stable. We will also examine overall population trends for the Sound. Continued monitoring of marine birds and synthesis of the data are needed to determine whether populations injured by the spill are recovering. Data collected from 1989 to 2007 in the oiled area indicated that common loons (*Gavia immer*), and cormorants (*Phalacrocorax spp*) are increasing. Numbers of all other injured species are either not changing or are declining in the oiled area. Populations of harlequin ducks (*Histrionicus histrionicus*), black oystercatchers (*Haematopus bachmani*), Kittlitz's Murrelets (*Brachyramphus brevirostris*), and common murres *(Uria aalgae*) are showing no trend in the oiled area; pigeon guillemots (*Cepphus columba*) and marbled murrelets (*Brachyramphus marmoratus*)) are declining in the oiled areas of Prince William Sound. We have found high inter-annual variation in numbers of some bird species and therefore recommend continuing to conduct surveys every two years. These surveys are the only ongoing means to evaluate the recovery of most of these injured marine bird species. A survey in 2010 would also benefit the ongoing Pigeon Guillemot Restoration Research Project by providing a Sound-wide pigeon guillemot population trend estimate through 2010, facilitating a comparison to the population trend on Naked Island.

Estimated Budget:
EVOS Funding Requested ***(must include 9% GA)***

FY10	FY11	FY12	FY13	Total
$254,499.70	**$39,240.00**			**$293,739.7**

Non-EVOS Funds to be used:

FY10	FY11	FY12	FY13	Total
$115,000.00				**$115,000.00**

Title: Prince William Sound Marine Bird Surveys, Synthesis and Restoration

I. NEED FOR THE PROJECT

A. Statement of Problem

The waters and shorelines of Prince William Sound support abundant marine bird and sea otter populations throughout the year (Isleib and Kessel 1973, Hogan and Murk 1982, Irons et al. 1988a). Potential injuries to marine birds from exposure to the *T/V Exxon Valdez* oil spill included, but were not limited to, death, changes in behavior, and decreased productivity. U. S. Fish and Wildlife Service, Migratory Bird Management conducted boat surveys in Prince William Sound prior to the *Exxon Valdez* oil spill in 1972-73 (Dwyer et al. 1976) and 1984-85 (Irons et al. 1988a,b). After the oil spill, Natural Resource Damage Assessment Bird Study Number 2 (Burn 1994, Klosiewski and Laing 1994) was initiated to document damage from the oil spill on the marine bird and sea otter populations of Prince William Sound. Data from these surveys indicated that populations of sea otters (Burn 1994) and several marine bird species (Klosiewski and Laing 1994) declined in the oil spill area. Thus, restoration projects 93045 (Agler et al. 1994a), 94159 (Agler et al. 1995a), 96159 (Agler and Kendall 1997), 98159 (Lance et al. 1999), 00159 (Stephensen et al. 2001), 04159 (Sullivan et al. 2005), 050751 (McKnight et al. 2006), and 070751 (McKnight et al. 2008) were initiated to continue monitoring marine bird and sea otter population abundance to assess recovery of injured species. Restoration projects 93045, 94159, 96159, 98159, 00159, 04159, 050751, and 070751 continued the original *Exxon Valdez* oil spill damage assessment study (Bird Study Number 2, Burn 1994, Klosiewski and Laing 1994) from 1989-91.

Using small boat surveys, this project will collect additional information to monitor the distribution and abundance of marine birds and sea otters in Prince William Sound. These data will be combined with data collected in 1989-91 (Klosiewski and Laing 1994), 1993 (Agler et al. 1994a), 1994 (Agler et al. 1995a), 1996 (Agler and Kendall 1997), 1998 (Lance et al. 1999, Irons et al. 2000, Lance et al. 2001) and 2000 (Stephensen et al. 2001), 2004 (Sullivan et al.2005), 2005 (McKnight et al. 2006), and 2007 (McKnight et al. 2008) to examine trends in marine bird distribution and abundance. This project will benefit restoration of Prince William Sound by determining whether populations that declined due to the spill are recovering and by identifying which species are still of concern.

Almost 30,000 marine bird (Piatt et al. 1990) and 900 sea otter (DeGange and Lensink 1990) carcasses were recovered following the *Exxon Valdez* oil spill. Based on modeling studies using carcass search effort and population data, an estimated 250,000 marine birds were killed in Prince William Sound and the northern Gulf of Alaska (Piatt and Ford 1996). Garrott et al. (1993) estimated that 2,800 sea otters also were killed. These estimates are probably low, because they only include direct mortality occurring in the first five months after the spill.

The U. S. Fish and Wildlife Service conducted boat surveys of marine bird and sea otter populations in Prince William Sound in 1972-73 (Dwyer et al. 1976), 1984-85 (Irons et al. 1988b), and many years following the spill (1989, 1990, 1991, Klosiewski and Laing 1994;

1993, Agler et al. 1994a; 1994, Agler et al., 1995a; 1996, Agler and Kendall, 1997; 1998, Lance et al., 1999; 2000, Stephensen et al. 2001; 2004,Sullivan et al.2005; 2005, McKnight et al. 2006; and 2007,McKnight et al. 2008). Klosiewski and Laing (1994) documented overall declines in 15 species or species groups between 1972-73 (Dwyer et al. 1976) and the years after the spill. When comparing population estimates with 1984-85 data, Klosiewski and Laing (1994) documented decline of 6 species or species groups.

McKnight et al. (2008) examined whether marine bird and mammal species designated as injured by the *EVOS* Trustee Council had shown signs of recovery by 2007. Data collected from 1989 to 2007 in the oiled area indicated that common loons (*Gavia immer*) and cormorants (*Phalacrocorax spp.*) are increasing. Numbers of all other injured species are either not changing or are declining in the oiled area. Populations of harlequin ducks (*Histrionicus histrionicus*), black oystercatchers (*Haematopus bachmani*), Kittlitz's murrelets (*Brachyramphus brevirostris*), and common murres *(Uria aalgae*) are showing no trend in the oiled area; pigeon guillemots (*Cepphus columba*), and marbled murrelets (*Brachyramphus marmoratus*), are declining in the oiled areas of Prince William Sound in summer. We have found high inter-annual variation in numbers of some bird species and therefore recommend continuing to conduct surveys every two years. These surveys are the only ongoing means to evaluate the recovery of most of these injured species. A survey in 2009 would also benefit the ongoing Pigeon Guillemot Restoration Research Project by providing a Sound-wide pigeon guillemot population trend estimate through 2009, facilitating a comparison to the population trend on Naked Island.

B. Relevance to 1994 Restoration Plan Goals and Scientific Priorities

Restoration of marine bird populations requires population estimates to determine whether recovery is occurring or if species are still affected by the oil spill. This project will benefit marine birds by revealing species that show continuing injury due to the *T/V Exxon Valdez* oil spill. Agler et al. (1994a, 1995a), Agler and Kendall (1997), and Lance et al. (1999), and Stephensen et al. (2001) found additional populations that were not previously shown to be injured. Survey data from this project have also been used by investigators of other EVOS studies on pigeon guillemots (Greg Golet, pers. comm.), marbled murrelets (K. Kuletz, pers. comm.), Kittlitz's murrelets (B. Day, per comm.), harlequin ducks (D. Rosenberg and D. Esler, pers. comm.), sea ducks (K. Laing and D. Esler, pers. comm.), black oystercatchers (B. Andres, pers. comm.), birds and forage fish (W. Ostrand, pers. comm.), herring (E. Brown, pers. comm.), and sea otters (Burn 1994).

This project directly relates to marine bird restoration objectives, which are set out in the 2006 Update on Injured Resources and Services.

Black oystercatchers - "will have recovered when the population returns to pre-spill levels"

Harlequin duck - "will have recovered when breeding- and nonbreeding-season demographics return to pre-spill levels…."

Marbled murrelet - "will have recovered when their populations are stable or increasing."

Pigeon guillemot - “will have recovered when their population is stable or increasing.”

All of the above recovery objectives relate to determining the population abundance of injured species. This is critical to determining recovery for most species. We propose to sample the entirety of Prince William Sound during March and July 2009 to estimate population abundance and distribution of marine birds. Data will be comparable with pre- and post-spill data collected by the U. S. Fish and Wildlife Service (Dwyer et al. 1976, Irons et al. 1988a,b, Agler et al. 1994a, Klosiewski and Laing 1994, Agler et al. 1995a, Agler and Kendall 1997, Lance et al. 1999, Stephensen et al. 2001, Sullivan et al. 2005, McKnight et al. 2006, and McKnight et al. 2008) to examine trends in abundance for these species. There are currently no other studies monitoring the populations of loons, cormorants, black oystercatchers, harlequin ducks, murres, pigeon guillemots, marbled murrelets, or Kittlitz’s murrelets in Prince William Sound.

Repeating this survey every two years increases our ability to more quickly detect a population trend that would support a conclusion that recovery objectives have been met. Using data from previous surveys, we have conducted power analyses to examine the power to detect trends in population abundance (Taylor and Gerrodette 1993). If all other parameters are equal, power is determined by the number of surveys conducted in a given period of time. As the number of surveys increases, the ability to detect a trend increases. For example, if a population had a coefficient of variation (C.V.) of 0.30 (which is higher than that of 73% of the injured species, Agler and Kendall 1999) the ability to detect an average annual 10 % change in population is 70% with 8 surveys (Fig. 2).

II. PROJECT DESIGN

A. Objectives

The purpose of this study is to obtain population estimates of marine birds in Prince William Sound to monitor the recovery of species whose populations may have declined due to the *T/V Exxon Valdez* oil spill. The specific objective of this project is:

1. To determine population abundance, with 95% confidence limits, of marine bird populations in Prince William Sound during March and July 2010 in both oiled and unoiled regions, as well as in Prince William Sound as a whole, in order to assess population trends in the years following the EVOS.

    a) Identify any trends (1989 – 2010) within the oiled region in population sizes of officially injured species as well as of the additional species for which injury has been demonstrated.

        H_0: There is no trend in population estimates in the oiled region (“no recovery”)

        H_A: There is a significant trend in population estimates in the oiled region (negative trend = “no recovery;” positive trend = “recovering”)

b) To identify any difference in trends (1989 – 2010) in population sizes between oiled and unoiled regions for officially injured species as well as for the additional species for whom injury has been demonstrated.

H_0: There is no difference in population trends between oiled and unoiled regions ("no recovery")

H_A: There is a significant difference in population trends between oiled and unoiled regions (negative trend = "no recovery;" positive trend = "recovering")

This research is important because it will provide information crucial to the determination of "recovery," as well as providing a means of assessing the effects of restoration efforts on marine bird populations. Several taxa that have yet to achieve "recovered" status (i.e., black oystercatchers, harlequin ducks, marbled murrelets, and pigeon guillemots) have restoration objectives related to population size. This research will be crucial in determining whether or not the proposed recovery objective has been met for each of these taxa. There are currently no other studies monitoring the populations of loons, cormorants, black oystercatchers, harlequin ducks, murres, pigeon guillemots, marbled murrelets, or Kittlitz's murrelets in Prince William Sound. In addition, these data, combined with data from future repetitions, may be used in assessments of the effectiveness of future restoration projects on marine bird populations in the Sound.

B. Procedural and Scientific Methods

Survey methodology and design will remain identical to that of past marine bird surveys conducted by the U. S. Fish and Wildlife Service in 1989, 1990, 1991, (Klosiewski and Laing 1994), 1993 (Agler et al. 1994a), 1994 (Agler et al. 1995a), 1996 (Agler and Kendall 1997), 1998 (Lance et al. 1999), 2000 (Stephensen et al. 2001), 2004 (Sullivan et al. 2005), 2005 (McKnight et al. 2006), and 2007 (McKnight et al. 2008). We will conduct two surveys: one during March ("winter") and another during July ("summer") 2010. We will use three 7.7 m fiberglass boats traveling at speeds of 10-20 km/hr to survey transects over two 3-week periods. Prior to sampling each transect, the survey crew will collect environmental data near the start point of the transect: sea surface temperature, sea surface salinity, turbidity, air temperature, wind speed/direction, sea state, weather, and observation conditions. For each survey, two observers (trained and experienced in marine bird identification) will survey a sampling window 100 m on either side, ahead of, and above the vessel (Klosiewski and Laing 1994). When surveying shoreline transects, observers will also record sightings on land within 100 m of shore. Observers will sample continuously and use binoculars to aid in species identification. Observers will practice estimating distances with a duck decoy, and radars on the survey vessels will be used to assist in determining our distance from land on shoreline transects. We will survey most transects when wave height is <30 cm, and we will not survey when wave height is >60 cm. Data will be reviewed and proofed at the conclusion of each day's survey work.

We will continue to use a stratified random sampling design containing three strata: shoreline, coastal-pelagic, and pelagic (Klosiewski and Laing 1994) (Fig. 1). The shoreline stratum will

consist of waters within 200 m of land. Irons et al. (1988b) divided this stratum, by habitat, into 742 transects with a total area of 820.74 km^2. We will locate shoreline transects by geographic features, such as points of land, to facilitate orientation in the field and to separate the shoreline by habitat (Irons et al. 1988a,b). Shoreline transects will vary in size, ranging from small islands with <1 km of coastline to sections of the mainland with over 30 km of coastline. Mean transect length will be 5.55 km. During winter, we plan to survey 99 shoreline transects, but this number varies among years, due to weather conditions and ice blockage. During summer, we plan to survey 212 shoreline transects. All transects were randomly chosen, and the same transects are used each survey (Klosiewski and Laing 1994).

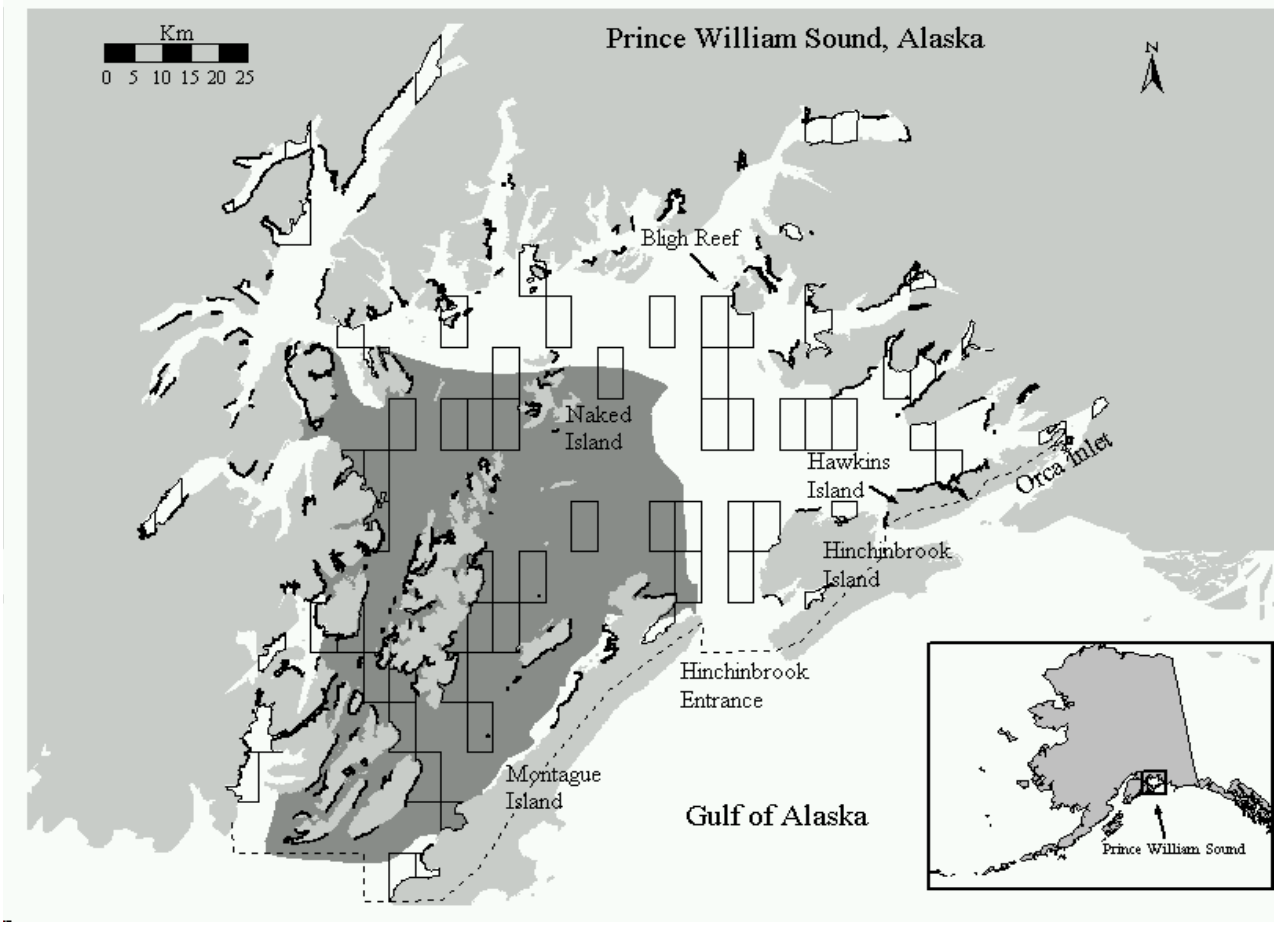

Figure 1. Locations of shoreline transects and pelagic transect blocks in Prince William Sound. Shading denotes the oiled region.

To sample the coastal-pelagic and pelagic strata of Prince William Sound, we will divide the study area into 5-minute latitude-longitude blocks. When a block includes >1.8 km of shoreline, we will classify it in the coastal-pelagic stratum, and we will classify blocks with $\leq$1.8 km of shoreline in the pelagic stratum (Klosiewski and Laing 1994). When coastal-pelagic or pelagic blocks intersect the 200 m shoreline stratum, they will be truncated to avoid overlap. We plan to survey 2 north-south transect lines, 200 m wide each, located 1 minute inside the east and west

boundaries of each coastal-pelagic and pelagic block. We will use Global Positioning Systems and nautical compasses to navigate transect lines. In the coastal-pelagic stratum, we plan to survey $\leq$29 blocks in the winter and $\leq$46 blocks in the summer. In the pelagic stratum, we plan to survey $\leq$25 blocks during both seasons.

To examine population trends over time and to determine if populations injured by the spill are recovering, we will poststratify Prince William Sound into two zones, oiled and unoiled (Fig. 1), based upon the pattern of oiling by the *Exxon Valdez* oil spill (Klosiewski and Laing 1994).

Precision of individual population estimates varies substantially depending on distribution patterns of each species. Population estimates for species with uniform distributions and substantial numbers of individuals tend to be more precise than estimates for rare and patchily distributed populations. However, despite imprecision associated with individual yearly population estimates, repeatedly surveying the same transects in each survey year provides the best method for tracking population trends over time.

Because this project incorporates and builds upon data collected in previous marine bird and mammal surveys, it is crucial that the sampling methodology remain identical to that of the historical efforts. Alternative methodologies are therefore not an option, as changing data collection procedures would render the new results incomparable with the historical data.

C. Data Analysis and Statistical Methods

As in previous surveys (Klosiewski and Laing 1994, Agler et al. 1994a,b,c, 1995a,b, Agler and Kendall 1997, Lance et al. 1999, Stephensen et al. 2001, Sullivan et al. 2005, McKnight et al. 2006, McKnight et al. 2008), we will use a ratio estimator (Cochran 1977) to estimate population abundance. Shoreline transects will be treated as a simple random sample; whereas the coastal-pelagic and pelagic transects will be analyzed as two-stage cluster samples of unequal size (Cochran 1977). To do this, we will estimate the density of birds counted on the combined transects for a block and multiply by the area of the sampled block to obtain a population estimate for each block; any land or shoreline area (within 200m of land) intersecting a block will be subtracted from the total area of that block. We then will add the estimates from all blocks surveyed and divide by the sum of the areas of all blocks surveyed. We will calculate the population estimate for a stratum by multiplying this estimate by the area of all blocks in the strata. Population estimates for each species and for all birds in Prince William Sound will be calculated by adding the estimates from the three strata, and we will calculate 95% confidence intervals for these estimates from the sum of the variances of each stratum (Klosiewski and Laing 1994).

a) Trends in the oiled region

We will perform a linear regression on log-tranformed population estimates over time (1989 – 2010) in the oiled region of Prince William Sound. Prior to calculating the $\log_{10}$ of each population estimate, we will add a constant of 0.167 to each estimate to avoid the undefined $\log_{10}$ of 0. In all analyses we will use a test size alpha = 0.10 to balance Type I and Type II errors. The reasons for this include: 1) variation is often high and sample sizes low (n = 11 survey years);

and 2) monitoring studies are inherently different from experiments and the number of tests being run with a multi-species survey are many, therefore, controlling for the number of tests by lowering alpha levels (e.g. Bonferroni adjustment) might obscure trends of biological value.

Taxa with significant increasing trends in the oiled region will be considered "recovering," while taxa with no trends or significant negative trends will be considered "not recovering.

b) Comparing trends between oiled and unoiled regions

We will use the regression technique detailed in (a) to perform regression analyses on population estimates (1989 – 2010) in the unoiled region. We will use a homogeneity of slopes test (Freud and Littell 1981) to compare population trends between the oiled and unoiled zones of Prince William Sound to examine whether species with population estimates of >500 individuals have changed over time. To do this, we must assume that marine bird and sea otter populations increase at the same rate in the oiled and unoiled zones of Prince William Sound. Significantly different slopes would indicate that population abundance of a species or species group changed at different rates.

Taxa showing no difference in trends between the oiled and unoiled regions will be considered "not recovering." Taxa showing significantly greater trends in the oiled region compared with the unoiled region will be considered "recovering." Taxa showing significantly greater trends in the unoiled region compared to the oiled region will be considered to be suffering "continuing and increasing effects."

Overall, a species will be considered "recovering" if it meets the requirements for this category in either the regression analysis within the oiled region or the homogeneous slopes analysis.

To determine optimum survey frequency, we conducted a power analysis to estimate the probability of detecting trends in abundance using linear regression from a given number of samples (Taylor and Gerrodette 1993). We examined our power to detect trends when coefficient of variation (CV) of the population was 0.30 (greater than the mean CV from previous surveys for 73% of the injured species; Fig. 2) and when the CV = 0.13 (the mean summer CV for *Brachyramphus* murrelets, an injured species. Models of seabird population growth predict most species increase no more than 12% per year (Nur and Ainley 1992), so we used 10% for our comparisons. With CV=0.30 the probability of detecting an average annual change of 10% would be 92% with the 10 surveys completed to date (Fig. 2).

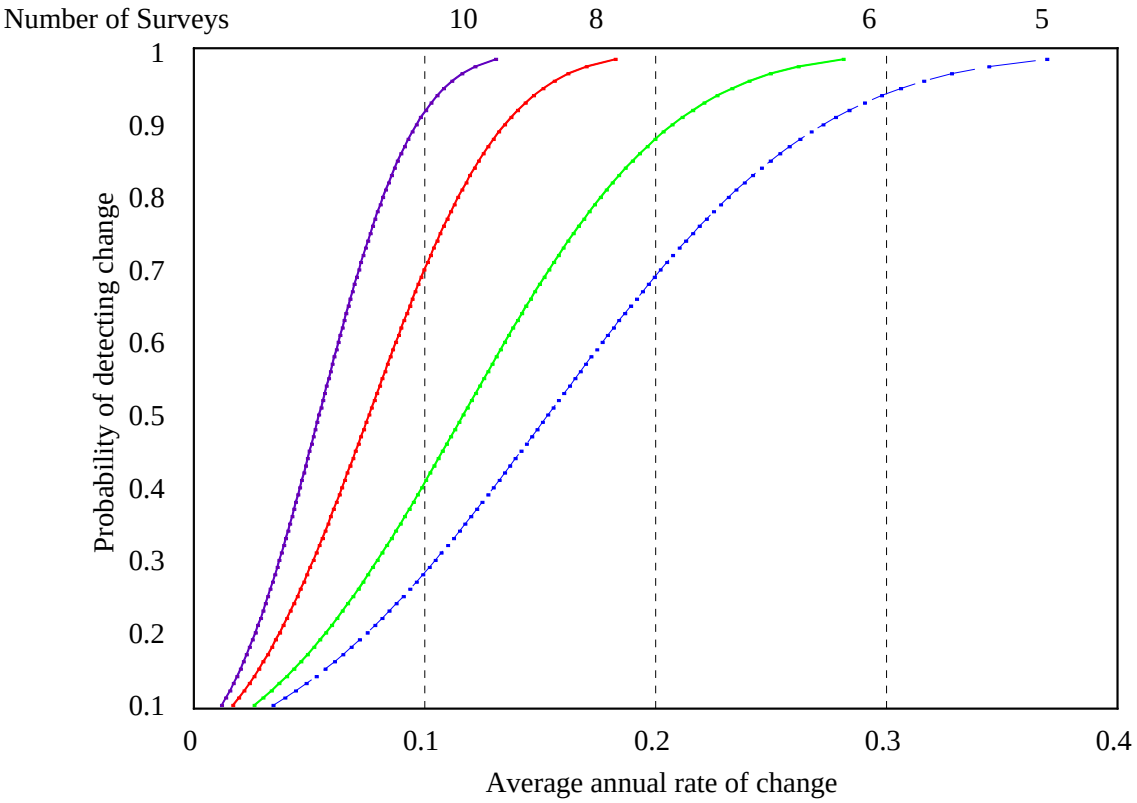

Figure 2. Estimated power based on numbers of surveys (5, 6, 8, and 10) conducted to detect a trend in marine bird populations in Prince William Sound when the CV = 0.30.

D. Description of Study Area

Our study area includes all waters within Prince William Sound and all land within 100 m of shore (Fig. 1). We exclude Orca Inlet, near Cordova, Alaska and the southern sides of Montague, Hinchinbrook, and Hawkins Islands (Klosiewski and Laing 1994).

E. Coordination and Collaboration with Other Efforts

Principle investigators from other EVOS Trustee Council funded projects have used our survey data in the past. Data from these surveys would be helpful for the sea otter and harlequin duck studies, as well as the Bodkin and Dean FY10 proposal to monitor the Nearshore in Prince William Sound. All data will be entered into the North Pacific Pelagic Seabird Database and will be available on the web to other scientists, as well as to lay people who would like to see it or use it.

III. SCHEDULE

A. Project Milestones

Objective 1. Collect and analyze data and write draft report on recovery of injured marine bird populations in Prince William Sound.
To be met on April 15, 2011.

B. Measurable Project Tasks Specify, by each quarter of each fiscal year, when critical project tasks (for example, sample collection, data analysis, manuscript submittal, etc.) will be completed. This information will be the basis for the quarterly project progress reports that are submitted to the Trustee Council Office.

FY 10, 1st quarter (October 1-December 31)
October: Project funding approved by Trustee Council
Funding: $50K

FY 10, 2nd quarter (January 1-March 31)
January : Annual Marine Science Symposium
January, February: Prepare for March survey.
March: Data Collection
Funding: $75K

FY 10, 3rd quarter (April 1-June 30)
April-June: Prepare for July survey
Funding: $25K

FY 10, 4th quarter (July 1-September 30)
July: Data Collection
Funding: $75K

FY 11, 1st quarter (October 1-December 31)
October-December: Data Analysis
Funding: $20K

FY 11, 2nd quarter (January 1-March 31)
January: Annual Marine Science Symposium
January-March: Write Draft Report
Funding: $18K

FY 11, 3rd quarter (April 1-June 30)
April-June: Revise report and finalize
Funding: $30K

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CURRICULUM VITAE OF PROPOSED PRINCIPAL INVESTIGATORS

Dr. David B. Irons
U.S. Fish and Wildlife Service
1011 East Tudor Road
Anchorage, Alaska 99503
david_irons@fws.gov
(907) 786-3376

EDUCATION

B. S. Environmental Resource Management 1976	*Pennsylvania State University*
M. S. Wildlife Ecology 1982	*Oregon State University*
Ph. D. Biology 1992	*University of California, Irvine*

RECENT PROFESSIONAL EXPERIENCE

1999-2008	Alaska Seabird Coordinator, Migratory Bird Management, U.S. Fish and Wildlife Service
1993-1998	Marine Bird Monitoring Coordinator, Migratory Bird Management, U.S. Fish and Wildlife Service
1984-1992	Biologist, Migratory Bird Management, U.S. Fish and Wildlife Service

COMMITTEES

Chair, World Seabird Conference, International Steering Committee
Alaska Region Representative, North American Colonial Waterbird Conservation Plan
Chair, Alaska Seabird Working Group
Chair, Circumpolar Seabird Group
Seabird Coordinator, Circumpolar Arctic Flora and Fauna (CAFF), Circumpolar Biodiversity Monitoring Network.
Chair, Pacific Seabird Group – 2003-2005

Related Publications

Golet, G. H., J. A. Schmutz, D. B. Irons, and J. A. Estes. 2004. Mechanistic determinants of reproductive costs in a long-lived seabird: a multiyear experimental study of the black-legged kittiwake. *Ecological Monographs* 74:353-372.

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Other Publications

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Irons, D. B., R. G. Anthony, and J. A. Estes. 1986. Foraging strategies of glaucous-winged gulls in a rocky intertidal community. *Ecology* 67:1460-74.

COLLABORATORS

Ainley, David, H.T. Harvey and Associates
Anker-Nilssen, Tycho, NINA, Norway
Brown, Evelyn, UAF
Byrd, Vernon, USFWS
Decker, Mary Beth, Yale U
Drew, Gary, USGS
Dragoo, Don, USFWS
Erickson, Wally, West Inc.
Ford, Glenn, R.G. Ford Consulting
Golet, Greg, TNC
Jodice, Pat, Clemson U.
Kendall, Steve, USFWS
Kuletz, Kathy, USFWS
Lance, Brian, NMFS
McDonald, Lyman, West Inc.
Ostrand, Bill, USFWS
Piatt, John, USGS
Roby, Dan, OSU
Schmutz, Joel USGS
Stephensen, Shawn, USFWS
Suryan, Rob, OSU
Turco, Kathy, self employed

Dr. Kathy J. Kuletz
U.S. Fish and Wildlife Service
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Anchorage, Alaska 99503
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Academic Training

Ph.D. Biology, 2005	Univ. of Victoria, British Columbia
M. S. Ecology & Evolutionary Biology, 1983	University of California, Irvine
B. S. Wildlife Ecology, 1974	California State Polytechnic, San Luis Obispo, with Honors

Recent Professional Experience

2005-present	Pelagic Observer Program Coordinator, Migratory Bird Management, USFWS
1998-2005	Alaska Seabird Specialist, Migratory Bird Management, USFWS
1989-1997	Principal Investigator, *Exxon Valdez* studies on marine birds, USFWS

Related Professional Experience
PI for Seabirds in Bering Sea Integrated Research Program (BSIERP), with NPRB grant
PI for North Pacific Pelagic Seabird Observer Program, with NPRB grant
Co-PI for 'Seabirds as Predators on Juvenile Herring', funded by EVOS in 2006-2009.
PI and Co-PI for EVOS projects on murrelets and pigeon guillemots, 1989 - 1999
PI for project on decadal changes in seabirds in Kachemak Bay (ADFG/SWG grant), 2004-2007.

Committees
Science & Statistical Committee of North Pacific Fisheries Management Council (2007-present)
NOAA/NPFMC Groundfish Fisheries Plan Team (2000 – 2006)
North Pacific Albatross Working Group
EVOS Prince William Sound Herring Working Group
Marbled Murrelet Technical Committee, Kittlitz's Murrelet Technical Committee (PSG)

Professional Societies
Pacific Seabird Group (Secretary, 1998-1999)
American Ornithologists' Union
Society of Conservation Biologists
The Wildlife Society

Honors, Awards, and Fellowships
Exceptional Service Award, *Exxon Valdez* Oil Spill, U.S. Fish and Wildlife Service, 1989
Regents Fellowship, University of California, Irvine, 1980, 1981
King Platt Memorial Award, University of Victoria, 1998 & 1999

Related Publications

Golet, G. H., K. J. Kuletz, D. D. Roby, and D. B. Irons. 2000. Adult prey choice affects chick growth and reproductive success in pigeon guillemots. Auk 117(1):82-91.

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Other Publications

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Kuletz, K. J. 1996. Marbled murrelet abundance and breeding activity at Naked Island, Prince William Sound, and Kachemak Bay, Alaska, before and after the *Exxon Valdez* oil spill. Pages 770-784 *in* S. D. Rice, R. B. Spies, D. A. Wolfe, and B. A. Wright, editors. Proceedings of the *Exxon Valdez* oil spill symposium. American Fisheries Society Symposium 18.

Kuletz, K.J. 2005. Foraging behaviour and productivity of a non-colonial seabird, the Marbled Murrelet (*Brachyramphus marmoratus*) relative to prey and habitat. Ph.D. Dissertation. University of Victoria, Victoria, British Columbia.

Kuletz, K.J. E.A. Labunski, S.G. Speckman. 2008. Abundance, distribution, and decadal trends of Kittlitz's and marbled murrelets and other marine species in Kachemak Bay, Alaska. Final Report (Project No. 14) by U.S. Fish and Wildlife Service for Alaska Dept. Of Fish and Game, State Nongame Wildlife Grant, Anchorage, Alaska.

Piatt, J.F., Kuletz, K.J., Burger, A.E., Hatch, S.A., Friesen, V.L., Birt, T.P., Arimitsu, M.L., Drew, G.S., Harding, A.M.A., Bixler, K.S. 2007. Status review of the marbled murrelet (*Brachyramphus marmoratus*) in Alaska and British Columbia. Open-file report, 2006-1387. Alaska Science Center, U.S.G.S., Anchorage, Alaska. 258p.

Recent Collaborators

Mary Anne Bishop (Prince William Sound Science Center); Vernon Byrd (U.S. Fish and Wildlife Service); George L. Hunt, Jr. (University of Washington); David Irons (U.S. Fish and Wildlife Service); Alexander Kataysky (Univ. of Alaska, Fairbanks); John Piatt (U.S. Geological Survey, Alaska Science Center); Dan Roby (Oregon State University); Mike Sigler (Alaska Fisheries Science Center, NOAA); Andrew Trites (University of British Columbia).

Budget Justification

FY 2010 – $254,499.70
FY 2011 -- $39,240.00
TOTAL: $293,739.7

Project Title: Prince William Sound Marine Bird Surveys, Synthesis and Restoration

Personnel: A co-project leader (GS 11) is needed to assist the project leader and must possess supervisory skills to govern the activities of seven subordinate workers. A minimum of three persons per boat (3 boats) for a total of nine persons are needed to conduct the survey. We will need biological technicians for three months -- approximately 60 days of survey time plus 30 days for field gear preparation/maintenance; one biotech will work an additional 3 months to help with survey logistics. The co-project leader will allocate 12 months to the project -- six months for field work in FY10 and six months in FY11 to conduct QA/QC on the data, enter data into the North Pacific Pelagic Seabird Database, conduct the analysis and write the report. The analysis and writing will occur in FY11, when the report is due.

The amount requested for personnel has increased somewhat since the 2007 surveys (project# 070751). The increase results from three factors. First, project 070751 did not include funding for QA/QC, data entry, analysis, and report writing; the funding for these activities was requested and received as a separate project (project #080751). In contrast, in the proposed project, both the data collection and analysis work are incorporated into a single project. Second, because of general reductions in the FWS budget, we can no longer provide 9 months of salary for a GS-9 biologist as in-kind support. To compensate, we have increased the funding request for one GS-5 technician to work for three additional months. Other additional costs result from the regular increase in FWS salaries that have occurred since 2007.

Request: (FY 2010: $95.5K; FY 2011: $36K, TOTAL: $131.5K)

Travel: Nine people will be traveling throughout Prince William Sound and will need approximately 20 nights of lodging in towns around the Sound. Per diem rates will be given to each person during the survey. A tunnel fee is assessed to every vehicle traveling through the tunnel near Portage and the truck/boat will make 12 round trips during the survey.

The amount requested for travel has increased somewhat since the 2007 surveys (project# 070751). The added cost is a direct result of increases in per diem lodging rates for FWS employees and volunteers, from $45/day in 2007 to $65/day at present.

Request: ($13.4K)

Contractual: Prince William Sound is large and requires extensive travel by boat. To make the survey cost effective, a support vessel will be contracted to provide lodging and food for 17 survey days. The boats will operate for hundreds of hours and will need repairs and replacement parts. There are also fees associated with launching and parking the boat in the harbors.

The amount requested for contractual services has increased somewhat since the 2007 surveys (project# 070751). The added cost is a direct result of the increase in fuel costs for the charter vessels; fuel costs surpassed $5/gallon during the 2008 season.

Requested: ($75.5K)

Commodities: Includes gas and oil to support boat transport and operation during the surveys; food for 9 people while on survey; and personal safety devices.

The amount requested for commodities has increased somewhat since the 2007 surveys (project# 070751). The added cost is a direct result of the increase in fuel costs, which surpassed $5/gallon during the 2008 season.

Request: ($46.6K)

Equipment: We are using USFWS equipment for this survey as an in-kind contribution but the survey work takes a toll on boats; on average, each boat will run a total of 40 full days. As a result, we are including funds for emergency replacement of motor parts that fail during the survey should that need arise.

Request: ($2.5K)

Indirect: We are using the standard G&A rate of 9%.

Request: ($25.9K)

Data Management and Quality Control Statement for Project Titled:

Prince William Sound Marine Bird Surveys, Synthesis and Restoration

1. Study design (p. 6 par. 8 – p.8 par 2; p. 10 par. 4-5)

We will conduct two surveys: one during March ("winter") and another during July ("summer") 2010. We will use three 7.7 m fiberglass boats traveling at speeds of 10-20 km/hr to survey transects over two 3-week periods. For each survey, two observers will survey a sampling window 100 m on either side, ahead of, and above the vessel (Klosiewski and Laing 1994). When surveying shoreline transects, observers will also record sightings on land within 100 m of shore. Observers will sample continuously and use binoculars to aid in species identification. Observers will practice estimating distances with a duck decoy, and radars on the survey vessels will be used to assist in determining our distance from land on shoreline transects. We will survey most transects when wave height is <30 cm, and we will not survey when wave height is >60 cm.

We will continue to use a stratified random sampling design containing three strata: shoreline, coastal-pelagic, and pelagic (Klosiewski and Laing 1994) (Fig. 1). The shoreline stratum will consist of waters within 200 m of land. During winter, we plan to survey 99 shoreline transects, but this number varies among years, due to weather conditions and ice blockage. During summer, we plan to survey 212 shoreline transects.

To sample the coastal-pelagic and pelagic strata of Prince William Sound, we will divide the study area into 5-minute latitude-longitude blocks. When a block includes >1.8 km of shoreline, we will classify it in the coastal-pelagic stratum, and we will classify blocks with $\leq$1.8 km of shoreline in the pelagic stratum (Klosiewski and Laing 1994). When coastal-pelagic or pelagic blocks intersect the 200 m shoreline stratum, they will be truncated to avoid overlap. We plan to survey 2 north-south transect lines, 200 m wide each, located 1 minute inside the east and west boundaries of each coastal-pelagic and pelagic block. We will use Global Positioning Systems and nautical compasses to navigate transect lines. In the coastal-pelagic stratum, we plan to survey $\leq$29 blocks in the winter and $\leq$46 blocks in the summer. In the pelagic stratum, we plan to survey $\leq$25 blocks during both seasons.

To determine optimum survey frequency, we conducted a power analysis to estimate the probability of detecting trends in abundance using linear regression from a given number of samples (Taylor and Gerrodette 1993). We examined our power to detect trends when coefficient of variation (CV) of the population was 0.30 (greater than the mean CV from previous surveys for 73% of the injured species; Fig. 2) and when the CV = 0.13 (the mean summer CV for *Brachyramphus* murrelets, an injured species. Models of seabird population growth predict most species increase no more than 12% per year (Nur and Ainley 1992), so we used 10% for our comparisons.

With CV=0.30 the probability of detecting an average annual change of 10% would be 92% with the 10 surveys completed to date (Fig 2).

2, General characteristics of the data (p. 6 par. 8 – p.8 par 2)

A) Sighting data
   a. Units of measurement = number of individuals
   b. Sample sizes

i. Winter surveys: 99 shoreline transects, 29 coastal-pelagic blocks (two transects per block), 25 pelagic blocks (two transects per block)
ii. Summer surveys: 212 shoreline transects, 46 coastal pelagic transects (two transects per block), 25 pelagic transects (two transects per block)

c. Sampling techniques
    i. Two observers will identify all marine birds and mammals within 100m of the vessel (to either side, front, and above) to the lowest taxonomic level possible as the vessel travels at 10-20 kph along each designated transect
d. Specific equipment: Binoculars (8X40 or 10X40)
e. Procedures for recording measurements
    i. Sighting data are entered immediately into a laptop running program DLog (R.G. Ford, Inc., Portland, OR), which assigns geographic coordinates to each sighting record.

3. Criteria and procedures for determining acceptable data quality (p. 7 par. 1)

We take several steps to ensure the quality of the observational data collected. First, we make every effort to use personnel with experience on previous Prince William Sound marine bird and mammal surveys. Having at least one experienced crewmember on each vessel is crucial for ensuring continuity of data collection technique among years. Second, new personnel are provided with in-depth identification tutorials for the major marine bird species seen in Prince William Sound in the form of several large PowerPoint files. Third, all survey personnel are required to attend a half-day bird identification training session that includes a comprehensive test. Data are proofed at the end of each day's work while the experience is still fresh in the crew's mind. Daily proofing allows the crew to identify and correct obvious errors in the datafiles. Any ambiguous records (generally <10 in 40,000 sighting/track records) are removed from the dataset to be analyzed.

The data will be analyzed using the program SAS (SAS Institute, Inc.) in collaboration with Shay Howlin of the statistical consulting group West, Inc.

4. Conversion algorithms

None of our data require conversion algorithms.

5. Handling and custody of samples (p. 11 par. 2)

No physical samples will be collected during this project, as the measurement data are purely observational in nature. Datafiles will be proofed and replicated onto temporary backup storage in the field. All the data collected in this study will be archived in the North Pacific Pelagic Seabird Database. We have abided by the Federal Government Data Committee standards for metadata and have created a metadata form that we believe will satisfy EVOS data requirements. Our data fit into the EVOS Taxonomic Sampling category. The fields associated with our data are as follows: Lat., Lon, hour, minute, second, year, month, day, record number, type, distance, depth, species, number, behavior, side, transect, obs cond., weather, direction, wind, vessel, seas, in obs, out obs, salinity, air temp, water temp.

6. Procedures for data reduction and reporting (p.9 par. 3 – p.10 par. 3)

All data will be used as they were collected, rather than being reduced, although species numbers will be averaged for the individual transects and will analyzed as discussed earlier in this section.

To examine population trends over time and to determine if populations injured by the spill are recovering, we will poststratify Prince William Sound into two zones, oiled and unoiled (Fig. 1), based upon the pattern of oiling by the *Exxon Valdez* oil spill (Klosiewski and Laing 1994).

We will use a ratio estimator (Cochran 1977) to estimate population abundance. Shoreline transects will be treated as a simple random sample; whereas the coastal-pelagic and pelagic transects will be analyzed as two-stage cluster samples of unequal size (Cochran 1977). To do this, we will estimate the density of birds counted on the combined transects for a block and multiply by the area of the sampled block to obtain a population estimate for each block; any land or shoreline area (within 200m of land) intersecting a block will be subtracted from the total area of that block. We then will add the estimates from all blocks surveyed and divide by the sum of the areas of all blocks surveyed. We will calculate the population estimate for a stratum by multiplying this estimate by the area of all blocks in the strata. Population estimates for each species and for all birds in Prince William Sound will be calculated by adding the estimates from the three strata, and we will calculate 95% confidence intervals for these estimates from the sum of the variances of each stratum (Klosiewski and Laing 1994).

a) Trends in the oiled region

We will perform a linear regression using the program SAS (SAS Institute, Inc.) on log-tranformed population estimates over time (1989 – 2010) in the oiled region of Prince William Sound. Prior to calculating the $\log_{10}$ of each population estimate, we will add a constant of 0.167 to each estimate to avoid the undefined $\log_{10}$ of 0. In all analyses we will use a test size alpha = 0.10 to balance Type I and Type II errors. The reasons for this include: 1) variation is often high and sample sizes low (n = 11 survey years); and 2) monitoring studies are inherently different from experiments and the number of tests being run with a multi-species survey are many, therefore, controlling for the number of tests by lowering alpha levels (e.g. Bonferroni adjustment) might obscure trends of biological value. Taxa with significant increasing trends in the oiled region will be considered "recovering," while taxa with no trends or significant negative trends will be considered "not recovering.

b) Comparing trends between oiled and unoiled regions

We will use the regression technique detailed in (a) to perform regression analyses on population estimates (1989 – 2010) in the unoiled region using the program SAS (SAS Institute, Inc.). We will use a homogeneity of slopes test (Freud and Littell 1981) to compare population trends between the oiled and unoiled zones of Prince William Sound using the program SAS (SAS Institute, Inc.) to examine whether species with population estimates of >500 individuals have changed over time. Significantly different slopes would indicate that population abundance of a species or species group changed at different rates. Taxa showing no difference in trends between the oiled and unoiled regions will be considered "not recovering." Taxa showing significantly greater trends in the oiled region compared with the unoiled region will be considered "recovering." Taxa showing significantly greater trends in the unoiled region than the oiled region will be considered to be suffering "continuing and increasing effects."

Overall, a species will be considered "recovering" if it meets the requirements for this category in either analysis.

***EXXON VALDEZ* OIL SPILL TRUSTEE COUNCIL**
DETAILED BUDGET FORM FY 10- FY 12

Budget Category:	Proposed FY 10	Proposed FY 11	Proposed FY 12	TOTAL PROPOSED
Personnel	$95,500.0	$36,000.0	$0.0	$131,500.0
Travel	$13,386.0	$0.0	$0.0	$13,386.0
Contractual	$75,500.0	$0.0	$0.0	$75,500.0
Commodities	$46,600.0	$0.0	$0.0	$46,600.0
Equipment	$2,500.0	$0.0	$0.0	$2,500.0
SUBTOTAL	$233,486.0	$36,000.0	$0.0	$269,486.0
General Administration (9% of subtotal)	$21,013.7	$3,240.0	$0.0	$24,253.7
PROJECT TOTAL	$254,499.7	$39,240.0	$0.0	$293,739.7
Other Resources (Cost Share Funds)	$115,000.0	$0.0	$0.0	$115,000.0

Comments: Cost-Share Funds

David Irons salary (GS13 for 3 months) = $30K
Kathy Kuletz salary (GS12 for 1 month) = $9K
Three USFWS biologists to assist on surveys (GS11, 3 people X 2 surveys = 6 months) = $36K
Boat user fee (120 days @ $200/day) = $24K
Equipment user fee (computers, survival suits, electronics, etc.) = $12K
GSA vehicle user fee = $4K

FY10 - 12

Project Title: Marine Bird Survey of PWS
Lead PI: Irons
Agency: U.S. Fish and Wildlife Service

FORM 2A
TRUSTEE AGENCY
SUMMARY

EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL
DETAILED BUDGET FORM FY 10- FY 12

Personnel Costs:		GS/Range/	Months	Monthly		Personnel
Name	Project Title	Step	Budgeted	Costs	Overtime	Sum
Unknown - Co-project Leader	PWS marine bird survey	GS11-1	6.0	6000.0	2500.0	38,500.0
Unknown - Biological Science Technician	PWS marine bird survey	GS5-1	6.0	3400.0	1500.0	21,900.0
Unknown - Biological Science Technician	PWS marine bird survey	GS5-1	3.0	3400.0	1500.0	11,700.0
Unknown - Biological Science Technician	PWS marine bird survey	GS5-1	3.0	3400.0	1500.0	11,700.0
Unknown - Biological Science Technician	PWS marine bird survey	GS5-1	3.0	3400.0	1500.0	11,700.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
	Subtotal		21.0	19600.0	8500.0	
			$95,500.0		**Personnel Total**	########

Travel Costs:	Ticket	Round	Total	Daily	Travel
Description	Price	Trips	Days	Per Diem	Sum
Truck and boat tunnel fee (Portage - Whittier)	10.0	12			120.0
Per diem (camp rate), 9 people, 20 days winter; 9 people, 20 days summer			360	3.0	1,080.0
Per diem (travel rate), 9 people, 2 days winter; 9 people, 2 days summer; 6			54	54.0	2,916.0
Lodging, 6 nights, 2 rooms @ $90/night/room (Cordova)			6	180.0	1,080.0
Lodging, 9 people, 14 nights (Whittier plus boat training)			126	65.0	8,190.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
		13386		**Travel Total**	########

FY10

Project Title: Marine Bird Survey of PWS
Lead PI: Irons
Agency: U.S. Fish and Wildlife Service

FORM 3B
PERSONNEL & TRAVEL DETAIL

***EXXON VALDEZ* OIL SPILL TRUSTEE COUNCIL**
DETAILED BUDGET FORM FY 10- FY 12

Contractual Costs: Description	Contract Sum
Charter vessel (winter - 10 days @ 3,500/day)	35,000.0
Charter vessel (summer - 7 days @ 3,500/day)	24,500.0
Harbor fees	1,000.0
Boat repairs and parts	10,000.0
Contract Kelsey Sullivan to provide transition guidance to new Co-PI and operate a survey vessel	5,000.0
75500	
If a component of the project will be performed under contract, the 4A and 4B forms are required. **Contractual Total**	########

Commodities Costs: Description	Commodities Sum
Boat fuel (70 gal/boat/day) 60 boat-days summer and 60 boat-days winter @ $5/gal	42,000.0
Outboard oil (4 gal/boat/survey), 3 boats, 2 surveys @ $20/gal	500.0
Food ($20/person/day) 9 people 13 days in summer and 10 days in winter	4,100.0
46600 **Commodities Total**	########

FY10

Project Title: Marine Bird Survey of PWS
Lead PI: Irons
Agency: U.S. Fish and Wildlife Service

FORM 3B
CONTRACTUAL & COMMODITIES DETAIL

***EXXON VALDEZ* OIL SPILL TRUSTEE COUNCIL**
DETAILED BUDGET FORM FY 10- FY 12

New Equipment Purchases: Description	Number of Units	Unit Price	Equipment Sum
Emergency replacement of equipment	1.0	2,500.0	2,500.0
			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		$2,500.0

Existing Equipment Usage: Description	Number of Units	Inventory Agency
	9	FWS
	9	FWS
	9	FWS
	9	FWS
	9	FWS

Existing E Description
Camping su
Survival su
Float coats
Mustang su
All other mi

FY10

Project Title: Marine Bird Survey of PWS
Lead PI: Irons
Agency: U.S. Fish and Wildlife Service

FORM 3B
EQUIPMENT
DETAIL

***EXXON VALDEZ* OIL SPILL TRUSTEE COUNCIL**
DETAILED BUDGET FORM FY 10- FY 12

Personnel Costs:		GS/Range/	Months	Monthly		Personnel
Name	Project Title	Step	Budgeted	Costs	Overtime	Sum
Unknown - Co-project Leader (Rpt writing)	PWS marine bird surveys	GS11-1	6.0	6000.0	0.0	36,000.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
	Subtotal		6.0	6000.0	0.0	
			$36,000.0		**Personnel Total**	#########

Travel Costs:	Ticket	Round	Total	Daily	Travel
Description	Price	Trips	Days	Per Diem	Sum
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
				Travel Total	$0.0

FY11

Project Title: Marine Bird Survey of PWS
Lead PI: Irons
Agency: U.S. Fish and Wildlife Service

FORM 3B
PERSONNEL & TRAVEL DETAIL

***EXXON VALDEZ* OIL SPILL TRUSTEE COUNCIL**
DETAILED BUDGET FORM FY 10- FY 12

Contractual Costs: Description	Contract Sum
If a component of the project will be performed under contract, the 4A and 4B forms are required. **Contractual Total**	$0.0

Commodities Costs: Description	Commodities Sum
Commodities Total	$0.0

FY11

Project Title: Marine Bird Survey of PWS
Lead PI: Irons
Agency: U.S. Fish and Wildlife Service

FORM 3B
CONTRACTUAL & COMMODITIES DETAIL

***EXXON VALDEZ* OIL SPILL TRUSTEE COUNCIL**
DETAILED BUDGET FORM FY 10- FY 12

New Equipment Purchases: Description	Number of Units	Unit Price	Equipment Sum
			0.0
			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: Description	Number of Units	Inventory Agency

FY11

Project Title: Marine Bird Survey of PWS
Lead PI: Irons
Agency: U.S. Fish and Wildlife Service

FORM 3B
EQUIPMENT
DETAIL

***EXXON VALDEZ* OIL SPILL TRUSTEE COUNCIL**
DETAILED BUDGET FORM FY 10- FY 12

Personnel Costs:		GS/Range/	Months	Monthly		Personnel
Name	Project Title	Step	Budgeted	Costs	Overtime	Sum
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
Subtotal			0.0	0.0	0.0	
					Personnel Total	$0.0

Travel Costs:	Ticket	Round	Total	Daily	Travel
Description	Price	Trips	Days	Per Diem	Sum
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
				Travel Total	$0.0

FY12

Project Title: Marine Bird Survey of PWS
Lead PI: Irons
Agency: U.S. Fish and Wildlife Service

FORM 3B
PERSONNEL & TRAVEL DETAIL

***EXXON VALDEZ* OIL SPILL TRUSTEE COUNCIL**
DETAILED BUDGET FORM FY 10- FY 12

Contractual Costs: Description	Contract Sum
If a component of the project will be performed under contract, the 4A and 4B forms are required. **Contractual Total**	$0.0

Commodities Costs: Description	Commodities Sum
Commodities Total	$0.0

FY12

Project Title: Marine Bird Survey of PWS
Lead PI: Irons
Agency: U.S. Fish and Wildlife Service

FORM 3B
CONTRACTUAL & COMMODITIES DETAIL

***EXXON VALDEZ* OIL SPILL TRUSTEE COUNCIL**
DETAILED BUDGET FORM FY 10- FY 12

New Equipment Purchases: Description	Number of Units	Unit Price	Equipment Sum
			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: Description	Number of Units	Inventory Agency

FY12

Project Title: Marine Bird Survey of PWS
Lead PI: Irons
Agency: U.S. Fish and Wildlife Service

FORM 3B
EQUIPMENT
DETAIL