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FY 2001 Detailed Project Proposals and Budgets

Exxon Valdez Oil Spill Trustee Council

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MEMORANDUM

TO: Restoration Work Force
PAG Representatives

FROM: Sandra Schubert
Project Coordinator

RE: FY 01 Restoration Proposals

DATE: April 19, 2000

This set of binders contains the Detailed Project Descriptions and detailed budgets submitted in response to the Trustee Council's FY 01 *Invitation to Submit Restoration Proposals*. In all, 111 research/monitoring/general restoration proposals totaling $13 million were received. Three additional proposals, which if funded would be outside of the annual work plan, will also be considered in FY 01 (projects 01100, 01126, and 01424). The Council's funding target for the FY 01 work plan is $6 million.

The front pocket of the first binder contains two spreadsheets:

1. A list of all proposals in numeric order. This list contains the project's assigned number and title, the name of the individual who submitted the proposal, and the project's assigned research cluster.

2. A list of all proposals by resource cluster. In addition to project number, title, and proposer, this list contains an abstract of the project, the project's assigned lead agency, the amount of funding requested for FY 01, and the project's duration (the number of years for which funding is being requested from the Trustee Council -- through FY 02 or the end of the project, whichever is sooner). For continuing projects, the spreadsheet also contains the FY 00 projection of the amount of funding needed in FY 01 (this column is labeled "FY 01 Expected"). Funding requests from non-Trustee agencies have been adjusted by Restoration Office staff to include agency "GA" (general administration).

Both of the spreadsheets are marked DRAFT. Please give me a call if you find any errors or omissions. Lead agencies and research clusters were assigned by Restoration Office staff, and are open to discussion.

The meeting of the Executive Director, Restoration Work Force, and two PAG members to develop the Draft Work Plan will be held in the Restoration Office (4th floor conference room) at 9:00 am Wednesday, June 7, 2000.

FY 01 WORK PLAN - INDEX OF DETAILED PROJECT DESCRIPTIONS

Proj.No.	Project Title	Proposer	Resource Cluster
01012-BAA	Photographic and Acoustic Monitoring of Killer Whale in Prince William Sound and Kenai Fjords	C. Matkin/North Gulf Oceanic Society	Marine Mammals
01052	Community Involvement Planning for GEM	P. Brown- Schwalenberg/CRRC	Subsistence
01064	Monitoring, Habitat Use, and Trophic Interactions of Harbor Seals in Prince William Sound	K. Frost, ADFG	Marine Mammals
01100	Public Information, Science Management, and Administration	All Trustee Council Agencies	Public Information/Science Mgt./Admin.
01126	Habitat Protection and Acquisition Support	C. Fries/ ADNR, K. Holbrook/USFS, G. Elison/DOI	Habitat Protection
01131	Chugach Native Region Clam Restoration	D. Daisy/CRRC	Subsistence
01139A2	Port Dick Creek Tributary Restoration and Development	M. Dickson/ADFG	Pink Salmon
01144	Common Murre Population Monitoring	D. Roseneau/USFWS	Seabird/Forage Fish and Related Projects
01159	Surveys to Monitor Marine Bird Abundance in Prince William Sound During Winter and Summer	D. Irons, R. Suryan/USFWS	Seabird/Forage Fish and Related Projects
01163-CLO	Alaska Predator Ecosystem Experiment in Prince William Sound and the Gulf of Alaska (APEX)	D. Duffy/Paumanok Solutions, et al	Seabird/Forage Fish and Related Projects
01190	Construction of a Linkage Map for the Pink Salmon Genome	F. Allendorf/Univ. Montana	Pink Salmon
01195	Pristane Monitoring in Mussels	J. Short, P. Harris/NOAA	Nearshore Ecosystem
01210	Youth Area Watch	R. DeLorenzo/Chugach School District	Subsistence
01225	Port Graham Pink Salmon Subsistence Project	P. McCollum/Port Graham Village Council	Subsistence
01245	Community-Based Harbor Seal Management and Biological Sampling	V. Vanek/ADFG, M. Riedel/Alaska Native Harbor Seal Commission	Marine Mammals
01247	Kametolook River Coho Salmon Subsistence Project	J. McCullough, L. Scarbrough/ADFG	Subsistence
01250	Project Management	All Trustee Council Agencies	Project Management
01256B	Sockeye Salmon Stocking at Solf Lake	D. Gillikin/USFS, P. Shields/ADFG	Subsistence
01273-CLO	Scoter Life History and Ecology: Linking Satellite Technology with Traditional Knowledge to Conserve the Resource.	D. Rosenberg/ADFG	Subsistence
01290	Hydrocarbon Database and Interpretation Service	J. Short, B. Nelson/NOAA	Nearshore Ecosystem
01314	Homer Mariner Park Habitat Restoration	J. Cushing/City of Homer	Habitat Improvement

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Proj.No.	Project Title	Proposer	Resource Cluster
01327	Pigeon Guillemot Restoration Research at the Alaska SeaLife Center	D. Roby/OSU, G. Divoky/UAF	Seabird/Forage Fish and Related Projects
01333	Sea Otter Monitoring	B. Henrichs/Native Village of Eyak	Subsistence
01338	Survival of Adult Murres and Kittiwakes in Relation to Forage Fish Abundance	J. Piatt/USGS-BRD	Seabird/Forage Fish and Related Projects
01339	Prince William Sound Human Use and Wildlife Disturbance Model	L. Suring/USFS	Habitat Improvement
01340	Toward Long-Term Oceanographic Monitoring of the Gulf of Alaska Ecosystem	T. Weingartner/UAF	Ecosystem Synthesis/GEM Transition
01341-CLO	Harbor Seal Recovery: Controlled Studies of Health and Diet	M. Castellini/UAF	Marine Mammals
01350	Alaska SeaLife Center Bench Fees	All Trustee Council Agencies	Public Information/Science Mgt./Admin.
01360-BAA	**The *Exxon Valdez* Oil Spill: Guidance for Future Research Activities**	C. Elfring/Polar Research Board, NRC	Ecosystem Synthesis/GEM Transition
01366-CLO	Improved Salmon Escapement Enumeration Using Remote Video and Time-Lapse Recording Technology	E. Otis/ADFG	Pink Salmon
01371-CLO	Effects of Harbor Seal Metabolism on Stable Isotope Ratio Tracers	D. Schell/UAF	Marine Mammals
01372	Steller Seal Lion Monitoring	B. Henrichs/Native Village of Eyak	Subsistence
01384	Kachemak Bay Citizen Researcher: Development of a Community-Based Marine Monitoring	G. Seaman, R. Foster/ADFG	Ecosystem Synthesis/GEM Transition
01385	Modeling Biodiversity in Kachemak Bay: A Proposal to Map Marine Nearshore Habitats at Nested Spatial Scales	C. Schoch/ADFG	Ecosystem Synthesis/GEM Transition
01389	3-D Ocean State Simulations for Ecosystem Applications from 1995-98 in Prince William Sound	J. Wang/UAF	SEA and Related Projects
01391	Cook Inlet Information Management/Monitoring System	K. Zeiner/ADNR, J. Hock/ADEC	Ecosystem Synthesis/GEM Transition
01393-BAA	Prince William Sound Food Webs: Structure and Change	T. Kline/PWSSC	SEA and Related Projects
01395	Planning for Long-Term Monitoring in the Nearshore: Designing Studies to Detect Change and Assess Cause	T. Dean/Coastal Resources Associates, et al	Nearshore Ecosystem
01396	Alaska Salmon Shark Assessment	L. Hulbert/NOAA	Cutthroat Trout, Dolly Varden, and Other Fish
01397	Developing Mass-Balance Simulation Models as Fisheries Management Tools in Alaska	T. Okey/UBC	Ecosystem Synthesis/GEM Transition

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Proj.No.	Project Title	Proposer	Resource Cluster
01399	Eastern Prince William Sound Human Use and Wildlife Disturbance Model	L. Suring/USFS	Habitat Improvement
01401	Assessment of Spot Shrimp Abundance in Prince William Sound	C. Hughey/ Valdez Native Tribe, C. O'Clair/ NOAA	Subsistence
01404	Archival Tags for Tracking King Salmon at Sea: Migrations, Biology, and Oceanographic Preferences in Prince William Sound	J. Nielsen/USGS-BRD	Cutthroat Trout, Dolly Varden, and Other Fish
01407	Harlequin Duck Population Dynamics	D. Rosenberg/ADFG	Nearshore Ecosystem
01412	Overlap of Offshore and Neritic Zooplankton Assemblages: Implications for Juvenile Herring	A. J. Paul, R. Foy/UAF	Pacific Herring
01423	Patterns and Processes of Population Change in Selected Nearshore Vertebrate Predators	J. Bodkin, D. Esler/USGS-BRD, T. Dean/CRA, Inc.	Nearshore Ecosystem
01424	Restoration Reserve	All Trustee Council Agencies	Restoration Reserve
01430	Youth Restoration Corps	K. Wolf/Youth Restoration Corps	Habitat Improvement
01440	Pink Salmon Hatcheries in Prince William Sound: Enhancement or Replacement of Natural Production?	A. Wertheimer/NOAA	Pink Salmon
01441-BAA	Harbor Seal Recovery: Effects of Diet on Lipid Metabolism and Health	R. Davis/Texas A&M Univ.	Marine Mammals
01450-BAA	Summary of the Status of Pacific Salmon Populations in the Region Affected by the Oil Spill	A. Wertheimer/AFS	Pink Salmon
01452-BAA	Assessing Prey and Competitor/Predators of Pink Salmon Fry	R. Thorne, G. Thomas/PWSSC	Pink Salmon
01454	Evidence and Consequences of Persistent Oil Contamination in Pink Salmon Natal Habitats	S. Rice/NOAA	Pink Salmon
01457-BAA	Assessing the Pacific Herring Stock Using Echointegration-Optical-Purse Seine Surveys	R. Thorne, G. Thomas/PWSSC	Pacific Herring
01460-BAA	Assessing the Number of Walleye Pollock as Predators of Juvenile Salmon and Herring	R. Thorne, G. Thomas/PWSSC	SEA and Related Projects
01462	Effect of Disease on Pacific Herring Population Recovery in Prince William Sound	G. Marty/Univ. of California Davis	Pacific Herring
01465	Environmental Contaminant Levels in Eastern North Pacific Killer Whales	M. Krahn/NMFS	Marine Mammals
01476	Effects of Oiled Incubation Substrate on Pink Salmon Reproduction	R. Heintz/NOAA	Pink Salmon
01477	Where Do Prince William Sound Harlequin Ducks Breed? A Satellite Telemetry Approach	D. Rosenberg/ADFG	Nearshore Ecosystem
01479	Effects of Food Stress on Survival and Reproductive Performance of Seabirds	J. Piatt/USGS-BRD, A. Kitaysky/Univ. of Washington	Seabird/Forage Fish and Related Projects
01481	Documentary Film on the Oil Spill Impacts on Subsistence Use of Intertidal Resources	C. Kompkoff/Chenega Bay IRA Council, P. Panamarioff/ Ouzinkie Tribal Council	Subsistence

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Proj.No.	Project Title	Proposer	Resource Cluster
01482-BAA	Establishment of a Biotoxin Monitoring Program in the Kodiak Island Area	J. Jellett/Jellett Biotek Limited	Subsistence
01486-BAA	Links Between Persistent Oil in Mussel Beds and Predators	S. Rice/NOAA, et. al.	Nearshore Ecosystem
01490	Can Kittiwakes Be Used to Predict Future Trends in Adult Herring Abundance?	D. Irons, R. Suryan/USFWS	Pacific Herring
01492	Were Pink Salmon Embryo Studies in Prince William Sound Biased?	J. Thedinga/NOAA	Pink Salmon
01494	User Guidelines and Environmental Education to Reduce Impacts of Recreation and Tourism on Injured Species in Prince William Sound	S. Leonard, C. Beck/AWRTA	Public Information/Science Mgt./Admin.
01498	Reinstating/Restoration of Oil as Petrochemical	J. Barlow/Power Alternative	Reduction of Marine Pollution
01499	Worms in Oil: Overlooked Biota in the Restoration Processes of the Nearshore	C. McRoy/UAF	Nearshore Ecosystem
01503	Orca Inlet Restoration	B. Henrichs/Native Village of Eyak	Subsistence
01507	Nuchek Subsistence Camp	B. Henrichs/Native Village of Eyak	Subsistence
01508	Copper River Salmon Run Data Infrastructure	B. Henrichs/Native Village of Eyak	Subsistence
01509	Monitoring Harbor Seal Population Condition to Assess Changes in Carrying Capacity in Prince William Sound	R. Small/ADFG	Marine Mammals
01513	***Exxon Valdez* Oil Spill: The Continuing Legacy**	J. Pfeiffenberger/Alaska SeaLife Center	Public Information/Science Mgt./Admin.
01519	Distribution and Habitat of Rockfish in Nearshore Waters of Prince William Sound	J. Thedinga/NOAA	Cutthroat Trout, Dolly Varden, and Other Fish
01520	Sea Otter Population Survey	J. Bodkin, A. Doroff/USGS	Nearshore Ecosystem
01522	Growth Rates of Cutthroat Trout and Dolly Varden: Comparison of Populations in Oiled and Unoiled Sites	G. Reeves, D. Markle/USFS	Cutthroat Trout, Dolly Varden, and Other Fish
01523	Within-Bay Distribution of Juvenile Herring in Prince William Sound	B. Norcross/UAF	Pacific Herring
01524	Herring Spawning Sites: Location or Substrate	B. Norcross/UAF	Pacific Herring
01526	Beluga Slough Habitat Assessment and Restoration	J. Cushing/City of Homer	Habitat Improvement
01528	Long-Term Monitoring of Intertidal Communities as a Framework for Hypothesis-Driven Research	G. Shigenaka/NOAA-HazMat	Nearshore Ecosystem
01531-BAA	Strategy and Technique Development for Monitoring the Ecopathology of 1996-1998 Prince William Sound Herring	T. Kline/PWSSC	Pacific Herring

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Proj.No.	Project Title	Proposer	Resource Cluster
01532	Coupling of Oceanic and Nearshore: The Search for Indicator Species	G. Irvine/USGS-BRD	Nearshore Ecosystem
01534	Comparison of Cytochrome P4501A Induction in Blood and Liver Cells of Sea Otters	B. Ballachey, P. Snyder/USGS	Nearshore Ecosystem
01535	EVOS Trustee Council Final Report	EVOS Restoration Office	Public Information/Science Mgt./Admin.
01536	Synthesis of Spill Damaged Resource Information into the Biological Conservation Database	K. Boggs, T. Gotthardt/UAA	Ecosystem Synthesis/GEM Transition
01543	**Evaluation of Oil Remaining in the Intertidal from the *Exxon Valdez* Oil Spill**	J. Short/NOAA	Nearshore Ecosystem
01544	Lower Cook Inlet Salmon Ecology Study	P. McCollum/CRRC	Subsistence
01545	Long Term Environmental Monitoring Program	J. Devens/PWSRCAC	Ecosystem Synthesis/GEM Transition
01549	Alaska Whaling Wall	Econo Painting, Anchorage	Public Information/Science Mgt./Admin.
01551-BAA	Checklist and Distributional Analysis of Marine Algal Species Collected as Vouchers Under Project CH1A	G. Hansen/OSU	Nearshore Ecosystem
01552-BAA	Exchange Between Prince William Sound and the Gulf of Alaska	S. Vaughn/PWSSC	SEA and Related Projects
01554-BAA	Development of Community-Based Monitoring Programs for EVOS Restoration and GEM	D. Sale/ECO Resource Group	Ecosystem Synthesis/GEM Transition
01555	Can Stress Hormones be Used as an Indication of Food Availability and Reproductive Performance? An Experimental Approach	R. Lanctot/USGS	Seabird/Forage Fish and Related Projects
01558	Harbor Seal Recovery: Application of New Technologies for Monitoring Health	S. Atkinson/UAF	Marine Mammals
01560	Correction Factors for Harbor Seal Surveys Using Photo-ID	M. Adkison/UAF, B. Kelly/UAS, R. Small/ADFG	Marine Mammals
01561	Using Predatory Fish to Sample Forage Fish	D. Roseneau/USFWS	Ecosystem Synthesis/GEM Transition
01566-BAA	"GEM News": An On-Line Marine Environmental Quality Report	B. Crampton/Intermountain Communications	Public Information/Science Mgt./Admin.
01570	Book on EVOS Science for General Readers	S. Loshbaugh/Freelance Writing	Public Information/Science Mgt./Admin.
01572-BAA	Use of Stable Isotopes to Identify Food Web Dependencies and Nutrient Sources for Breeding Seabirds	R. Suryan/USFWS, T. Kline/PWSSC, K. Hobson/CWS	Seabird/Forage Fish and Related Projects

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Proj.No.	Project Title	Proposer	Resource Cluster
01573	Chenega Bay Stream Enhancement	P. Kompkoff/Chenega Bay IRA Council	Subsistence
01574-BAA	Assessment of Bivalve Recovery on Treated Mixed-Soft Beaches	D. Lees/Littoral Ecological and Environmental Services	Nearshore Ecosystem
01577	Establishment of a Long-Term, Real-Time, Moored Oceanographic Monitoring Station in the Nearshore Region of the Gulf of Alaska	B. Stevens, P. Stabeno/NOAA	Ecosystem Synthesis/GEM Transition
01579	Monitoring Ecosystem Parameters along the Northern Gulf of Alaska	W. Bechtol/ADFG	Seabird/Forage Fish and Related Projects
01581-BAA	Publication of Pre- and Post-Spill Data on Health, Development, and Survival of Sea Otter Pups and Weanlings	L. Rotterman/Enhydra Research	Nearshore Ecosystem
01582-BAA	Development, Integration, Analysis and Publication of Critical Information on Sea Otters	L. Rotterman/Enhydra Research	Nearshore Ecosystem
01583	Baseline Mapping and Geomorphology of Kenai Peninsula Shoreline	O. Smith/UAA	Ecosystem Synthesis/GEM Transition
01586	Climate Change and Forage Fish Abundance: Development of Stable Isotope Methods for Long-Term Monitoring	M. Ben-David, B. Finney, D. Mann/UAF	Seabird/Forage Fish and Related Projects
01588	Factors Affecting Forage Fish School or School Group Selection in Prince William Sound	R. Suryan/USFWS	Seabird/Forage Fish and Related Projects
01595	Prototype for Community-Based Environmental Monitoring and Watershed Assessment	B. vanAppel/Cook Inlet Keeper	Ecosystem Synthesis/GEM Transition
01599-CLO	Evaluation of Yakataga Oil Seeps as Regional Background Hydrocarbon Sources in Benthic Sediments of the Spill Area	J. Short/NOAA	Nearshore Ecosystem
01610	Kodiak Archipelago Youth Area Watch	P. Brown-Schwalenberg/CRRC	Subsistence
01611	Alaska Peninsula Youth Area Watch	J. Lind/Chignik Lake Village Council	Subsistence
01616	Sound Waste Management Plan: Boat Harbor Sewage System Phase	S. Cogswell/PWSEDC	Reduction of Marine Pollution
01630	Planning for Long-Term Research and Monitoring Program	Restoration Office	Ecosystem Synthesis/GEM Transition

INDEX OF PROPOSALS BY RESOURCE CLUSTER -- FY 01

Proj.No.	Project Title	Proposer	Lead Agency	New or Cont'd	FY01 Expected	FY01 Request	Total Request FY01-02
Pink Salmon						$718.8	$1,156.1
01139A2	Port Dick Creek Tributary Restoration and Development	M. Dickson/ADFG	ADFG	Cont'd 6th yr. 5 yr. project	$10.0	$13.9	$18.9

This project will fund collection and analysis of additional water temperature, water level, salinity, stream discharge, and sedimentologic parameters (bedload transport, accumulated sediments and gravel/cobble transport rates) for inclusion in a manuscript. Closeout funds (final report and manuscript preparation) were provided for this project in FY 00. Funds requested for FY 01 and FY 02 would extend monitoring and analysis two additional years. The major goal of this project is the restoration of the native Port Dick Creek salmon stocks, which had been exposed to moderate to heavy oiling during the oil spill. Actual restoration of the spawning habitat took place in June 1996. Closeout funds were provided for this project in FY 00.

01190	Construction of a Linkage Map for the Pink Salmon Genome	F. Allendorf/Univ. Montana	ADFG	Cont'd 6th yr. 7 yr. project	$240.8	$240.0	$480.8

This project will continue experiments at the Alaska SeaLife Center that apply a genetic linkage map, which was constructed during the first four years of the project, to test for effects of regions of the genome on traits that are important to recovery of pink salmon (e.g., growth and survival). The map also will be used to evaluate the potential impact of hatchery-raised fish on the fitness of wild stocks. Sexually mature adults from the 1998 and 1999s cohort produced from wild pink salmon collected from Likes Creek are expected to return to the Alaska SeaLife Center in August 2000 and 2001. Genotypes in released fry and returning adults will be compared to test for genetic differences in marine survival and other life history traits (e.g., body size, egg number, and egg size).

01366-CLO	Improved Salmon Escapement Enumeration Using Remote Video and Time-Lapse Recording Technology	E. Otis/ADFG	ADFG	Cont'd 3rd yr. 3 yr. project	$12.3	$12.4	$12.4

Salmon resources and services within the spill area, and particularly within Prince William Sound, were injured by the oil spill and have not fully recovered. To monitor the recovery of salmon stocks in the spill area and improve escapement information used to set spawning escapement goals, this project will develop remote video and time-lapse recording technology for enumerating salmon escapement. Remote video has the potential to provide accurate, archivable documentation of salmon escapements well beyond the capacity of aerial survey indices, and well below the cost of weir and sonar projects. Videotapes can be retrieved and reviewed weekly to facilitate in-season management of commercial fisheries. Funding in FY 01 is for preparation of a final report and possibly a publication.

INDEX OF PROPOSALS BY RESOURCE CLUSTER -- FY 01

Proj.No.	Project Title	Proposer	Lead Agency	New or Cont'd	FY01 Expected	FY01 Request	Total Request FY01-02
01440	Pink Salmon Hatcheries in Prince William Sound: Enhancement or Replacement of Natural Production?	A. Wertheimer/NOAA	NOAA	New 1st yr. 1 yr. project		$46.9	$46.9

This project will examine pink salmon production models to determine if hatchery production in Prince William Sound enhances or replaces wild production. Pink salmon catches in the sound are at historical highs, with most of the catch produced by hatcheries. A recently published study supported in part by Exxon asserts that >90% of the current production would have been attained by wild stocks in the absence of hatchery production and implies that hatcheries are the cause of the decline and lack of recovery of wild pink salmon. This project will critically examine these assertions, determining if historical patterns of abundance or population dynamic models indicate replacement rather than enhancement of Prince William Sound pink salmon and consider alternate models.

Proj.No.	Project Title	Proposer	Lead Agency	New or Cont'd	FY01 Expected	FY01 Request	Total Request FY01-02
01450-BAA	Summary of the Status of Pacific Salmon Populations in the Region Affected by the Oil Spill	A. Wertheimer/AFS	NOAA	New 1st yr. 2 yr. project		$52.5	$105.0

This project will provide a comprehensive survey of the current status of salmon populations in the region affected by the oil spill. Status will be evaluated using a hierarchical approach, proceeding from large-scale geographic resolution to the fine scale of analysis of escapement data for specific spawning aggregates. The evaluation will use both catch and escapement data. Results will be georeferenced so that summary maps can be produced with a GIS program, and the status review will be published in the peer reviewed journal *Fisheries.* The status review will provide an important benchmark by which to measure the effectiveness of management policies to sustain and conserve salmon as environmental and anthropogenic changes occur.

Proj.No.	Project Title	Proposer	Lead Agency	New or Cont'd	FY01 Expected	FY01 Request	Total Request FY01-02
01452-BAA	Assessing Prey and Competitor/Predators of Pink Salmon Fry	R. Thorne, G. Thomas/PWSSC	NOAA	New 1st yr. 2 yr. project		$49.5	$121.5

Residents of Prince William Sound have repeatedly voiced the complaint that pink salmon populations in the spill-area suffered long-term impacts from the oil spill. Estimates of spring macrozooplankton prey and pollock predators are the primary biological data input to the pink salmon fry models developed by researchers over the past decade. This project will expand the current spring predator prey-surveys that are supported by the Oil Spill Recovery Institute, Sound Emergency Response Vehicle System, Prince William Sound Aquaculture Corporation, and the Alaska Department of Fish and Game to increase survey coverage, conduct more data analysis, and add new optical sampling devices to further reduce the dependence of the surveys on expensive and less-representative discrete net sampling.

Proj.No.	Project Title	Proposer	Lead Agency	New or Cont'd	FY01 Expected	FY01 Request	Total Request FY01-02
01454	Evidence and Consequences of Persistent Oil Contamination in Pink Salmon Natal Habitats	S. Rice/NOAA	NOAA	Cont'd 2nd yr. 2 yr. project	$104.0	$103.2	$103.2

Reports of persistent oil contamination in natal pink salmon streams in Prince William Sound and adverse biological effects at parts per billion oil concentrations stimulated this study in FY 00. Preliminary results demonstrate evidence of continued hydrocarbon contamination in some previously oiled streams. Fry from Prince William Sound and experimentally dosed fish have been collected for examination of a biomarker, cytochrome P4501A. When analyses are completed, data will be inspected for correlation between the biomarker, growth, predator avoidance, and marine survival. These results will be integrated with past research to reexamine the recovery status of pink salmon and their spawning habitat.

INDEX OF PROPOSALS BY RESOURCE CLUSTER -- FY 01

Proj.No.	Project Title	Proposer	Lead Agency	New or Cont'd	FY01 Expected	FY01 Request	Total Request FY01-02
01476	Effects of Oiled Incubation Substrate on Pink Salmon Reproduction	R. Heintz/NOAA	NOAA	Cont'd 3rd yr. 3 yr. project	$36.0	$97.0	$136.0

Populations are maintained through successful reproduction; this project is designed to determine if exposure to oil impairs pink salmon reproduction. Under Part A, the ability of the parental generation (P1) to produce offspring (F1) will be measured. The P1 was exposed when they incubated in 1998; the F1 will incubate in clean water beginning in FY 01. Part B extends Part A by measuring the ability of the F1 to produce viable offspring (F2) in 2002. A diminished ability to produce the F2 generation represents a genetic effect transmitted to unexposed generations. Corroborating evidence for parental and genetic effects of oil is increasing. This project will demonstrate the extent of these grave and unanticipated effects of oil pollution. [NOTE: This project also requested funds ($36,000) for FY 03.]

01492	Were Pink Salmon Embryo Studies in Prince William Sound Biased?	J. Thedinga/NOAA	NOAA	New 1st yr. 2 yr. project		$103.4	$131.4

Effects of the oil spill on wild pink salmon embryo survival in Prince William Sound are disputed among government- and industry-sponsored researchers. Exxon contends that the government's conclusions that reduced embryo viability in oiled streams was caused by persistent oil contamination were biased because sampling times were earlier in oiled streams than in reference streams. This project will perform a combination of retrospective and experimental studies to determine if estimates of pink salmon embryo survival were accurate or biased by conducting a historical review of past sampling procedures and experimentally determining the ability to discriminate eggs killed by sampling (shock mortality) and previously dead eggs.

Pacific Herring						$470.0	$782.3
01412	Overlap of Offshore and Neritic Zooplankton Assemblages: Implications for Juvenile Herring	A. J. Paul, R. Foy/UAF	ADFG	New 1st yr. 1 yr. project		$52.8	$52.8

Pacific herring population crashes in the past decade have been linked to mortality due to disease. Young-of-the-year herring metamorphose in July, well after the spring zooplankton bloom, and have to forage in a stratified water column low in nutrients. Prey availability and nutrition affect herring condition which dictates vulnerability to disease and overwintering survival. Studies have found that Gulf of Alaska derived carbon may be transported into Prince William Sound neritic environments, influencing food webs. This project will analyze the importance of central Prince William Sound and Gulf of Alaska zooplankton to juvenile herring diets from archived samples collected in neritic and central Prince William Sound from the spring of 1996 and 1997.

INDEX OF PROPOSALS BY RESOURCE CLUSTER -- FY 01

Proj.No.	Project Title	Proposer	Lead Agency	New or Cont'd	FY01 Expected	FY01 Request	Total Request FY01-02
01457-BAA	Assessing the Pacific Herring Stock Using Echointegration-Optical-Purse Seine Surveys	R. Thorne, G. Thomas/PWSSC	NOAA	New 1st yr. 2 yr. project		$72.8	$145.8

Using a combination of echointegration, optical, and purse seining techniques, highly precise estimates of age 3+ Pacific herring and predators in overwintering areas of Prince William Sound have been made. These techniques have been applied to measure the abundance and distribution of juvenile herring in the fall, which is required input to forecast with the juvenile overwintering survival model. The spring 2000 survey shows the herring population at its lowest abundance since the fall of 1993. With matching support from the Oil Spill Recovery Institute and the Alaska Department of Fish and Game, this project will continue the overwinter survey and add a fall survey of juveniles as an early indicator of future recovery.

Proj.No.	Project Title	Proposer	Lead Agency	New or Cont'd	FY01 Expected	FY01 Request	Total Request FY01-02
01462	Effect of Disease on Pacific Herring Population Recovery in Prince William Sound	G. Marty/Univ. of California Davis	ADFG	Cont'd 3rd yr. 3 yr. project	$81.7	$76.8	$167.4

The Pacific herring population of Prince William Sound has not recovered from severe population decline in 1993. The two most important diseases in these fish are associated with viral hemorrhagic septicemia virus and the fungus-like organism *Ichthyophonus hoferi*. Prevalence of *Ichthyophonus* has been fairly constant since 1994, but virus prevalence has been highly variable. High prevalence of virus and associated ulcers in 1998 was related to decreased biomass and closure of most fisheries in 1999. All Pacific herring fisheries are closed in the year 2000. To determine if disease is limiting recovery, this project will continue to monitor the two major diseases in Pacific herring in Prince William Sound through April 2002. [NOTE: FY 01 was originally scheduled to be the closeout year for this project. The principal investigator is now proposing a fourth year of funding (FY 02).]

Proj.No.	Project Title	Proposer	Lead Agency	New or Cont'd	FY01 Expected	FY01 Request	Total Request FY01-02
01490	Can Kittiwakes Be Used to Predict Future Trends in Adult Herring Abundance?	D. Irons, R. Suryan/USFWS	DOI	New 1st yr. 2 yr. project		$18.3	$25.3

Because the population dynamics of many seabird species are strongly linked to marine productivity, seabirds are commonly promoted as indicators of change in the marine environment. A more proactive use of seabirds as indicators would be to predict future trends in prey populations. Such a predator-prey relationship with predictive potential may exist in Prince William Sound, between black-legged kittiwakes and Pacific herring. The reproductive success of kittiwakes nesting at the two most productive colonies in the sound appears to be regulated by the abundance of age-1 herring. If kittiwake reproductive parameters could be used as a proxy for the relative abundance of age-1 herring, could future trends in herring recruitment and adult population size then be predicted? Initial review of a 14-year data record of kittiwake reproductive success and age-3 herring abundance provides evidence of such predictive power. This project will conduct a much more detailed analysis to evaluate this relationship and the possibility of including kittiwake data in herring stock recruitment models.

Proj.No.	Project Title	Proposer	Lead Agency	New or Cont'd	FY01 Expected	FY01 Request	Total Request FY01-02
01523	Within-Bay Distribution of Juvenile Herring in Prince William Sound	B. Norcross/UAF	ADFG	New 1st yr. 2 yr. project		$38.8	$72.6

This project will further analyze herring distribution data collected within bays in Prince William Sound during the Sound Ecosystem Assessment (SEA, Project/320). Specifically, the project will examine the small scale distribution of herring in relation to physical characteristics within bays used as nursery areas. This should result in an explanation of differences in factors that affect survival of juvenile herring among bays discovered during SEA investigations. Broader implications will be examined by comparing the results to those of Atlantic herring.

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Proj.No.	Project Title	Proposer	Lead Agency	New or Cont'd	FY01 Expected	FY01 Request	Total Request FY01-02
01524	Herring Spawning Sites: Location or Substrate	B. Norcross/UAF	ADFG	New 1st yr. 2 yr. project		$120.5	$167.8

This project will examine the question, "Why are herring spawning areas where they are?" by investigating two factors, location and substrate. The hypothesis is that not all combinations of oceanography, locations and substrate of herring spawning sites will result in successful recruitment of herring. To examine both factors, historical spawning and non-spawning sites in Prince William Sound will be examined. Simulated larval herring dispersal will reveal the importance of location. Field surveys and manipulations will identify importance of substrate. Knowledge of spawning site selection could become very important to the recovery of herring

Proj.No.	Project Title	Proposer	Lead Agency	New or Cont'd	FY01 Expected	FY01 Request	Total Request FY01-02
01531-BAA	Strategy and Technique Development for Monitoring the Ecopathology of 1996-1998 Prince William Sound Herring	T. Kline/PWSSC	NOAA	New 1st yr. 2 yr. project		$90.0	$150.6

The distinctive stable isotopic composition of Prince William Sound food sources when used to reconstruct recent herring migration could suggest ecological mechanisms that predispose Prince William Sound Pacific herring populations to epizootics. This project will address integrating Prince William Sound herring ecology and pathology studies and develop a strategy and technique for monitoring the ecopathology of herring populations. The strategy will involve (a) including natural stable isotope abundance measurements as a part of ongoing pathology monitoring and (b) stratifying the stable isotope analysis based upon the pathology monitoring results.

SEA and Related Projects						$442.3	$598.4
01389	3-D Ocean State Simulations for Ecosystem Applications from 1995-98 in Prince William Sound	J. Wang/UAF	ADFG	Cont'd 2nd yr. 2 yr. project	$72.2	$142.5	$142.5

Using the observed data collected from 1995-98 in Prince William Sound and the forcing of tide, coastal current inflow/outflow, freshwater discharge, and wind stress, a 3-D Prince William Sound model developed under the Sound Ecosystem Assessment project (SEA, /320) will be used to produce a continuous four year, 3-D fields of velocity, temperature, salinity and mixing coefficients for resource managers, fishing industry and biological applications (in SEA, only 1996 physical forcing has been provided). In addition, the interannual variability of Prince William Sound ocean circulation, temperature, and salinity due to interannually variable atmospheric forcing will be studied. This will allow identification of the key environmental parameters to be included in a long-term monitoring program to assist resource managers. In addition, FY 01 funding will rescue the Sound Ecosystem Assessment (SEA, Project/320) database and install it on a new server at the Institute of Marine Science, International Arctic Research Center at the University of Alaska Fairbanks. The new server will serve future modeling studies for the Gulf Ecosystem Monitoring (GEM) program.

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Proj.No.	Project Title	Proposer	Lead Agency	New or Cont'd	FY01 Expected	FY01 Request	Total Request FY01-02
01393-BAA	Prince William Sound Food Webs: Structure and Change	T. Kline/PWSSC	NOAA	Cont'd 3rd yr. 3 yr. project	$127.7	$131.2	$131.2

Recent research has shown that the oceanographic conditions connecting the northern Gulf of Alaska with Prince William Sound may affect recruitment and nutritional processes in fishes. Accordingly, food webs are subject to changes in carbon flow occurring between the Gulf of Alaska and Prince William Sound. This project seeks to (a) conduct retrospective analysis of Gulf of Alaska production shifts since the oil spill and (b) address ECOPATH model validation data gaps. These analyses will enable a better understanding of the ecological role of regime shift processes conjectured to be impeding the natural restoration of populations in Prince William Sound affected by the oil spill.

01460-BAA	Assessing the Number of Walleye Pollock as Predators of Juvenile Salmon and Herring	R. Thorne, G. Thomas/PWSSC	NOAA	New 1st yr. 2 yr. project		$53.5	$107.0

This project will expand the current winter surveys of prespawning pollock that are supported by the Oil Spill Recovery Institute and the Alaska Department of Fish and Game to increase coverage, conduct more data analysis, and add a fall survey of juvenile pollock as an early indicator of future recruitment. Walleye pollock is the most abundant predator of and competitor with juvenile salmon and herring in the sound, and surveys between 1995 and 2000 show its distribution and abundance to fluctuate with the recruitment of large year classes. Thus, annual surveys to estimate its abundance are crucial to track changing inter-annual trends in survival of pink salmon and Pacific herring stocks in the sound.

01552-BAA	Exchange Between Prince William Sound and the Gulf of Alaska	S. Vaughn/PWSSC	NOAA	Cont'd 2nd yr. 3 yr. project	$107.6	$115.1	$217.7

One of the least understood physical processes that influence the biological components of Prince William Sound is the exchange between the northern Gulf of Alaska and Prince William Sound. This project will document the interannual variability in water mass exchange between Prince William Sound and the adjacent northern Gulf of Alaska at Hinchinbrook Entrance, and identify mechanisms governing this exchange. The project will deploy an upward looking ADCP mooring in Hinchinbrook Entrance to create time series of velocities spanning three years. The mooring will be equipped with a CTD to create a time series of deep temperature and salinity. To identify the dominant factors that govern Prince William Sound/Gulf of Alaska exchange, the mooring velocity and deep temperature/salinity time series will be combined with meteorological and physical data collected under other research programs already in progress.

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Proj.No.	Project Title	Proposer	Lead Agency	New or Cont'd	FY01 Expected	FY01 Request	Total Request FY01-02
Cutthroat Trout, Dolly Varden, and Other Fish						$409.7	$747.8
01396	Alaska Salmon Shark Assessment	L. Hulbert/NOAA	NOAA	Cont'd 2nd yr. 3 yr. project		$131.6	$181.6

This project will perform an unbiased estimate of salmon shark abundance and consumption in Prince William Sound. FY 01 will focus on continued field sampling and analyses of salmon shark abundance and consumption from data collected in FY 00 with an emphasis on data collected from directed stratified random line transect sampling and from aerial survey counts from the Alaska Department of Fish and Game and U.S. Geological Survey. Satellite tags and data archival tags will be employed to describe salmon shark movements and migrations, and critical feeding areas and depths. This research will assess the role of a predominant shark species as an indicator of change in the dynamic ocean climate and trophic structures in Prince William Sound and the Gulf of Alaska. [NOTE: This project was originally proposed as a two-year project; a third year of funding (FY 02) is also now proposed.]

01404	Archival Tags for Tracking King Salmon at Sea: Migrations, Biology, and Oceanographic Preferences in Prince William Sound	J. Nielsen/USGS-BRD	DOI	New 1st yr. 2 yr. project		$136.5	$197.8

Archive tags with temperature and light-geolocation sensors will be monitored for post-smolt king salmon in Prince William Sound. Light/location relationships specific to the Gulf of Alaska developed under Project 00478 will be applied in this study of movement and migration paths for king salmon during maturation in ocean environments in the sound. The opportunity to test the development and application of this tag technology for the first time in king salmon is available in collaboration with a new Alaska Department of Fish and Game chinook hatchery on Ester Island. Tagging chinook reared in the hatchery environment to the required size (~30 cm) will allow the efficiency and accuracy of this technology to be tested. Archive tagged fish will be used to document king salmon use of marine habitats, maturation routes, contribution to the sport fishery, and hatchery/wild interactions for chinook in Prince William Sound.

01519	Distribution and Habitat of Rockfish in Nearshore Waters of Prince William Sound	J. Thedinga/NOAA	NOAA	New 1st yr. 2 yr. project		$64.7	$109.6

Information is limited on the life-history and habitat of many commercially important rockfish species in Alaska, especially juvenile stages. Rockfish are classified as an injured species but the status of rockfish stocks in Prince William Sound is unknown as is their recovery from the oil spill. A survey of nearshore waters is needed to identify habitats used by rockfish, especially those habitats that ay be essential to maintain healthy populations. This project will use a remotely operated vehicle (ROV) equipped with video camera to link habitat and rockfish assemblages in nearshore waters of the sound. A combination of underwater video and beach seining offers an effective way to identify and describe rockfish habitat. [NOTE: This project also requested funds ($19,300) for FY 03.]

01522	Growth Rates of Cutthroat Trout and Dolly Varden: Comparison of Populations in Oiled and Unoiled Sites	G. Reeves, D. Markle/USFS	USFS	New 1st yr. 3 yr. project		$76.9	$258.8

Dolly Varden and cutthroat trout originally were listed as injured because studies following the oil spill found that growth rates of populations in oiled areas were less than those of populations in unoiled areas. This project will examine growth rates of populations in oiled and unoiled areas by comparing sites with similar geographic features. Results from this study will determine the status of these species. [NOTE: This project also requested funds ($139,600) for FY 03.]

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Proj.No.	Project Title	Proposer	Lead Agency	New or Cont'd	FY01 Expected	FY01 Request	Total Request FY01-02
Marine Mammals						$906.2	$1,271.0
01012-BAA	Photographic and Acoustic Monitoring of Killer Whale in Prince William Sound and Kenai Fjords	C. Matkin/North Gulf Oceanic Society	NOAA	Cont'd 9th yr. 9 yr. project		$74.5	$74.5
	This project will continue the monitoring of the damaged AB resident pod and the potentially endangered AT1 transient population as well other Prince William Sound/Kenai Fjords killer whales. Monitoring has occurred on a yearly basis since 1984. Methods include the photo-identification of individual whales and acoustic monitoring with remote and vessel-based hydrophone systems. The project continues interpretation of current and previous data as well as data collected with other funds.						
01064-CLO	Monitoring, Habitat Use, and Trophic Interactions of Harbor Seals in Prince William Sound	K. Frost, ADFG	ADFG	Cont'd 7th yr. 6 yr. project		$25.1	$25.1
	This project will fund an additional year of data analysis and manuscript preparation for this multi-year study of harbor seals in Prince William Sound. FY 00 was to be the closeout year for this project. However, at the end of FY 00 some data will remain unanalyzed and unpublished. FY 01 funding will cover analysis and final write-up of (a) August 2000 harbor seal aerial surveys, (b) a comparison of 2000 counts with previous years (i.e., an updated analysis of population trend), (c) 1999 seal pup tagging data, and (d) integration of 1999 pup tagging data with other years and a synoptic analysis of movements and diving behavior of harbor seal pups in Prince William Sound.						
01245	Community-Based Harbor Seal Management and Biological Sampling	V. Vanek/ADFG, M. Riedel/Alaska Native Harbor Seal Commission	ADFG	Cont'd 8th yr. 9 yr. project		$48.2	$73.2
	Under this project, village-based technicians are selected by the Alaska Native Harbor Seal Commission and trained by the Alaska Department of Fish and Game to collect biological samples from harbor seals. The samples are transported to Anchorage or Kodiak for further sampling and distribution to participating scientists for analysis. In FY 01, the sample collection program in Prince William Sound, lower Cook Inlet, around Kodiak Island, and along the Alaska Peninsula will continue. The Alaska Native Harbor Seal Commission will produce and distribute a newsletter with summaries of the biological sampling program.						
01341-CLO	Harbor Seal Recovery: Controlled Studies of Health and Diet	M. Castellini/UAF	ADFG	Cont'd 4th yr. 4 yr. project	$90.1	$90.1	$90.1
	This project will fund the last year of data analysis for a long-term study underway at the Alaska SeaLife Center quantifying the impact of feeding differing fish diets on the health and body condition of harbor seals. Even though health status biomarkers for marine mammals in Prince William Sound were established during field trials (Project /001), this Alaska SeaLife Center component is the critical test of how each marker varies in a seal depending on diet and season. The project will also establish whether specific diets are nutritionally adequate to maintain seal health by monitoring health parameters and measuring assimilation efficiency during feeding trials. While this project focuses on the issue of harbor seal health, the approach is potentially applicable to any of the injured top predators. [NOTE: The principal investigator has indicated that additional closeout funds (no amount specified) may be requested for FY 02.]						

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Proj.No.	Project Title	Proposer	Lead Agency	New or Cont'd	FY01 Expected	FY01 Request	Total Request FY01-02
01371-CLO	Effects of Harbor Seal Metabolism on Stable Isotope Ratio Tracers	D. Schell/UAF	ADFG	Cont'd 3rd yr. 3 yr. project	$96.3	$92.9	$92.9

A major concern when using stable isotope tracers in ecosystem studies is the fidelity with which isotope ratios are transferred up food chains. Use of specific habitats or prey cannot be assessed because geographic gradients in isotope ratios confound trophic effects and/or prey switching. To remove these problems, this project developed complex analytical protocols to isolate amino acids from harbor seals which were pulse-labeled with ^{15}N-amino acids. Subsequent samples of blood plasma and red blood cells over time allowed for estimation of nitrogen incorporation rates. The goals of the final year are to identify pathways of rapid versus slower turnover and to investigate determination of habitat biomarkers.

01441-BAA	Harbor Seal Recovery: Effects of Diet on Lipid Metabolism and Health	R. Davis/Texas A&M Univ.	ADFG	Cont'd 3rd yr. 3 yr. project	$78.1	$163.8	$163.8

Ecosystem-wide changes in food availability could be affecting harbor seal population recovery. To better understand the results from field studies of harbor seal health, body condition and feeding ecology, data is needed for seals on diets that vary in nutritional composition. Working with the Alaska SeaLife Center, this project will determine how fatty acid profiles in the blubber of captive harbor seals change over time during controlled diets of herring and pollock. In addition, the project will assess the aerobic capacity and lipid metabolism of skeletal muscle in harbor seals fed controlled diets and in wild harbor seals in Prince William Sound. The results will enhance understanding of the nutritional role and assessment of dietary fat for harbor seals.

01465	Environmental Contaminant Levels in Eastern North Pacific Killer Whales	M. Krahn/NMFS	NOAA	New 1st yr. 1 yr. project		$82.6	$82.6

Certain groups of killer whales that are found in waters of Prince William Sound declined following the oil spill and have failed to recover. Although the deaths of these whales are most likely linked to the effects of the spill, the potential role of other factors, such as toxic levels of other anthropogenic contaminants (e.g., organochlorines, toxic elements), in the lack of recovery should be considered. This project will analyze archived blubber samples, obtained from killer whales ranging from California to Alaska, to determine concentrations of selected organochlorines and will compare the samples to those of previously analyzed Prince William Sound killer whales. Having a broad baseline on levels of organochlorines in killer whales from North Pacific populations is needed to assess the possible contribution of organochlorines as factors affecting low reproduction (AT1 pod) and population decline (AB pod).

01509	Monitoring Harbor Seal Population Condition to Assess Changes in Carrying Capacity in Prince William Sound	R. Small/ADFG	ADFG	New 1st yr. 2 yr. project		$92.4	$187.4

The production and survival of young harbor seals is critical to reversal of the long-term decline of seals in Prince William Sound, and to ultimate recovery of the population from damage due to the oil spill. Significant inter-annual differences in diet and body condition of young seals were documented in 1997-99. This project will obtain additional information on the population condition (e.g., diet and percent body fat) of pup, yearling, and sub-adult harbor seals, the age classes most likely to be limited by food availability. Data obtained on harbor seal population condition from this project and from 1997-99 will be compared with concurrent population abundance data to assess the status of harbor seals relative to carrying capacity, and subsequently derive more comprehensive and realistic expectations for population recovery. [NOTE: This project also requested fund ($65,000) for FY 03.]

Proj.No.	Project Title	Proposer	Lead Agency	New or Cont'd	FY01 Expected	FY01 Request	Total Request FY01-02
01558	Harbor Seal Recovery: Application of New Technologies for Monitoring Health	S. Atkinson/UAF	ADFG	New 1st yr. 3 yr. project		$172.1	$359.4

This project will investigate the potential for new technologies to assess and monitor the endocrine and immune systems as diagnostic measures of the health of harbor seals. Analysis of thyroxine (T_4), triiodothyronine (T_3), and cortisol (primary metabolic and gluconeogenic hormones), and measurement of immunoglobulins (IgG, IgM, and IgA) and the body burden of organochlorine contaminants will provide an assessment of both permanently captive seals as well as seals that are brought into the Alaska SeaLife Center for rehabilitation. The work will also employ community involvement through the Alaska Native Harbor Seal Commission. Once the profiles of healthy seals and those failing to thrive in their natural environment are assessed, these techniques will be evaluated for routine monitoring of free-ranging seals in an effort to restore this species.

01560	Correction Factors for Harbor Seal Surveys Using Photo-ID	M. Adkison/UAF, B. Kelly/UAS, R. Small/ADFG	ADFG	New 1st yr. 2 yr. project		$64.5	$122.0

Aerial counts of harbor seals count only those animals on the beach. The fraction of the population on the beach varies by date and with environmental factors such as the time of day, stage of tide, etc. Inferring abundance and trends in abundance from counts depends upon correction factors that are subject to uncertainty. Recently developed techniques for photographic identification of individual seals allow a large fraction of a population to be "marked". This project will design and implement mark-recapture experiments to provide substantially improved and integrated estimates of correction factors used to infer abundance and trends of harbor seals.

Nearshore Ecosystem						$2,709.7	$4,904.0
01195	Pristane Monitoring in Mussels	J. Short, P. Harris/NOAA	NOAA	Cont'd 6th yr. 7 yr. project	$55.0	$55.0	$110.0

This project has focused on elucidating the transport mechanism of pristane from *Neocalanus ssp* copepods into mussels in Prince William Sound for the previous five years. In FY 00, the utility of monitoring the response of pristane in mussels to mass-release of juvenile pink salmon from Prince William Sound hatcheries was successfully initiated using pristane concentration levels. This project will continue with this direction to assess feeding conditions for juvenile pink salmon during the critical period of initial marine residence, and will forecast survivals through this period. Forecasts will be compared to actual returns to assess reliability. [NOTE: The principal investigators have proposed that this project be continued indefinitely.]

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Proj.No.	Project Title	Proposer	Lead Agency	New or Cont'd	FY01 Expected	FY01 Request	Total Request FY01-02
01290	Hydrocarbon Database and Interpretation Service	J. Short, B. Nelson/NOAA	NOAA	Cont'd 10th yr. 11 yr. project	$35.0	$35.0	$70.0

This ongoing project provides data and sample archiving services for all samples collected for hydrocarbon analysis in support of Trustee Council projects. These data represent samples collected since the oil spill in 1989 to the present and include environmental and laboratory National Resource Damage Assessment and restoration data. Additionally, this project provides interpretive services for hydrocarbon analysis, public releases of the hydrocarbon and pristane databases, and storage and maintenance of the hydrocarbon sample archives. [NOTE: The principal investigator has proposed that this project be continued indefinitely.]

01395	Planning for Long-Term Monitoring in the Nearshore: Designing Studies to Detect Change and Assess Cause	T. Dean/Coastal Resources Associates, et al	DOI	New 1st yr. 2 yr. project		$210.5	$355.5

This project will produce a draft nearshore monitoring plan that provides a framework for future monitoring under the Gulf Ecosystem Monitoring (GEM) program. The process to be used in creating this plan will be to formulate hypotheses with respect to potential changes to the nearshore environment, identify questions that must be answered before a design can be developed to address these hypotheses, answer design questions by analyzing existing data or conducting directed field studies, and conduct cost-benefit analyses to identify the most powerful design within funding constraints. Workshops will be held during the course of plan development to seek input from the Trustee Council stakeholders.

01407	Harlequin Duck Population Dynamics	D. Rosenberg/ADFG	ADFG	Cont'd 2nd yr. 3 yr. project	$71.0	$79.4	$154.4

Harlequin duck populations have not recovered from the effects of the oil spill. Populations are declining in oiled areas of Prince William Sound while increasing in unoiled areas. This project will conduct late-winter boat surveys to assess the recovery of ducks inhabiting oiled areas. Population structure, abundance and recruitment will be compared between oiled and unoiled areas in Prince William Sound to assess trends, population dynamics, and the progress of recovery. As part of the Gulf Ecosystem Monitoring program, this project would help identify changes to the Gulf of Alaska ecosystem and improve our ability to differentiate between natural and man-caused population changes. [NOTE: This project also requested funds ($75,000) for FY 03.]

01423	Patterns and Processes of Population Change in Selected Nearshore Vertebrate Predators	J. Bodkin, D. Esler/USGS-BRD, T. Dean/CRA, Inc.	DOI	Cont'd 3rd yr. 4 yr. project	$265.0	$504.7	$981.9

Sea otters and harlequin ducks have not fully recovered from the oil spill. This project will explore links between oil exposure and the lack of population recovery, with the intent of understanding constraints to recovery of these species and the nearshore environment. Sea otter work will include aerial surveys of distribution and abundance, estimation of abundance and size of green sea urchins, estimation of age-specific survival rates, and monitoring of CYP1A expression. Harlequin duck field studies will examine the relationship between survival and CYP1A. Captive experiments on both seal otters and harlequin ducks will examine the relationships between oil exposure and CYP1A induction, and metabolic and behavioral consequences of exposure. [NOTE: This project also requested funds ($250,000) for FY 03.]

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Proj.No.	Project Title	Proposer	Lead Agency	New or Cont'd	FY01 Expected	FY01 Request	Total Request FY01-02
01477	Where Do Prince William Sound Harlequin Ducks Breed? A Satellite Telemetry Approach	D. Rosenberg/ADFG	ADFG	New 1st yr. 2 yr. project		$110.9	$221.9

Harlequin ducks have not recovered from the effects of the oil spill. Populations in oiled areas are continuing to decline. Conditions on the breeding grounds may contribute to the decline or impede recovery. However, the location of breeding areas for the majority of Prince William Sound harlequin ducks is unknown. This project will use satellite telemetry to gain information on pre- and post breeding movements within the sound, dispersal, migration routes, and location of breeding areas. This critical life-history information which is lacking for Prince William Sound harlequin ducks will aid in understanding the causes of population change and assessing recovery. Identification of breeding areas and migration routes will allow for improved habitat protection via acquisition, recreational and land-use planning, permitting, and pollution control. [NOTE: This project also requested funds ($110,000) for FY 03.]

01486-BAA	Links Between Persistent Oil in Mussel Beds and Predators	S. Rice/NOAA, et. al.	NOAA	New 1st yr. 2 yr. project		$199.0	$329.0

Links between oil-contaminated mussel beds and impacts on infauna and vertebrate predators have been inferred, but have not been definitively demonstrated. Significant oil concentrations in some mussel beds have persisted to present, much longer than originally expected, and may explain contemporary observations of vertebrate predator exposure to oil. The possibility that oiled beds are long-term sources of vertebrate contamination was unanticipated, and has implications for future monitoring and response decisions in the event of future spills. In a more holistic approach than in the past, this project will examine evidence for links between persistence of *Exxon Valdez* oil in mussel beds, infauna, and nearshore vertebrate predators.

01499	Worms in Oil: Overlooked Biota in the Restoration Processes of the Nearshore	C. McRoy/UAF	ADFG	New 1st yr. 1 yr. project		$64.8	$64.8

Marine oligochaetes occurred in high abundance in the coarse sediments of oiled beaches following the oil spill. In 1990, the Alaska Department of Environmental Conservation made a limited survey of oiled/unoiled intertidal areas in Prince William Sound with the specific objective of assessing this population. Preliminary results indicated these animals were the most abundant macrofauna on both treated and untreated oiled beaches with population densities reaching thousands m-2. The data have never been analyzed or published but contain documentation of a major pathway for moving oil into the nearshore food web and information on a control of the bioremediation process. This project will analyze the historical data, investigate the current status of populations in the oiled intertidal zone, and model the potential role of these animals in the nearshore.

01520	Sea Otter Population Survey	J. Bodkin, A. Doroff/USGS	DOI	New 1st yr. 2 yr. project		$41.6	$96.0

This project will conduct aerial surveys of sea otters along the Kenai Peninsula and Kodiak Archipelago. Although sea otter oiling and mortality following the oil spill was widespread in these areas, only one survey has been conducted in these areas since 1990. Previous research supported by the Trustee Council resulted in the design, testing, and implementation of cost effective aerial survey method for sea otters that is both accurate and precise. This method has been employed in Prince William Sound since 1993. While the statistical power to detect change with this survey method is good, the immediate value of the proposed surveys will be in providing current baseline data within the spill area and delineating the geographic and numerical magnitude of the sea otter decline observed elsewhere in the North Pacific.

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Proj.No.	Project Title	Proposer	Lead Agency	New or Cont'd	FY01 Expected	FY01 Request	Total Request FY01-02
01528	Long-Term Monitoring of Intertidal Communities as a Framework for Hypothesis-Driven Research	G. Shigenaka/NOAA-HazMat	NOAA	New 1st yr. 2 yr. project		$302.8	$602.8
	This project will extend an assessment of intertidal injury and recovery established in 1989 and operated continuously through FY 00. The assessment originally provided basic information on the early effects of the spill and subsequent cleanup which formed the basis for spill response guidance now institutionalized into standard operating procedures. The assessment has evolved from this operational focus into an umbrella monitoring program for spill impact and recovery hypothesis testing. Specifically, the long-term trends from the ten-plus years of monitoring serve to identify more tightly targeted research questions related to issues of recovery in the Prince William Sound intertidal ecosystem.						
01532	Coupling of Oceanic and Nearshore: The Search for Indicator Species	G. Irvine/USGS-BRD	DOI	New 1st yr. 2 yr. project		$291.0	$566.0
	This project will (a) identify nearshore species whose abundances are coupled with low-frequency dynamic processes (e.g., regime shifts) occurring in the oceanic realm, and that could serve as sentinels of change for the Gulf Ecosystem Monitoring (GEM) program; (b) investigate mechanisms that are responsible for such coupling, identifying processes that could also be monitored; and (c) investigate long-term (7,000 year) patterns of productivity and relative species abundance in nearshore, intertidal communities via retrospective analyses. [NOTE: This project also requested funds ($275,000) for FY 03.]						
01534	Comparison of Cytochrome P4501A Induction in Blood and Liver Cells of Sea Otters	B. Ballachey, P. Snyder/USGS	DOI	New 1st yr. 1 yr. project		$19.9	$19.9
	This project will sample liver from the sea otters captured under Project /423 for assays of CYP1A and for examination of histopathological changes. Liver CYP1A levels will be compared to those measured in blood from the same individuals. The project will also assay for CYP1A in archived frozen liver samples from sea otters that were oiled and died in 1989, to enable comparison of current levels of CYP1A induction with levels in sea otters that had a known high degree of oil exposure. The results of this project will provide a basis for comparison of cytochrome P4501A induction in sea otters in 1989, in 1996-98, and in 2001, and will help determine if there is a decline in CYP1A levels over time.						
01543	Evaluation of Oil Remaining in the Intertidal from the *Exxon Valdez* Oil Spill	J. Short/NOAA	NOAA	New 1st yr. 2 yr. project		$523.0	$1,023.0
	This project will assess the amount of oil remaining from the oil spill on shorelines within (FY 01) and outside (FY 02) Prince William Sound. FY 01 funding will be requested in two phases. Phase 1 ($23,000) will produce a final sampling design to be implemented in the spring of 2001 (Phase 2, $500,000). Phase 2 will be presented for Trustee Council approval in December 2000. [NOTE: This project also requested funds ($22,000) for FY 03.]						

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Proj.No.	Project Title	Proposer	Lead Agency	New or Cont'd	FY01 Expected	FY01 Request	Total Request FY01-02
01551-BAA	Checklist and Distributional Analysis of Marine Algal Species Collected as Vouchers Under Project CH1A	G. Hansen/OSU	NOAA	New 1st yr. 1 yr. project		$70.3	$70.3

During previous EVOS studies (CH1A), intense investigations were carried out on the intertidal algal communities of Prince William Sound, Kenai, Kodiak, and the Alaska Peninsula. As a byproduct of these studies, thorough voucher collections were made of the algal species present in more than 100 transect areas used for the study. The 7,300 voucher specimens were identified to species, curated, and cataloged, but no money was available at the time for publishing the wealth of information on algal biodiveristy and distribution they provided. This project will use these data to prepare regional checklists and biogeographic analyses of the species discovered and finally make available these critical habitat data for restoration and conservation efforts in Alaska.

01574-BAA	Assessment of Bivalve Recovery on Treated Mixed-Soft Beaches	D. Lees/Littoral Ecological and Environmental Services	NOAA	New 1st yr. 2 yr. project		$143.6	$180.3

Previous studies suggest that bivalve assemblages on beaches in Prince William Sound exposed to high-pressure hot-water washing during the 1989-90 shoreline treatment program remain severely damaged in terms of species composition and function. This project will assess the generality of this apparent injury to these assemblages. A finding that our conclusions are accurate will indicate that a considerable proportion of mixed-soft beaches in treated areas of the sound remain extremely disturbed and that the beaches are functionally impaired in terms of their ability to support foraging by subsistence users and nearshore vertebrate predators. The study will also provide insights into potential remediation alternatives for restoring the biodiversity and functional aspects of these assemblages if such measures are shown to be justified.

01581-BAA	Publication of Pre- and Post-Spill Data on Health, Development, and Survival of Sea Otter Pups and Weanlings	L. Rotterman/Enhydra Research	NOAA	New 1st yr. 1 yr. project		$5.9	$5.9

This project will revise and publish a manuscript containing pre- and post-spill data on the health and survival of sea otter pups and weanlings. The project will (a) improve understanding of EVOS damage to marine mammals and related natural communities, (b) evaluate seal otter population processes affecting recovery, (c) evaluate future response and restoration strategies, and (d) generate benchmarks of sea otter population status.

01582-BAA	Development, Integration, Analysis and Publication of Critical Information on Sea Otters	L. Rotterman/Enhydra Research	NOAA	New 1st yr. 1 yr. project		$41.8	$41.8

This project will provide information about the survival, reproduction, population structure, movements, habitat use or rehabilitation of sea otters in Prince William Sound and adjacent areas. Findings from this project will enable: (a) evaluation of past, current and future monitoring and assessment study techniques and design, (b) establishment of benchmarks against which to gauge current status relative to recovery, (c) formulation of future spill response, (d) interpretation of monitoring and damage assessment results and modeling of sea otter recovery, and (e) elucidation of processes (e.g., immigration or emigration) impacting the course of recovery.

INDEX OF PROPOSALS BY RESOURCE CLUSTER -- FY 01

Proj.No.	Project Title	Proposer	Lead Agency	New or Cont'd	FY01 Expected	FY01 Request	Total Request FY01-02
01599-CLO	Evaluation of Yakataga Oil Seeps as Regional Background Hydrocarbon Sources in Benthic Sediments of the Spill Area	J. Short/NOAA	NOAA	Cont'd 2nd yr. 2 yr. project	$10.0	$10.5	$10.5

This project will evaluate fluxes of crude oil from terrestrial oil seeps and of particulate coal near Yakataga into the northern Gulf of Alaska to delineate the extent of "natural oil pollution" in the area affected by the oil spill. In FY 01, a final report and manuscript will be prepared.

Seabird/Forage Fish and Related Projects						$991.8	$1,596.5
01144	Common Murre Population Monitoring	D. Roseneau/USFWS	DOI	Cont'd 6th yr. 5 yr. project		$46.5	$60.5

This project is related to projects 98144 (which censused the Chiswell Islands murre nesting colonies in FY 98), 99144 (which censused the Barren Islands nesting colonies in FY 99), and 00144 (which provided funds for final report and manuscript preparation). It is based on the recommendation made by the principal investigator at the conclusion of the FY 98 study to recount the Chiswell Islands murre colonies in FY 00 or FY 01, and it is designed to collect additional murre population numbers data at this injured nesting complex. Data will be compared with counts made at the Chiswell Islands in 1989-1992 and 1998, and the results of these analyses will be used in combination with results from the 1989-1997 and 1999 Barren Islands studies to help determine the recovery status of common murres in the spill area.

01159	Surveys to Monitor Marine Bird Abundance in Prince William Sound During Winter and Summer	D. Irons, R. Suryan/USFWS	DOI	Cont'd 8th yr. 9 yr. project	$37.0	$35.7	$286.7

This project has conducted small boat surveys to monitor abundance of marine birds in Prince William Sound during March 1990, 1991, 1993, 1994, 1996, 1998, and 2000 and July 1989, 1990, 1991, 1993, 1996, 1998, and 2000. This data will be used to examine trends by determining whether populations in the oiled zone changed at the same rate as those in the unoiled zone. Overall population trends for Prince William Sound from 1989-2000 will also be examined. An annual report and a publication will be prepared. [NOTE: This project also requested funds ($50,000) for FY 03.]

01163-CLO	Alaska Predator Ecosystem Experiment in Prince William Sound and the Gulf of Alaska (APEX)	D. Duffy/Paumanok Solutions, et al	NOAA	Cont'd 8th yr. 8 yr. project	$200.0	$197.4	$217.4

This project will fund a second closeout year for Project /163, which is using seabirds as probes of the trophic (foraging) environment of Prince William Sound and Cook Inlet, comparing their reproductive and foraging biologies, including diet. These measurements are being compared with hydroacoustic, aerial, and net sampling of fish to calibrate seabird performance with fish distribution and abundance. This will allow a determination of the extent to which food limits the recovery of seabirds from the oil spill. Historical data from a variety of sources is being used to detect shifts in forage fish abundance and to test hypotheses explaining such shifts. In FY 01, a synthesis of project results will be prepared.

INDEX OF PROPOSALS BY RESOURCE CLUSTER -- FY 01

Proj.No.	Project Title	Proposer	Lead Agency	New or Cont'd	FY01 Expected	FY01 Request	Total Request FY01-02
01327	Pigeon Guillemot Restoration Research at the Alaska SeaLife Center	D. Roby/OSU, G. Divoky/UAF	DOI	Cont'd 4th yr. 4 yr. project	$93.0	$93.3	$93.3
	This project tests the feasibility of restoration techniques for pigeon guillemots (e.g., installation of artificial nest sites, use of social attractants, captive propagation and release). It also includes controlled experiments crucial to two other restoration objectives: (a) development of nondestructive biomarkers of petroleum hydrocarbon contamination in seabirds and (b) understanding how dietary factors (prey species composition, prey size, lipid content, feeding frequency) constrain growth, development, and condition at fledging in guillemots and other fish-eating seabirds.						
01338	Survival of Adult Murres and Kittiwakes in Relation to Forage Fish Abundance	J. Piatt/USGS-BRD	DOI	Cont'd 4th yr. 4 yr. project	$46.4	$47.2	$47.2
	Some seabird populations damaged by the oil spill continue to decline or are not recovering. In order to understand the ultimate cause of seabird population fluctuations, productivity, recruitment, and adult survival must be measured. Recent studies in Project /163 (APEX) focused on measuring productivity only. Recruitment measurement demands an unrealistic study duration. This project will augment current studies in lower Cook Inlet that relate breeding success and foraging effort to fluctuations in forage fish density by using banding and resighting to quantify the survival of adult common murres and black-legged kittiwakes.						
01479	Effects of Food Stress on Survival and Reproductive Performance of Seabirds	J. Piatt/USGS-BRD, A. Kitaysky/Univ. of Washington	DOI	Cont'd 3rd yr. 4 yr. project	$129.6	$129.6	$204.6
	Traditional field methods of assessing effects of fluctuations in food supply on the survival and reproductive performance of seabirds may give equivocal results. This project will apply an additional tool: The measure of stress hormones in free-ranging seabirds. Food stress can be quantified by measuring base levels of stress hormones such as corticosterone in the blood of seabirds, or the rise in blood levels of corticosterone in response to a standardized stressor: capture, handling and restraint. These techniques will be applied to seabirds breeding in lower Cook Inlet and captive birds will be used for controlled experiments. This project provides a unique opportunity for a concurrent field and captive study of stress in seabirds.						
01555	Can Stress Hormones be Used as an Indication of Food Availability and Reproductive Performance? An Experimental Approach	R. Lanctot/USGS	DOI	New 1st yr. 1 yr. project		$18.9	$18.9
	This project will complement and enhance Project /479, which is investigating how stress hormone levels (i.e., corticosterone) in adult seabirds relate to local food conditions and indicate the future reproductive health of a colony. This project will (a) test for differences in corticosterone levels between supplementally fed and unfed black-legged kittiwakes that are nesting at one colony, thereby removing any inherent environmental differences present when birds from two colonies are compared, (b) measure changes in corticosterone level in adults throughout the breeding season, (c) explore the effects of adult gender on corticosterone levels, and (d) evaluate how corticosterone levels relate to an individual's reproductive success and survival, as well as overall productivity of the colony. Funding will support analysis of plasma samples collected in 2000 and preparation of manuscripts.						

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Proj.No.	Project Title	Proposer	Lead Agency	New or Cont'd	FY01 Expected	FY01 Request	Total Request FY01-02
01572-BAA	Use of Stable Isotopes to Identify Food Web Dependencies and Nutrient Sources for Breeding Seabirds	R. Suryan/USFWS, T. Kline/PWSSC, K. Hobson/CWS	DOI	New 1st yr. 2 yr. project		$116.4	$186.4

This project will use stable isotope analysis to investigate possible linkages between the reproductive success of a piscivorous seabird, the black-legged kittiwake, and the source of nutrients in their diet (Prince William Sound vs. Gulf of Alaska). Feather samples from kittiwake nestlings throughout the sound and zooplankton samples from the sound and adjacent Gulf of Alaska waters were collected during two years when breeding conditions varied considerably. By comparing conditions between years, this project will gain new insight into food web dynamics affecting seabird reproductive success. This information will be valuable in identifying conditions necessary for recovery of piscivorous seabirds injured during the oil spill.

01579	Monitoring Ecosystem Parameters Along the Northern Gulf of Alaska	W. Bechtol/ADFG	ADFG	New 1st yr. 2 yr. project		$91.6	$184.8

This project will refine long-term monitoring techniques for forage fish populations in Cook Inlet, an area representative of ecosystem conditions and changes in the northern Gulf of Alaska. These measurements will be compared with hydroacoustic and net samples of fish to calibrate seabird performance with fish distribution and abundance, in an effort to determine whether competitive and predatory interactions or different responses to the environment may be favoring the abundance of one fish species over another. [NOTE: This project also requested funds ($31,400) for FY 03.]

01586	Climate Change and Forage Fish Abundance: Development of Stable Isotope Methods for Long-Term Monitoring	M. Ben-David, B. Finney, D. Mann/UAF	ADFG	New 1st yr. 2 yr. project		$122.4	$175.9

This project will use two methods to reconstruct forage-fish abundances over the time scales of centuries to millennia of interest in examining animal-climate relationships. Both methods are also applicable to contemporary population monitoring. The first method utilizes nitrogen stable isotopes as a record of marine organic matter input. The second method uses fish scales recovered from ocean sediment accumulated in anoxic basins as a direct record of fish abundances. Available data on forage fish abundance and reproductive success of seabirds from Prince William Sound and vicinity collected since 1989 will be used to calibrate the results of both the ^{15}N and the fish scale analyses. These data will be used to develop a model for the relation between sedimentary $d^{13}C$ and $d^{15}N$ data, climate, and changes in abundance of fishes and birds.

01588	Factors Affecting Forage Fish School or School Group Selection in Prince William Sound	R. Suryan/USFWS	DOI	New 1st yr. 2 yr. project		$92.8	$120.8

This project will use existing digital imagery and underwater videos of seemingly exploitable schools of juvenile forage fishes (i.e., at or near surface) with and without foraging seabirds present to examine the fine scale selection of fish schools by foraging seabirds. The main goal of this project is to determine what factors (e.g., species composition, age class, threshold biomass, school depth, school location) determine whether or not a school of forage fish is truly available or of interest to foraging seabirds (both surface feeding and diving species). This project will provide important evidence in testing new hypotheses of food limitations in the recovery of seabird populations following the oil spill.

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Proj.No.	Project Title	Proposer	Lead Agency	New or Cont'd	FY01 Expected	FY01 Request	Total Request FY01-02
Subsistence						$2,485.9	$6,363.5
01052	Community Involvement Planning for GEM	P. Brown- Schwalenberg/CRRC	ADFG	Cont'd 7th yr. 8 yr. project	$200.0	$223.7	$473.7
	In FY 01, the Spill Area-Wide Coordinator will continue to actively involve residents of Tatitlek, Chenega Bay, Port Graham, Nanwalek, Cordova/Eyak, Seward, Seldovia, Valdez, Kodiak/Ouzinkie, and Chignik Lake in the restoration program through direct communication with a network of local facilitators. In addition, the project will work to address the future of community involvement with regard to the Gulf Ecosystem Monitoring (GEM) program. A Monitoring Committee, consisting of the Spill Area-Wide Coordinator, the TEK Specialist, contracted scientists, and the community facilitators, will focus on three objectives: (a) designing a community based monitoring program, (b) identifying specific monitoring activities, and (c) selecting monitoring activities for pilot projects in FY 02.						
01131	Chugach Native Region Clam Restoration	D. Daisy/CRRC	ADFG	Cont'd 6th yr. 5 yr. project		$11.5	$11.5
	Cost effective procedures for establishing easily accessible subsistence clam populations near Alaska Native villages in the oil spill region are being established. All fieldwork has been completed on this project. Additional funding is needed to complete data analysis and final report preparation, as FY 99 fieldwork and data collection were more costly than anticipated. This project will extend the submittal of the final report from April 15, 2000 to April 15, 2001.						
01210	Youth Area Watch	R. DeLorenzo/Chugach School District	ADFG	Cont'd 6th yr. 7 yr. project	$107.0	$107.0	$203.3
	This project links students in the oil spill impacted area with research and monitoring projects funded by the Trustee Council. The project involves students in the restoration process and provides these individuals the skills to participate in restoration now and in the future. Youth conduct research identified and delegated by principal investigators who have indicated interest in working with students. Youth Area Watch fosters long-term commitment to the goals set out in the restoration plan and is a positive community investment in that process. Participating communities in FY 01 will be Tatitlek, Chenega Bay, Cordova, Nanwalek, Port Graham, Seldovia, Seward, Valdez, and Whittier.						
01225	Port Graham Pink Salmon Subsistence Project	P. McCollum/Port Graham Village Council	ADFG	Cont'd 6th yr. 5 yr. project		$91.0	$182.0
	This project was scheduled to closeout in FY 00. The project is helping to supply pink salmon for subsistence use in the Port Graham area during the broodstock development phase of the Port Graham hatchery. The fire that destroyed the hatchery in January of 1998 set the hatchery program back a year. Funding in FY 01 will help offset the impact of the fire. The project is designed to ensure that pink salmon remain available for subsistence use until the more traditional species are rejuvenated. The two strategies being employed are (a) increased fisheries management surveillance to maximize use of the adult pink salmon return and (b) increasing marine survival of hatchery produced pink salmon.						

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Proj.No.	Project Title	Proposer	Lead Agency	New or Cont'd	FY01 Expected	FY01 Request	Total Request FY01-02
01247	Kametolook River Coho Salmon Subsistence Project	J. McCullough, L. Scarbrough/ADFG	ADFG	Cont'd 5th yr. 6 yr. project	$20.0	$22.7	$50.7

Subsistence users from the Alaska Peninsula Native Village of Perryville have noted significant declines in the coho salmon run in the nearby Kametolook River since the oil spill. Criminal settlement funds were used in FY 96 to determine what method would best restore the river's coho salmon stock to historic levels. This project will provide funding through FY 02 for the Alaska Department of Fish and Game to try conservative and safe restoration methods. In 1997, two instream incubation boxes were installed in the upper reach of the Kametolook River. In 1998, to increase the efficiency of the egg take, two holding pens were installed near the coho spawning region of the river.

01256B	Sockeye Salmon Stocking at Solf Lake	D. Gillikin/USFS, P. Shields/ADFG	USFS	Cont'd 6th yr. 7 yr. project	$40.0	$58.3	$108.3

This project will benefit subsistence, recreation, and commercial users of western Prince William Sound. There are two phases to the project: Phase 1, which began in FY 96, verified the ability of Solf Lake to support a sustainable population of sockeye salmon. Phase 2 included stocking the lake with approximately 100,000 sockeye salmon fry, then ensuring access to the lake for returning adult salmon. The stocking program began in 1998 along with modification to the two outlets to control water levels. The reconstruction of the fishway in the eastern channel will be completed in the summer of 2000 ensuring returning adult salmon access to Solf Lake in the year 2001. [NOTE: This project, originally scheduled to closeout in FY 02, is now requesting funds in FY 03 ($50,000) and FY 04 ($2,500).]

01273-CLO	Scoter Life History and Ecology: Linking Satellite Technology with Traditional Knowledge to Conserve the Resource.	D. Rosenberg/ADFG	ADFG	Cont'd 4th yr. 3 yr. project		$77.7	$78.7

This project will provide closeout funding for the scoter satellite telemetry and traditional ecological knowledge project. A final report and manuscripts will be prepared, reporting on the findings of this three year effort.

01333	Sea Otter Monitoring	B. Henrichs/Native Village of Eyak	DOI	New 1st yr. 5 yr. project		$100.0	$200.0

The sea otters in Orca Inlet have been dying and washing up on the beaches in the past few years. The problem is getting worse. Since January 2000, over 100 sea otters have been picked up between Hartney Bay and Nelson Bay. Necropsies show the cause of death to be parasites and bone impaction. These are picked up by sea otters feeding on cannery waste. This project calls for a study to find a way to prevent these needless deaths. [NOTE: This proposal was submitted as an idea; if recommended for funding, a Detailed Project Description and budget will need to be prepared.] [2nd NOTE: This project also requested $100,000 for FY 03, for FY 04, and for FY 05.]

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Proj.No.	Project Title	Proposer	Lead Agency	New or Cont'd	FY01 Expected	FY01 Request	Total Request FY01-02
01372	Steller Sea Lion Monitoring	B. Henrichs/Native Village of Eyak	DOI	New 1st yr. 5 yr. project		$250.0	$500.0

Steller sea lions are on the decline and have been placed on the endangered list by the National Marine Fisheries Service. If this trend continues, subsistence fishing for salmon, herring and other marine life will be curtailed. Some traditional areas may be closed to all fishing and hunting. This project will monitor the interaction between the Steller sea lions and the fishing fleets. [NOTE: This proposal was submitted as an idea; if recommended for funding, a Detailed Project Description and budget will need to be prepared.] [2nd NOTE: This project also requested $250,000 for FY 03, for FY 04, and for FY 05.]

Proj.No.	Project Title	Proposer	Lead Agency	New or Cont'd	FY01 Expected	FY01 Request	Total Request FY01-02
01401	Assessment of Spot Shrimp Abundance in Prince William Sound	C. Hughey/ Valdez Native Tribe, C. O'Clair/ NOAA	NOAA	Cont'd 3rd yr. 4 yr. project	$95.0	$95.0	$128.0

This project will determine whether the spot shrimp population in Prince William Sound is recovering from depletion. FY 00 results are consistent with those of the Alaska Department of Fish and Game annual survey and indicate a cessation in the apparent decline of spot shrimp abundance in western Prince William Sound that had taken place from 1992 to 1998. Evidence of the beginning of recovery of the spot shrimp population, though encouraging, is inconclusive. In FY 01, the project will provide a second estimate of the abundance of spot shrimp to determine if the trend hinted at in FY 00 is real, and will model growth and estimate recruitment potential by sampling juveniles.

Proj.No.	Project Title	Proposer	Lead Agency	New or Cont'd	FY01 Expected	FY01 Request	Total Request FY01-02
01481	Documentary Film on the Oil Spill Impacts on Subsistence Use of Intertidal Resources	C. Kompkoff/Chenega Bay IRA Council, P. Panamarioff/ Ouzinkie Tribal Council	ADFG	Cont'd 2nd yr. 2 yr. project	$111.8	$111.8	$111.8

This project will produce a 28 minute documentary film on the impacts of the oil spill on the subsistence use of intertidal resources, including mussels, clams, chitons, and octopus, by residents of two predominantly Alaska Native communities: Chenega Bay in Prince William Sound and Ouzinkie on Kodiak Island. This project will build on two previous subsistence documentaries (projects 96214 and 98274) and will focus on the use of resources in the intertidal, the area hardest hit by oil, and broaden the discussion by bringing in the perspective of the residents of Chenega Bay, the first community directly in the path of the spilled oil, and Ouzinkie, the first Kodiak-area community to see the oil arrive. The documentary will compare the impact the spill has had on the use of intertidal resources in each community as well as the ongoing EVOS restoration efforts to help residents mitigate these impacts.

Proj.No.	Project Title	Proposer	Lead Agency	New or Cont'd	FY01 Expected	FY01 Request	Total Request FY01-02
01482-BAA	Establishment of a Biotoxin Monitoring Program in the Kodiak Island Area	J. Jellett/Jellett Biotek Limited	NOAA	Cont'd 2nd yr. 3 yr. project		$215.0	$322.0

During FY 00, Jellett Biotek developed and optimized a rapid test for detecting paralytic shellfish poisoning (PSP) in shellfish samples from Kodiak Island (Project 00482). Funding in FY 01 will establish a beach-monitoring program for marine biotoxins in partnership with the Youth Area Watch (Project /210). The project will also adapt the rapid tests to detect toxic phytoplankton in water samples as an "early warning system" of toxic blooms. The relationship between toxic alga blooms and the contamination of shellfish will be researched. The data generated may identify beach areas that tend to be free of toxins over the year and help target areas for shellfish harvest or even aquaculture production.

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Proj.No.	Project Title	Proposer	Lead Agency	New or Cont'd	FY01 Expected	FY01 Request	Total Request FY01-02
01503	Orca Inlet Restoration	B. Henrichs/Native Village of Eyak	DOI	New 1st yr. 5 yr. project		$100.0	$250.0

Orca Inlet has become barren over the years. While it used to supply many of the subsistence resources to the residents of Eyak/Cordova, in recent years it has supplied very little. As a result of the processors dumping their fish waste and the earthquake, the inlet is dying. This project will develop a plan to restore Orca Inlet to what it was when we were children. [NOTE: This proposal was submitted as an idea; if recommended for funding, a Detailed Project Description and budget will need to be prepared.] [2nd NOTE: This project also requested $150,000 for FY 03, for FY 04, and for FY 05.]

01507	Nuchek Subsistence Camp	B. Henrichs/Native Village of Eyak	DOI	New 1st yr. 1 yr. project		$125.0	$125.0

As a result of the oil spill, the availability of subsistence foods has changed. The residents of the spill region are spending more time gathering traditional subsistence foods. A subsistence camp at Nuchek would allow the youth and elders to address these changes. Many of the people in the region trace their ancestry back to Nuchek. As Chugach Alaska Corporation has built a facility at Nuchek and holds annual spirit camps, this would be an appropriate location for this subsistence camp. [NOTE: This proposal was submitted as an idea; if recommended for funding, a Detailed Project Description and budget will need to be prepared.]

01508	Copper River Salmon Run Data Infrastructure	B. Henrichs/Native Village of Eyak	DOI	New 1st yr. 5 yr. project		$525.3	$2,861.4

This project will protect and enhance the salmon runs on the Copper River to replace the lost subsistence resources in Prince William Sound. The project will install modern automated run monitoring and data collection equipment on all significant Copper River tributaries and will develop a baseline data index to existing data systems over a five-year period (a test year with a five-year full data set over a full run cycle). The Copper River fishery is at risk because of a shift in resource use patterns. Harvest of salmon on or near spawning tributaries is increasing rapidly. This project will provide salmon count data systems on the Copper River that can distinguish between species, provide genetic separation, monitor tributaries, and transmit data in real time. [NOTE: This proposal was submitted as an idea; if recommended for funding, a Detailed Project Description and budget will need to be prepared.] [2nd NOTE: This project also requested funds for FY 03 ($893,100), FY 04 ($937,800), FY 05 ($984,700), and FY 06 ($1,033,900).]

01544	Lower Cook Inlet Salmon Ecology Study	P. McCollum/CRRC	ADFG	New 1st yr. 2 yr. project		$198.8	$397.6

This project will improve existing knowledge of the survival mechanisms of pink and sockeye salmon in southeastern lower Cook Inlet. Research will be conducted in order to more clearly define the survival mechanisms of juvenile pink and sockeye salmon smolts as they are out-migrating from the Port Graham and English Bay drainages on their way to the Gulf of Alaska. Out-migrating salmon smolts will be tracked, captured, and sampled for growth, stock origin (thermal marks, coded wire tags, scale samples), stomach contents (for prey species identification), and timing (days since release or out-migration) in order to gain a more detailed understanding of the key survival mechanisms in the early marine life of these juvenile salmon.

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Proj.No.	Project Title	Proposer	Lead Agency	New or Cont'd	FY01 Expected	FY01 Request	Total Request FY01-02
01573	Chenega Bay Stream Enhancement (O'Brien Creek)	P. Kompkoff/Chenega Bay IRA Council	USFS	New			

Several stream habitat constraints exist within the O'Brien Creek watershed. Habitat improvements would benefit the numerous fish species that utilize the habitat, including, pink salmon, chum salmon, coho salmon, sockeye salmon, Dolly Varden, and cutthroat trout. A self-sustaining and limited subsistence use fishery would be priceless for the community of Chenega Bay, as well as adding potential for promoting tourism. [NOTE: Budget not provided.]

01610	Kodiak Archipelago Youth Area Watch	P. Brown-Schwalenberg/CRRC	ADFG	Cont'd 2nd yr. 3 yr. project	$61.8	$91.7	$196.7

This project is a collaboration between the Chugach Regional Resources Commission and the Kodiak Island Borough School District to conduct a Youth Area Watch Program. In FY 00, students from Akhiok, Larsen Bay, Old Harbor, Port Lions, Kodiak City, and Karluk participated. In FY 01, the project will expand to two additional communities, Chiniak and Port Lions. Other activities in FY 01 will include: site teacher training in collaboration with the Kodiak College; construction of a web site for students, teachers, administrators, and project scientists to collaborate, share, and coordinate projects, as well as post data; purchase of additional equipment for monitoring activities; and participation by students, teachers, and scientists in the annual Science Camp held at Afognak.

01611	Alaska Peninsula Youth Area Watch	J. Lind/Chignik Lake Village Council	ADFG	New 1st yr. 2 yr. project		$81.4	$162.8

This project will expand the Youth Area Watch program, currently funded by the Trustee Council in Prince William Sound/lower Cook Inlet (Project /210) and the Kodiak region (Project /610), to the Alaska Peninsula. Students will participate in the following projects: (a) the Fishing Research Institute's annual monitoring projects in the Chignik Lake and Black Lake areas, (b) the Alaska Department of Fish and Game's weir site near the mouth of the Chignik River, and (c) if possible, a oceanographic and climatic monitoring program in cooperation with such programs as GLOBE (Global Learning and Observations to Benefit the Environment) or involvement with the Kodiak Archipelago oceanographic monitoring project. Students from the villages of Chignik Lake, Chignik Lagoon, Chignik Bay, Perryville, and Ivanoff Bay will participate.

Reduction of Marine Pollution						$184.0	$184.0
01498	Reinstating/Restoration of Oil as Petrochemical	J. Barlow/Power Alternative	ADEC	New 1st yr. 1 yr. project		$85.6	$85.6

This project will contribute to development of effective alternative energy systems applicable for power and/or propulsion in an effort to mitigate or terminate dependence on oil as fuel.

Proj.No.	Project Title	Proposer	Lead Agency	New or Cont'd	FY01 Expected	FY01 Request	Total Request FY01-02
01616	Sound Waste Management Plan: Boat Harbor Sewage System Phase	S. Cogswell/PWSEDC	ADEC	New 1st yr. 1 yr. project		$98.4	$98.4

Providing communities the capacity to manage and control pollutants will protect Prince William Sound species and will aid the recovering species affected by the oil spill. Boat harbor pump-out systems will provide seasonal safe sewage management for marine vessels. The systems can be easily activated in winter in case of a natural or man-made emergency. This system will protect the commercial shellfish operations around the sound, as well as the other fish and marine mammal populations recovering from the oil spill.

Habitat Improvement						$462.7	$596.2
01314	Homer Mariner Park Habitat Restoration	J. Cushing/City of Homer	ADNR	New 1st yr. 1 yr. project		$83.5	$83.5

Mariner Park is a highly stressed coastal salt marsh habitat that is experiencing a dramatic reduction in biodiveristy while incompatible and environmentally destructive human uses flourish. In 1999 Dames & Moore was contracted by the City of Homer, with funding from the Trustee Council, to conduct an environmental assessment and offer alternatives for habitat restoration. This project will follow through on the City-approved alternative for enhancing, preserving, and protecting Mariner Park's intertidal habitats through conservation easements, maintenance dredging of the lagoon entrance, and installation of interpretive structures.

01339	Prince William Sound Human Use and Wildlife Disturbance Model	L. Suring/USFS	USFS	Cont'd 4th yr. 4 yr. project		$24.1	$24.1

This project will fund two manuscripts for publication in professional journals. One manuscript will describe the use of GIS techniques to describe current human-use patterns in western Prince William Sound and to model potential changes in those use patterns as a result of additional development. A second manuscript will document use of the GIS generated maps of present and projected human-use patterns and their incorporation with GIS maps of the distribution of injured resources, as a basis for identifying areas where there may be conflicts between human use and wildlife. Identification of potential areas of conflict has allowed development of recommended management practices that may eliminate or minimize the negative effects of increasing human use. All injured species will be addressed in a general approach but specific management recommendations will be provided for harbor seal, pigeon guillemot, and cutthroat trout.

01399	Eastern Prince William Sound Human Use and Wildlife Disturbance Model	L. Suring/USFS	USFS	New 1st yr. 3 yr. project		$185.9	$265.9

This project is an expansion of the human-use and wildlife disturbance model developed for western Prince William Sound (Project /339). The project will use GIS techniques to describe human-use patterns in eastern Prince William Sound and to model potential changes in those patterns as a result of additional development. GIS generated maps of present and projected human-use patterns will be incorporated with GIS maps of the distribution of resources injured as a result of the oil spill in order to identify areas where there may be conflicts between human use and wildlife. Identification of potential areas of conflict will allow development of recommended management practices that may eliminate or minimize the negative effects of increasing human use. All injured wildlife resources and wildlife subsistence species will be addressed with specific management recommendations. [NOTE: This project also requested funds ($60,000) for FY 03.]

INDEX OF PROPOSALS BY RESOURCE CLUSTER -- FY 01

Proj.No.	Project Title	Proposer	Lead Agency	New or Cont'd	FY01 Expected	FY01 Request	Total Request FY01-02
01430	Youth Restoration Corps	K. Wolf/Youth Restoration Corps	USFS	New 1st yr. 2 yr. project		$53.5	$107.0

This project will provide funding support to the Youth Restoration Corps to continue its streambank restoration activities along the Kenai and other rivers in the spill area. The corps provides 16-19 year-old youth hands-on training in riparian ecosystems, and work experience using a variety of bio-restoration techniques. The program emphasizes the use of low cost, locally available, natural materials and implements a variety of techniques that can be used on sites that are accessible only by foot. By the conclusion of this project, 1600 lineal feet of riverbank along the sanctuary of the Kenai and Russian rivers and along the Kenai River at the Kenai River Center will have been restored and monitored to ensure stability.

01526	Beluga Slough Habitat Assessment and Restoration	J. Cushing/City of Homer	ADNR	New 1st yr. 1 yr. project		$115.7	$115.7

Beluga Slough is undergoing rapid degradation of its protective beach berm by destructive human use. The slough itself provides critical habitat for migrating shorebirds and waterfowl, as well as invertebrates and young fish of several species. This project will fund a comprehensive feasibility study that includes botanical, biological, and hydrological field studies coupled to community information. The study will be invaluable for developing a hands-on habitat restoration and enhancement plan to reverse the berm's destruction, which in turn will conserve the diversity and overall health of the slough's intertidal and subtidal fauna. The slough's sustained health will benefit migrating and wintering birds and promote recreationally compatible human use of the area.

Habitat Protection							
01126	Habitat Protection and Acquisition Support	C. Fries/ ADNR, K. Holbrook/USFS, G. Elison/DOI	ADNR	Cont'd	$96.6		

This project provides negotiation support to the Trustee Council in order to reach closure on habitat protection priorities. This support includes title reports, appraisals, on-site inspections, hazardous materials surveys, land surveys, timber cruises and reviews, and other services necessary for the successful completion of habitat protection negotiations. [NOTE: An FY 01 DPD and budget have not yet been prepared for this project.]

Ecosystem Synthesis/GEM Transition						$1,986.9	$2,937.7
01340	Toward Long-Term Oceanographic Monitoring of the Gulf of Alaska Ecosystem	T. Weingartner/UAF	ADFG	Cont'd 4th yr. 4 yr. project	$72.0	$66.8	$66.8

Interannual variations in the temperature and salinity of Gulf of Alaska shelf waters could significantly influence this ecosystem and, therefore, the recovery and restoration of organisms and services affected by the oil spill. This variability is best quantified from long time series such as that gathered over 30 years at a hydrographic station (GAK1) near Seward. This project will continue this time series to quantify variability on this shelf. It will also attempts to establish relationships between Seward sea level and shelf salinity and regional atmospheric pressure patterns and discharge variability. The data and the analyses will aid in designing a cost-effective ecosystem-monitoring program.

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Proj.No.	Project Title	Proposer	Lead Agency	New or Cont'd	FY01 Expected	FY01 Request	Total Request FY01-02
01360-BAA	The *Exxon Valdez* Oil Spill: Guidance for Future Research Activities	C. Elfring/Polar Research Board, NRC	NOAA	Cont'd 2nd yr. 3 yr. project	$131.5	$241.6	$331.7

The National Research Council's Polar Research Board and Board on Environmental Studies and Toxicology will appoint a special committee to review the scope, content, and structure of the Trustee Council's draft Science Program and draft Research and Monitoring Plan. To provide context for their review, the committee will become familiar with the relevant body of scientific knowledge, including that developed by activities sponsored by the Council. The committee will prepare an interim report on the Science Program, which will then help the Council in development of the Research and Monitoring Plan. The committee will then prepare a final report analyzing whether the Research and Monitoring Plan is complete, scientifically sound, and meets the expectations of the Council. Both reports will contain conclusions and recommendations intended to give guidance on the nature and scope of future research and monitoring activities in the northern Gulf of Alaska.

01384	Kachemak Bay Citizen Researcher: Development of a Community-Based Marine Monitoring	G. Seaman, R. Foster/ADFG	ADFG	New 1st yr. 2 yr. project		$110.9	$168.9

The Kachemak Bay National Estuarine Research Reserve will develop a prototype community-based citizen-monitoring program. The reserve will partner with the Center for Alaska Coastal Studies to pilot and evaluate two monitoring projects and disseminate the multi-level Citizen Researcher protocol and additional research education strategies to the EVOS region. Products will include (a) a *Tools Manual for Research Education* providing low and moderate cost strategies designed to link research and monitoring and their results with the community (intended for researchers and educators) and (b) a Train-the-Trainers manual and training for community educators within the spill region.

01385	Modeling Biodiversity in Kachemak Bay: A Proposal to Map Marine Nearshore Habitats at Nested Spatial Scales	C. Schoch/ADFG	ADFG	New 1st yr. 2 yr. project		$101.4	$181.9

This project will address the issue of determining rates and spatial extents of ecological effects due to changes in environmental conditions. These changes may be masked by large natural fluctuations of biological populations in space and time. Furthermore, no method exists to extrapolate data collected from local sites to large areas. This project will apply a method developed in Alaska (Cook Inlet and Shelikof Strait), the Olympic Coast National Marine Sanctuary, and Puget Sound which partitions complex shorelines into physically homogeneous segments to minimize the variability of the biological community caused by physical forces, to Kachemak Bay. Under this method, groups of similar segments are aggregated to extrapolate biological transect data collected from small areas to larger spatial scales. Data collected under this project will provide a basis for monitoring estuarine, interidal biodiversity over time, and will be an important technology and tool for the Gulf Ecosystem Monitoring (GEM) Program. [NOTE: This project also requested funds ($23,200) for FY 03.]

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Proj.No.	Project Title	Proposer	Lead Agency	New or Cont'd	FY01 Expected	FY01 Request	Total Request FY01-02
01391	Cook Inlet Information Management/Monitoring System	K. Zeiner/ADNR, J. Hock/ADEC	ADNR	Cont'd 3rd yr. 3 yr. project	$239.0	$239.0	$239.0

The Cook Inlet Information Management/Monitoring System (CIIMMS) will provide a wide range of users the opportunity to share and access valuable information and data about the Cook Inlet watershed and Cook Inlet-related activities. CIIMMS potential users include educators, scientists, students, researchers, resource managers, private organizations and individual citizens. CIIMMS will provide an interactive website for the Cook Inlet community to efficiently and effectively contribute, identify and access relevant information from a distributed network of providers. The CIIMMS website is at *http://www.dec.state.ak.us/ciimms*.

01397	Developing Mass-Balance Simulation Models as Fisheries Management Tools in Alaska	T. Okey/UBC	ADFG	New 1st yr. 1 yr. project		$137.5	$137.5

This project will develop a mass-balance simulation model to be used to better understand and manage important fisheries resources within Prince William Sound and adjacent marine areas. A mass-balance model of trophic flows in the sound was developed under Project /330. Although analyses using this model indicate intriguing effects of fisheries, the current model was not specifically structured to evaluate harvest strategies or policies that fisheries managers are currently considering. This project will (a) obtain and incorporate more detailed information on selected species and species groups from the Alaska Department of Fish and Game and other sources; (b) modify the existing model to provide output useful for fisheries management; (c) include environmental forcing components in the model to allow simulation of possible environmental, as well as anthropogenic, effects on species of interest; and (d) make the model and data available in the public domain on the Internet.

01536	Synthesis of Spill Damaged Resource Information into the Biological Conservation Database	K. Boggs, T. Gotthardt/UAA	ADFG	New 1st yr. 1 yr. project		$103.8	$103.8

This project will synthesize all information pertaining to conservation biology on resources injured by the oil spill into the Biological Conservation Database. The database is part of an effort by The Nature Conservancy, Association of Biodiversity Information, and the network of 86 Natural Heritage Programs throughout the Western Hemisphere to document information on terrestrial and nearshore endangered animals, plants, and ecosystems. It is the largest effort of its kind and contains a catalogue of all the vertebrate animals and vascular plants known from North America, plus many species of invertebrate animals and nonvascular plants. The incorporation of EVOS-funded resource information into the database will ensure linkage of this information to broader based conservation efforts. It will also provide a permanent method to store the information for tracking the status of the injured resources over time. The information will be transferred to resource managers, conservation groups, and other users through existing methods including web pages, presentations, and data requests.

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Proj.No.	Project Title	Proposer	Lead Agency	New or Cont'd	FY01 Expected	FY01 Request	Total Request FY01-02
01545-BAA	Long Term Environmental Monitoring Program	J. Devens/PWSRCAC	NOAA	New 1st yr.		$233.4	$473.7

This project will provide long term baseline measurements of hydrocarbon levels and sources at program sites within areas of the Prince William Sound, Kenai Peninsula, Kodiak, and Gulf of Alaska. The project's objective is to provide a more comprehensive program for the collection of baseline data in subtidal sediments and mussel tissue that can be used to determine impacts of oil sources on the ecosystem. This project will provide an improved link to recovery status and greater efficiency in hydrocarbon sampling and analysis that has been on going since 1993 under the auspices of the Prince William Sound Regional Citizens' Advisory Council.

01554-BAA	Development of Community-Based Monitoring Programs for EVOS Restoration and GEM	D. Sale/ECO Resource Group	NOAA	New 1st yr. 2 yr. project		$94.9	$207.3

This project will develop a framework for evaluating existing community-based monitoring efforts related to past and continuing restoration projects. A survey will be conducted of scientists, managers, and community members that have participated in the EVOS outreach and scientific studies to date. Three workshops will then be held to strengthen alliances, define problems and opportunities, develop guidelines for a community-based monitoring program, and suggest pilot studies to solidify community-based monitoring for the Gulf Ecosystem Monitoring (GEM) Program during FY 02. A report will document the results of the survey and workshops and suggest a strategy for community-based monitoring efforts in the spill area.

01561	Using Predatory Fish to Sample Forage Fish	D. Roseneau/USFWS	DOI	New 1st yr. 2 yr. project		$82.2	$198.7

This project is based on work recently completed under APEX (Project /163K). It is designed to develop a strong, cost-effective, community-based program to monitor long-term trends in capelin, sand lance, and other forage fish stocks in the northern Gulf of Alaska for the Gulf Ecosystem Monitoring (GEM) program. The project will establish a network of partnerships among biologists from the Alaska Maritime National Wildlife Refuge, the U.S. Geological Survey-Biological Resource Division, and the Alaska Department of Fish and Game; students and teachers in Youth Area Watch programs (Projects /210 and /610); community involvement facilitators and resource specialists (Project /052); and subsistence, sport, and commercial fishermen. It will directly involve residents of oil spill communities and Youth Area Watch students in data collection and monitoring tasks. [NOTE: This project also requested funds for FY 03 ($134,500) and FY 04 ($26,500).]

01577	Establishment of a Long-Term, Real-Time, Moored Oceanographic Monitoring Station in the Nearshore Region of the Gulf of Alaska	B. Stevens, P. Stabeno/NOAA	NOAA	New 1st yr. 2 yr. project		$136.1	$175.7

The Gulf of Alaska underwent large scale oceanographic changes after 1977, associated with major declines in the abundance of crab, shrimp, small pelagic fish, seabirds, and marine mammals and increases in salmon and groundfish. The mechanism of change is poorly understood because long-term, real-time oceanographic data were not systematically collected. Future regime shifts and effects of human impacts cannot be predicted or studied without an understanding of such changes. This project will address this problem by developing OSKAR: Ocean Station Kodiak Alaska Region, a moored instrument array on the continental shelf in the Gulf of Alaska, to collect long-term oceanographic data and make it available to scientists via the internet. [NOTE: This project also requested funds ($40,000) for FY 03.]

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Proj.No.	Project Title	Proposer	Lead Agency	New or Cont'd	FY01 Expected	FY01 Request	Total Request FY01-02
01583	Baseline Mapping and Geomorphology of Kenai Peninsula Shoreline	O. Smith/UAA	ADFG	New 1st yr. 2 yr. project		$385.8	$545.7

This project will create a GIS database of coastal geomorphology and mapping along the changeable shoreline of the Kenai Peninsula as a baseline for future monitoring in the Gulf Ecosystem Monitoring (GEM) program. Color photogrammetry digital maps will be prepared for 270 km of coast from the head of Kachemak Bay to Point Possession. Cross-shore profiles and surface sediment characteristics will be measured in the first and second years at 30 locations intended for future monitoring of shoreline change. Boundaries of nearshore ecosystems and environmental sensitivity classifications defined by others will be verified and presented with shoreline data via the Cook Inlet Information Management/Monitoring System (Project /391).

01595	Prototype for Community-Based Environmental Monitoring and Watershed Assessment	B. vanAppel/Cook Inlet Keeper	ADEC	New 1st yr. 2 yr. project		$53.5	$107.0

Cook Inlet Keeper was the first community-based organization in Alaska to start a federal and state-approved citizen-based water quality monitoring program. Now other groups in Cook Inlet communities are establishing similar monitoring programs, and requesting Keeper's help. Keeper is ready to unify Cook Inlet monitoring efforts by creating a Quality Assurance Management Plan which will ensure the consistency and credibility of citizen-based monitoring in the Cook Inlet watershed. Keeper will then explore ways to combine citizen monitoring with other tools to develop a watershed assessment prototype. Community-based watershed assessments will help Cook Inlet communities manage natural resources and plan development in ways that will benefit long-term conservation of injured resources and lost or reduced services.

01630	Planning for Long-Term Research and Monitoring Program	Restoration Office	ALL	Cont'd 2nd yr. 3 yr. project	$50.0		

In March 1999, the Trustee Council earmarked an estimated $115 million of Restoration Reserve funds for a long-term monitoring and research program in the spill area and adjacent northern Gulf of Alaska. Development of a draft plan for what is tentatively named the Gulf Ecosystem Monitoring (GEM) program was initiated in FY 99 and will continue through FY 02. Project 01630 will be accomplished through the combined efforts of the Restoration Office and Chief Scientist. [NOTE: An FY 01 DPD and budget have not yet been prepared for this project.]

Public Information/Science Mgt./Admin.						$504.3	$567.2
01100	Public Information, Science Management, and Administration	All Trustee Council Agencies	ALL	Cont'd	$1,500.0		

This project provides overall support for science management, public involvement, and administration of the restoration program. This includes funding for the Trustee Council staff working at the direction of the Executive Director, the scientific peer review process, public involvement efforts including the active participation of the 17-member Public Advisory Group (PAG), and Trustee agency participation in the restoration program. [NOTE: An FY 01 DPD and budget have not yet been prepared for this project.]

Proj.No.	Project Title	Proposer	Lead Agency	New or Cont'd	FY01 Expected	FY01 Request	Total Request FY01-02
01350	Alaska SeaLife Center Bench Fees	All Trustee Council Agencies	ADFG	Cont'd			

This project will pay for the use of labs and office space, as well as other direct expenses, at the Alaska SeaLife Center for those projects funded by the Trustee Council that have a SeaLife Center component. Nine FY 01 proposals include a SeaLife Center component: 01190/Pink Salmon Genome, 01327/Pigeon Guillemot Restoration, 01341/Harbor Seal Health and Diet, 01371/Harbor Seal Metabolism, 01404/Archival Tags for Tracking King Salmon, 01423/Population Change in Selected Nearshore Vertebrate Predators, 01441/Effects of Diet on Harbor Seal Lipid Recovery, 01532/Coupling of Oceanic and Nearshore:Search for Indicator Species, and 01558/New Technologies for Monitoring Harbor Seal Health. The bench fee cost for eight projects sponsored by the Trustee Council in FY 00 was $427,800 (including agency GA).

01494	User Guidelines and Environmental Education to Reduce Impacts of Recreation and Tourism on Injured Species in Prince William Sound	S. Leonard, C. Beck/AWRTA	ADNR	New 1st yr. 1 yr. project		$34.8	$34.8

This project will produce guidelines for responsible recreation in Prince William Sound. Guidelines will be based on solid scientific knowledge, and will include an explanation of the "whys" behind recommended behavior. The project also will present the user guidelines, and the stories behind the guidelines, in a more detailed and entertaining format. This work will help create exhibits and other information so visitors, school kids, and adults better understand the sound's natural environment, helping to reinforce and magnify the impact of the guidelines on recreation behavior. This project will use scientific data collected through the EVOS process and other research initiatives to change the behavior of tourists and recreationists to support the Trustee Council's restoration objectives.

01513	*Exxon Valdez* Oil Spill: The Continuing Legacy	J. Pfeiffenberger/Alaska SeaLife Center	ADFG	New 1st yr. 2 yr. project		$53.5	$69.6

This project will develop an interactive exhibit "*Exxon Valdez* Oil Spill: The Continuing Legacy" to inform the public about the current status of wildlife species injured by the spill. It will combine pieces of the existing exhibit "Legacy of an Oil Spill, 10 Years After" with new audio and visual components that will allow easy updating of information as the status of injured species changes over time. This exhibit will be a permanent installation at the Alaska SeaLife Center and will serve as a source of public dissemination to hundreds of thousands of visitors.

01535	EVOS Trustee Council Final Report	EVOS Restoration Office	ADFG	New 1st yr. 2 yr. project		$91.2	$138.0

This project will provide a final report for the activities of the Trustee Council, starting with the earliest damage assessment efforts and ending with the FY 02 Work Plan and disbursements of the final payment from Exxon. It will also include a complete history of the litigation leading to the civil settlement, which funds the Trustee Council. This project will increase public awareness and understanding of EVOS restoration activities, policies, and procedures. It will provide agencies and groups (facing a similar trustee situation) with a detailed history of the *Exxon Valdez* Oil Spill Restoration process, including highlights and pitfalls, so that others can benefit from lessons learned in the groundbreaking EVOS effort. This published history will include references and an index.

01549	Alaska Whaling Wall	Econo Painting, Anchorage	ADFG	New 1st yr. 1 yr. project		$151.8	$151.8

This project is designed to enhance public awareness of the plight of the A/B killer whale pod through a Wyland whale wall.

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Proj.No.	Project Title	Proposer	Lead Agency	New or Cont'd	FY01 Expected	FY01 Request	Total Request FY01-02
01566-BAA	"GEM News": An On-Line Marine Environmental Quality Report	B. Crampton/Intermountain Communications	NOAA	New 1st yr. 1 yr. project		$126.0	$126.0

GEM News, an e-mail newsletter, will provide information coordination and news dissemination that meets the information needs identified by the restoration process and the Gulf Ecosystem Monitoring (GEM) program. The Trustee Council has indicated they intend to provide leadership in coordinating agency programs and getting information about the Gulf of Alaska to the public. This project will create an e-mail and web newsletter for this purpose. Readership will include agency staff, tribes, commercial fishermen, school districts, local governments, researchers, media, and other interested parties.

01570	Book on EVOS Science for General Readers	S. Loshbaugh/Freelance Writing	ADFG	New 1st yr. 1 yr. project		$47.0	$47.0

This project will produce a publication-ready, book-length manuscript about the scientific and restoration projects following the oil spill. Written for the intelligent lay reader, it will emphasize the cutting-edge quality, adventurous experiences, ethical issues and lucid, non-technical explanations of findings. Based on interviews, symposium presentations, and review of the technical literature, it will include discussions of scientists' personal motivations, partnerships between western and indigenous knowledge systems, legal entanglements, technical advances, the interdisciplinary ecosystem approach, and the implications both process and findings hold for future research design, science in the public arena, and the environment.

Project Management

01250	Project Management	All Trustee Council Agencies	ALL	Cont'd	$320.0		

Project management represents those costs incurred by the state and federal Trustee agencies in fulfilling their responsibility to ensure that individual projects are managed consistent with the Memorandum of Agreement and Consent Decree, the Restoration Plan, and Trustee Council authorization. Tasks performed by project managers include coordinating activities between principal investigators and the Restoration Office, reviewing project expenditure activity, assisting in the development of project budgets, and tracking project reports. [NOTE: An FY 01 DPD and budget have not yet been prepared for this project.]

Restoration Reserve

01424	Restoration Reserve	All Trustee Council Agencies	ALL	Cont'd	$12,000.0		

In recognition of the fact that complete recovery from the oil spill may not occur for decades, the Trustee Council established the Restoration Reserve to hold funds to be used for restoration after the last payment is received from Exxon Corporation in September 2001. A $12 million deposit in FY 01 would be the eighth deposit into the reserve account and would bring the total in the account to $96 million. An additional $12 million deposit in FY 02 would provide a reserve of $108 million plus interest (roughly $170 million). On March 1, 1999 the Council approved a spending plan for the future use of these funds. [NOTE: An FY 01 DPD and budget have not yet been prepared for this project.]

INDEX OF PROPOSALS BY RESOURCE CLUSTER -- FY 01

Proj.No.	Project Title	Proposer	Lead Agency	New or Cont'd	FY01 Expected	FY01 Request	Total Request FY01-02

	All Proposals*	Work Plan Only**
Total Continuing Projects FY 01 Expected:	$17,601.6	$4,005.0
Total Continuing Projects FY 01 Request:	$18,836.1	$5,239.5
Total New & Continuing Projects FY 01 Request:	$26,638.9	$13,042.3
Total New & Continuing Projects FY 01-02 Request:	$50,276.3	$23,179.7

** 114 projects were received (48 continuing and 66 new). The costs included for the following projects are estimates, as budgets have not yet been prepared: 01250/Project Management ($320.0), 01350/ASLC Bench Fees, ($400.0), 01630/GEM Planning ($50.0), 01100/Public Information/Science Management/Administration ($1,500.0), 01126/Habitat Protection Support ($96.6), and 01424/Restoration Reserve ($12,000.0).*

*** The Work Plan Only column includes all projects except 01100/Public Information/Science Management/Administration ($1,500.0), 01126/Habitat Protection Support ($96.6), and 01424/Restoration Reserve ($12,000.0).*

MEMORANDUM

To: Stephen Braund, Pete Peterson, Jim Reynolds, Alan Springer, George Rose, Core Peer Reviewers

From: Phil Mundy, Science Coordinator, phil_mundy@oilspill.state.ak.us

Re: Conventions for peer review of FY 01 proposals

Date: April 20, 2000

The procedures for reviewing the FY 01 Detailed Project Description (DPD) proposals will be similar to prior years with two exceptions. The Chief Scientist, Bob Spies, will send a memo documenting standard procedure under separate cover.

1. Primary reviewers are asked to e-mail the electronic review form for their projects to me no later than the end of business on **May 19**. Please pay close attention to the section entitled "Overall assessment of this project and its relationship to the cluster and overall program." Secondary and tertiary reviewers are encouraged to do the same. Bob Spies will assign projects to reviewers and send electronic review sheets for each project to each reviewer.

2. The subject line of the e-mail to me should read, **FY 01 DPD 01nnn** where nnn is the project number. Please attach the review form as a word processor file, and put the form inside the e-mail as text as a back up.

The explanation of how the electronic reviews will be used is as follows. At the peer reviewers meeting the text of the primary reviewer's recommendation, and secondary and tertiary reviews if available, will be projected on a screen during the discussion. The text will be edited as the discussion of the DPD proceeds. At the end of the discussion, the text should reflect as much as possible the sense of the group. The Chief Scientist will refer to this text when he prepares his recommendation for the Trustee Council.

In the past, it was up to a reporter to listen to the comments and to prepare a synopsis, however this did not give the group access to the synopsis, nor did the reviewers have access to other than oral versions of other reviewer's comments. In this way, all participants can view the text as it evolves, and also have access to at least the text of the primary review.

Please note that you need to be generally familiar with the full suite of DPD's because you are asked to evaluate the proposals on which you are the primary reviewer in relation to the cluster (i.e. pink salmon) and overall restoration program. In addition to

the questions on the electronic review form, consider the following quesitons in relation to the clusters and the overall program:

Are some projects especially important because they help achieve a balanced, integrated, ecologically-oriented whole? See the GEM Program document at http://www.oilspill.state.ak.us/future/gem.htm

Are some projects worthwhile and technically appropriate but less important than others?

Are some projects most appropriately considered to be within the normal management responsibilities of the Trustee agencies?

Are some new projects more important than some ongoing projects?

Are there important gaps?

For continuing projects, take special note of the "Explanation of Changes in Continuing Projects" section of the DPD. This section is included with ongoing projects to simplify your work.

This is a new venture, so your cooperation is particularly vital to its success. Looking forward to working with you. If you have any questions, please contact me.

Cc: Bob Spies, Molly McCammon, Sandra Schubert, Andy Gunther

PHOTOGRAPHIC AND ACOUSTIC MONITORING OF KILLER WHALE IN PRINCE WILLIAM SOUND AND KENAI FJORDS, ALASKA (Submitted under BAA #52ABNF00039)

Project Number: 01012

Restoration Category: Monitoring, Research

Proposer: North Gulf Oceanic Society

Lead Trustee Agency: NOAA

Duration: 1 year

Cost: $69, 608

FY 2001

Geographic Area: Prince William Sound/Kenai Fjords, Alaska

Injured Resource/Service: Killer Whales

ABSTRACT

This project continues the monitoring of the damaged AB resident pod and the potentially endangered AT1 transient population as well other Prince William Sound/Kenai Fjords killer whales. Monitoring has occurred on a yearly basis since 1984. Methods include the photoidentfication of individual whales and acoustic monitoring with remote and vessel -based hydrophone systems. The project continues interpretation of current and previous data as well as collection of data additional to this project using other resources .

INTRODUCTION

This project is a continuation of the reduced annual killer whale monitoring program. Killer whales were monitored under EVOS Trustee Council funding in 1989, 1990, and 1991 (damage assessment) and in 1993 and 1995 (restoration monitoring). A reduced annual monitoring program was initiated in 1996. Analysis in this project will build on results of the comprehensive killer whale investigation initiated in FY95 and continued in FY96, FY97, and FY98. In FY99 and FY00 the monitoring program was augmented with matching funding to continue aspects of genetic and contaminant analysis and we expect this to be the case in 2001.

On March 31, 1989 AB pod was observed in oil sheens and six of the 36 pod members were missing. A total of 14 whales were lost from resident AB pod in the two years following the *Exxon Valdez* oil spill and there was no recruitment into the pod during those years. Since that time the social structure within AB pod has shown signs of deterioration. Maternal groups have traveled independently or with other pods, and pod members have not consistently traveled with closest relatives. Although 4 calves were recruited during the period 1992-1994, there were 5 additional mortalities in 1994. There has been a net increase of only two individuals since 1995. Due to two additional mortalities in 1999 and one recruited calf, the pod currently contains 24 individuals. The rate of mortality observed in this pod after the oil spill far exceeds that recorded for other resident pods observed in Prince William Sound over the past 13 years or for 19 pods in British Columbia over the past 20 years. Continued mortalities have prevented recovery.

Nine whales from the transient AT1 group have not been observed since 1989. Two additional AT1 whales have not been sighted for seven years. From genetic and photographic data from beached whales, two of these eleven whales are known to be dead. Although transient killer whale social structure is not fully understood, we are increasingly certain that the missing AT1 whales are dead. Statistical analysis also strongly suggests that they have either died or permanently emigrated from the area. Since there is no record of them in adjacent regions and they appear to have a limited range, it is most likely they are dead.

This project will continue the monitoring program necessary to map the changes (recovery or non-recovery) of Prince William Sound killer whales on a reduced annual basis. Behavioral observations and spatial and temporal data will be collected opportunistically in the course of photographic and acoustic monitoring, but there will be no new analysis of this data.

Fourteen years of systematic data collected under public and private funding have been placed in a specially designed GIS database currently housed at the U.S. Fish and Wildlife Service, Marine Mammals Management Division, Anchorage, Alaska. The database contains 763 records of encounters with killer whales in and near Prince William Sound and Kenai Fjords, Alaska. Among these are 557 encounters with resident whales and 206 encounters with transient-type whales. Analyses have found large-scale differences in spatial distribution patterns between resident and transient whales over time (Sheel et al in press). Changes in transient whale distributions have been examined in relation to changes harbor seal populations.

There is worldwide concern that specific PCB and dioxin congeners may have negative effects on reproduction in mammals. The recovery of killer whales in Prince William Sound and the long-term health of the population is dependent on unimpeded reproductive processes. Recently there is concern over contaminant levels and their relationship to the recent decline of southern resident killer whales in Puget Sound. During this study we have determined contaminant levels in both resident and transient killer whales, and found much higher levels in the transient population. Contaminants seem to passed from mother to offspring via lactation and levels follow consistent patterns within genealogies. Samples were obtained from individually identified living whales that can be

resampled to assess future changes in levels. The ability to sample and potentially resample specific known individuals and their known kin is a unique aspect of this project. Soon to be published results (Ylitalo et al, in prep.) raise concern that contaminants in transient whales could negatively impact reproduction. There has been no successful reproduction in the AT1 group since 1984. All chemical analysis of tissue and assistance in the interpretation of results has been provided without cost by the NMFS/NOAA Environmental Contaminant Laboratory, Seattle, Washington.

In FY97 we initiated a remote hydrophone and acoustic analysis monitoring element. Initial analysis and separation of pods has been completed and initial publication readied for submission. Currently we are operating a single hydrophone in Resurrection Bay powered by solar and wind power and using microwave transmission technology. It is currently operational and is effectively documenting presence and absence of killer whales during the winter months

We are still compiling our catalogue of acoustic dialects for resident pods. In 1999 we obtained much needed recordings of AJ, AD05 and AD16 pods. We are hopeful of obtaining additional recordings of AG, and AF pods to fill out pod specific repertoire data. (NGOS is using a 16 year database of killer whale recordings to establish killer whale dialects). The dialect of the AT1 transient group have been established and also related to behavior. (Saulitis et al, in prep) The dialect catalogue is used to document the presence of specific killer whale pods and groups recorded from the remote hydrophone. The long-term goal of this aspect of the project is to determine the extent of winter use by killer whales of these inshore waters and provide an additional, innovative, cost effective tool for monitoring killer whales year round. A hydrophone in Resurrection Bay has the added benefit of providing a continuos live feed to the Alaska Sea Life Center and Seward for the education of visitors and residents. In winter 1998/99, using in kind donations for opportunistic surveys, we were able to determine that AB pod used inner Resurrection Bay on a routine basis in all months from October to April. Other pods including AI, AN10, and AJ were also present at times. In winter 1999-2000 acoustic monitoring indicated whales were absent for most of the late fall/midwinter, however, AJ pod and AD05 pods returned in late winter.

NEED FOR THE PROJECT

A. Statement of Problem

The AB pod of killer whales was injured by the EVOS. Although it had shown signs of recovery from 1991 to 1993, mortalities in 1994/95 reduced the number of surviving AB pod whales to 22. Since 1995 there has been a net gain of only two individuals, and recovery has not occurred. At least 11 of the AT1 group of transient killer whales have apparently died since 1989 and there has been no recruitment within the group. This project will continue to monitor the status of AB pod and the AT1 group.

Sightability of killer whales in Prince William Sound has changed since the spill; particularly resident whales are now more frequently encountered in the Kenai Fjords region. Transient whales are seen less frequently in all areas.

Initial mortalities within AB pod following the spill have apparently led to additional mortalities due to loss of key individuals. Deterioration of AB pod social structure has led to a situation where one subpod now travels separately most of the time (the AB25 supod travels with AJ pod). The project will provide long-term insight into effects of changes in killer whale social structure due to unnatural mortalities.

Despite considerable effort, re-sightings of the AT1 group have declined and fewer individuals are seen when members of this transient group are located. We are confident that half of the original 22 members of this group are dead, or have emigrated to other

regions; although the later possibility is very unlikely. None of these whales have been identified in southeastern Alaska despite healthy pinneped populations in that region.

Although the rate of encounter with members of the AT1 transient group has declined, there has been no detectable increase in the sightings of other transient groups, suggesting that other transients are not increasing their use of the Sound as use of the region as AT1 group declines. Whether this overall decline in the encounters with transient (marine mammal eating) killer whales is related to oil spill effects or ecosystem changes is not clear, but we suspect a combination of the two factors. It is likely that the severe decline in harbor seals and Steller sea lions are important factors in the decline of transients in the region.

MtDNA and nuclear DNA analysis has demonstrated the genetic uniqueness of the AT1 group from residents as well as from other transients. Our nuclear DNA analysis is confirming those differences. The loss of the AT1 group could represent a serious overall loss of genetic diversity.

Some environmental contaminants such as PCBs and DDTs have been linked to reproductive dysfunction in mammals. We have discovered high levels of these contaminants in the transient (marine mammal eating) killer whales, including the non-reproducing AT1 group. When compared to other cetacean populations, these levels appear to be in a range that could result in reproductive dysfunction or other effects that might impede recovery of this group.

B. Rationale/Link to Restoration

Annual killer whale population monitoring will determine recovery status of AB pod and the AT1 transient group. The actual status of AB pod is considered non-recovering at this time. Long term patterns will only be clarified by continued monitoring. A low level annual monitoring program was initiated in FY96 and is proposed to continue in FY01. Since all pods and whales are not observed in every year, annual monitoring will prevent extensive data gaps and allow determination of recruitment and mortalities in a much shorter time frame. An annual killer whale behavioral database of spanning 16 years now exists in a GIS format. It is accompanied by a photographic database the includes identifications of all individuals from each frame of film for every encounter logged in the GIS system. This data system will be used to log all encounters and summarize effort. Because killer whales are a long-lived species with low reproductive and mortality rates, this monitoring must be consistent and long-term to be meaningful. Without the pre-spill monitoring of these whales damage assessment would have been impossible. This species is a key ecosystem element (a sentinel species) reflecting long-term environmental trends and is worthy of inclusion in a long-term monitoring program.

Continued development of acoustic monitoring and dialect is providing a cost-effective year- round extension of the monitoring program. We will continue to work cooperatively with the Alaska Sea Life Center, Kenai Fjords National Park, and See More Wildlife Systems in this endeavor. In addition we will be providing a two day workshop in May 2000 for tour and charter boat operators in the region to draft guidelines for behavior of their vessels in the presence of whales. Over 100,000 visitors used these operators to view wildlife in 1999 Our program will directly involve residents and visitors in the process of monitoring and restoration through connection with Alaska Sea Life Center and Kenai Fjords charter boat industry.

C. Location

This project is part of an ongoing killer whale research in Prince William Sound and the Kenai Fjords region, Alaska. The project involves the village of Chenega, Port San Juan Hatchery, the Alaska Sea Life Center, Kenai Fjords National Park, and other

residents and visitors to the region. It operates cooperatively with the Kenai Fjords and Prince William Sound tourboat industry.

COMMUNITY INVOLVEMENT AND TRADITIONAL ECOLOGICAL KNOWLEDGE

There is great public concern and interest for killer whales in Prince William Sound and in Kenai Fjords. The rapidly expanding tourboat industry depends on a healthy killer whale population to attract and satisfy visitors and residents. We have been closely involved with tourboat and recreational operators and residents by exchanging sighting information on a daily basis and providing a catalogue of individual whales to enhance enjoyment of whale observation. We have provided and continue to provide workshops detailing whale biology. We will conduct an intensive 2 day whale watching guideline workshop with tourboat operators and conduct onboard training for operations around marine mammals. We are involved in the Youth Area Watch program, taking young students out to participate in our research. Recent publication of an updated identification catalogue that includes details of our research results and viewing guidelines has further sparked interest in these whales. Killer whales now draw thousands of visitors to the region each year.

We continue to collect observations and stories from native residents and others that will provide background for interpretation of our findings and place the work in a historical and cultural perspective. Some of these legends and stories are used to place our research in a broader context in our recent publication: "Killer Whales of Southern Alaska".

PROJECT DESIGN

A. Objectives

1. Continue photographic monitoring program and determine status of resident killer whale pods, particularly AB pod. Examine the demographics of this pod in relation to other resident killer whale pods.

2. Monitor the AT1 group of transient killer whales to determine mortality or recruitment and indications of recovery to pre-spill distribution and abundance.

3. Monitor year round movements of resident and transient killer whales using remote hydrophone in Resurrection Bay.

4. Continued analysis of calls and separation of pod dialects necessary for interpretation of remote hydrophone data.

B. Methods

Killer Whale Photographic Monitoring

The goal of this aspect of the study is the photoidentification of each individual in each pod/group, that regularly uses the Sound, particularly AB pod and the AT1 group. Knowledge of the demographics of all regularly sighted pods and groups may be necessary to meet recovery definitions.

Thus, it is important that researchers maximize the time actually spent with killer whales (particularly AB pod and the AT1 group) to insure thorough identification of all individuals. Methods proposed to obtain photographic data necessary to meet monitoring objectives will be similar to those used by the NGOS in Prince William Sound/Kenai Fjords for the past sixteen consecutive years. Searches for whales will not be made on random transects, but based on current and historical sighting information. In addition whales will be located by listening for killer whale calls with a directional hydrophone (calls can be heard up to 10 miles away), or by responding to VHF radio calls from other vessels reporting sightings of whales. We have developed network of cooperating vessel owners and tourboat operators that regularly report whale sightings. In addition, requests for recent killer whale sightings will be made routinely on hailing Channel 16 VHF and working channel 77.

A vessel log and chart of the vessel track will kept for each day the research vessels operate. The elapsed time and distance traveled will be recorded and vessel track plotted. Record will be made of the time and location of all whale sightings and the weather and sea state noted at regular intervals.

Specifics of each encounter with killer whales will be recorded. The killer whale encounter data sheet developed in 1995 and specifically tailored to GIS data entry requirements will be used. Data recorded will include date, time, duration, and location of the encounter. Rolls of film exposed and the estimated number of whales photographed will also be recorded. A chart of the whales' trackline during the encounter will be completed and the distance traveled by the vessel with the whales will be calculated at the time of GIS input. General behavior of the whales (i.e. feeding, resting, traveling, socializing, milling) will be recorded by time and location.

Photographs for individual identification will be taken of the port side of each whale showing details of the dorsal fin and gray saddle patch. Photographs will be taken at no less than 1/1000 sec using Fuji Neopan 1600, a high speed black and white film,. A Nikon 8008 or N70 autofocus camera with internal motor drive and a 300 mm f4.5 autofocus lens will be used. When whales are encountered, researchers will systematically move from one subgroup (or individual) to the next keeping track of the whales photographed. If possible, individual whales will be photographed several times during each encounter to insure an adequate identification photograph. Whales will be followed until all whales are photographed or until weather and/or darkness makes photography impractical.

All photographic negatives will be examined under a Wild M5 stereomicroscope at 9.6 power. Identifiable individuals in each frame will be recorded. When identifications are not certain, they will not be included in the analysis. Unusual wounds or other injuries will be noted. Photographic negatives will be analyzed using a photographic database that spans sixteen years. Identities of each whale that appears in every frame of usable film will be recorded and stored in VAX computer system. Final analysis and assessment will follow Matkin et al. (1994).

The primary vessel used to secure identification photographs will be a 34' diesel inboard powered vessel capable of 20 knots, that can sleep 3-4 individuals (R.V. *Windwalker).* With sleeping accommodations and large fuel capacity, the R.V. *Windwalker* can remain in the field for extended periods photographing whales.. This vessel will operate a total of 50 days under funding from this project, with periods of operation in May as well as during the late July through early September period. From historical data these dates are judged to be to be the most likely time to encounter AB pod as well as many of the other resident pods that use the Prince William Sound and Kenai Fjords.

The report for the monitoring segment will include a summary of field effort, and summary of the pods and individuals encountered and a status report on AB pod and the AT1 group. Changes within AB pod will be examined with consideration for the age and sex structure of the pod and maternal groups within the pod. Frame by frame input of

identification data from exposed film into VAX and IBM PC computer systems will occur and identifications tabulated by pod and by individual. Copies of killer whale encounter data and vessel logs will be made available to the EVOS Trustee Council and/or lead agency and this data will be archived in the GIS database for potential future analysis. Frame by frame identification data will also be made available on disc. Copies of the GIS program and data base will also be made available by request to NGOS.

Acoustic Monitoring

Pod specific dialects for resident killer whales have been determined from tape recordings made by several researchers in the Prince William Sound area and in Southeast Alaska during the spring and summer months of the years 1984 to 1997. Construction of a catalogue of pod specific dialects is ongoing and dependent on recordings that will be made during the FY99 field season. Specific calls from Prince William Sound transient (AT1 group) killer whales also have been catalogued (Saulitis 1993, Saulitis in prep.). A total of 8456 calls have been screened and digitized using a Kay Elemetrics Real Time Sound Spectrum Analyzer, Model 5500. Samples from this screening process were digitized using the Canary acoustic spectrum analysis software (The Cornell Bioacoustics Workstation). Calls from different killer whale pods and transient groups are being categorized using the same method used by John Ford in British Columbia, Canada. This process involves arbitrary acoustical identification paired with a visual and statistical comparison of sound spectra. The results of this initial analysis were presented at the 12th Biennial Conference of Marine Mammalogy in Monaco (Yurk , H., Barrett-Lennard, L., Ford, J.K.B., Matkin, C.M., Saulitis, E., and K. Heise. 1998. Clans among resident killer whales (*Orcinus orca*) in Prince William Sound.)

Continued assessment of repertoires of Prince William Sound killer whales will occur in 2000. A publication detailing the linkage of dialect and genetic data Hopefully this will include the repertoires of the less frequently encountered pods from which we will attempt to obtain recordings from in FY99. In addition, recordings from the remote hydrophone obtained will be analyzed. The acoustic relationships between resident pods will be clarified and further compared with genetic results. While similarities of mitochondrial DNA sequences or overall genetic similarity describes relatedness of pods within the past 10,000 to 20,000 years, dialects reflect the more recent history of community divergence.

Because of movements of killer whales into the Kenai Fjords region during the early and late winter months in recent years, our remote hydrophone has operated in the Thumb Point area of Resurrection Bay . An anchored and encased cable runs from the transmitter on shore to the hydrophone at a depth of about 30 meters. A microwave transmission system will relays acoustic signals to Seward. The system is operated by a combination of wind and solar power coupled with storage batteries.

During summer months the hydrophone will be monitored from the R.V *Windwalker* as an aid in locating whales. During the summer and winter months in Kenai Fjords it will be monitored in Seward on a regular basis. Receivers are equipped with recording systems. The receiver will be monitored on a regular scheduled basis and a log of operation maintained. Whale calls will be recorded by M. Brittain in Seward and analyzed by Harald Yurk at the University of British Columbia.

Most equipment needed to complete the contracted field research will be provided by the North Gulf Oceanic Society, including binoculars, nets, directional hydrophones, photographic equipment and biopsy equipment. Remote hydrophone equipment and maintenance of that equipment will be provided by contract to See More Wildlife Systems. Apple Macintosh and IBM compatible computers owned by NGOS as well and the GIS system at U.F.W.S, Marine Mammal Management Division in Anchorage and VAX data

system at the Pacific Biological Station, Nanaimo will be used for data storage and analysis.

C. Contracts and Other Agency Assistance

The entire project will be completed under the auspices of the North Gulf Oceanic Society(NGOS) under permits held by NGOS. NGOS will provide a technician to enter data collected in 2001 into the GIS database housed at U.S.F.W.S. in Anchorage using the a preexisting menu interface. Final photographic analysis will be completed by Graeme Ellis at the Pacific Biological Station in Nanaimo, B.C. Acoustic analysis will be conducted by Harold Yurk at the University of British Columbia. Monitoring the remote hydrophone system will be a cooperative project with Mike Brittian and the Alaska Sea Life Center. Contracts for vessel leases will be issued by the North Gulf Oceanic Society or the Society will use its own vessel for the project.

SCHEDULE

A. Measurable Project Tasks for FY2001

Oct 1-30 2000: Summarize monitoring fieldwork for FY2000. Input data into GIS system.

Oct. 1 - Dec. 31, 2000: Analysis of photographs from 2000 fieldwork.

Oct. 1-Dec. 31, 2000: Acoustic analysis of killer whale calls from previous year.

Oct. 1, 2000- May 1 2001: Publication of paper on population dynamics of killer whale pods since EVOS.

Oct. 1 2000- March 30 2001: Continue winter recordings in Seward from remote hydrophone.

May -Sept. 2001: Killer whale monitoring emphasis field work. Monitor hydrophone from research vessel as possible.

The R.V.*Windwalker* will operate for 50+ selected days in May, July, August and September. The primary function of this vessel will be killer whale photoidentification monitoring. Time periods is selected are based on historical periods of high encounter rate with AB pod, other resident pods and the AT1 transient group and sighting reports from tourboat operators. Operational expense for additional field days will be funded by other monies.

B. Project Milestones and Endpoints

The FY2001 killer whale project will continue the reduced annual photoidentification monitoring program and the acoustic monitoring program initiated in FY1997. Future fieldwork will involve population monitoring and acoustic monitoring and regular publications of results.

C. Completion Date

Killer whale monitoring and remote hydrophone projects are completed on an annual basis, however they are envisioned as ongoing elements of the GEM program.

PUBLICATIONS AND REPORTS

Matkin, C.O., G.E. Ellis, and E. Saulitis. Populations of killer whales in Prince William Sound eleven years after the *Exxon Valdez* oil spill. To be submitted to Marine Mammal Science.

Saulitis, E.S., F. Fay, and C.O. Matkin. The acoustic behavior of the AT1 transient group in Prince William Sound, Alaska. To be submitted to Animal Behavior.

PROFESSIONAL CONFERENCES

Bienniel Conference of the Biology of Marine Mammals, Vancouver, B.C. Canada November 2001

COORDINATION AND INTEGRATION OF RESTORATION EFFORT

The monitoring of killer whales and analysis of historic and current data on killer whale behavior is part of an program to investigate killer whale recovery and the interactions of killer whales and harbor seals. It will be integrated with the harbor seal trophic studies (Kathy Frost, project leader). In FY2001 this project will rely on approximately $9,000 in matching funds from other sources. As a non-profit research institution familiar with private funding sources and cooperative programs, NGOS can work with the Trustee Council cooperation to maximize potential for other funding in the future.

PROPOSED PRINCIPAL INVESTIGATOR:

Craig O. Matkin
North Gulf Oceanic Society
P.O. Box 15244, Homer, Alaska 99603
Phone/Fax (907) 235-6590
COMATKIN@xyz.net

KEY PERSONNEL

Craig Matkin (M.S. University of Alaska), is the project leader. Matkin will be responsible for supervising the completion of all fieldwork and insuring successful operation of boats and equipment. He will be the operator of the R.V. *Windwalker* and supervise directly all work completed from that platform. He will direct data analysis and assemble all material for annual and comprehensive reports and be responsible for completion and submission of these reports. He will represent this project and present the work to the EVOS Trustee Council.

Matkin has studied killer whales in Prince William Sound since 1977. He initiated systematic killer whale photoidentification in Prince William Sound, and is a founding

member of NGOS. In 1994 he completed the "The Biology and Management of Killer Whales in Alaska" for the U.S. Marine Mammal Commission. Other pertinent publications include EVOS killer damage assessment results ("The Status of Killer Whales in Prince William Sound 1984-1992", Craig O. Matkin, G. M. Ellis, M.E. Dahlheim, and J. Zeh in T.R. Loughlin. ed. Marine Mammals and the *Exxon Valdez* and Matkin and C.O., Matkin, D.R., Ellis, G.M. , Saulitis, E. and McSweeney, D. 1997. Movements of resident killer whales in Southeastern Alaska and Prince William Sound, Alaska. Marine Mammal Science, 13(3):469-475. Mr. Matkin also teaches at the University of Alaska, Lower Kenai Penninsula Campus.

Eva L. Saulitis (M.S. University of Alaska) , a director of NGOS, has conducted fieldwork on killer whales in Prince William Sound each season since 1987. She is a principal field biologist for the monitoring segment of this project (photoidentification) and will co-operate the research vessel *Whale 2* aid in maintanance of the remote hydrophone. She will make ready and maintain all necessary equipment, complete photoidentification work and all logs and data sheets as required. She will provide entry of field data into the GIS system.

Saulitis completed her MS thesis "The Behavior and Vocalizations of the AT Group of Killer Whales in Prince William Sound, Alaska." in 1993. She coauthored the "Biology and Management of Killer Whales in Alaska" for the U.S. Marine Mammal Commission and "Killer Whales" for the EVOS Restoration notebook series and authored Saulitis, E.L., C.O. Matkin, K. Heise, L. Barrett Lennard, and G.M. Ellis. 2000. *Foraging strategies* of sympatric killer whale (*Orcinus orca*) populations in Prince William Sound, Alaska. Marine Mammal Science16(1):94-109. She has done extensive analysis of killer whale calls and has operated research vessels in Prince William Sound since 1988.

Graeme Ellis has participated in killer whale photoidentification studies in Canada and Alaska for 24 years. Ellis will do all final identifications of individual killer whales. He will examine all negatives on a repetitive frame by frame basis and supervise the input of the final identification data into the VAX computer system. With Matkin he will update all life history information on individual whales and provide positive identifications from photographs of each whale biopsied.

Currently Ellis directs whale identification work at the Pacific Biological Station in Nanaimo, British Columbia and has done final identifications on Prince William Sound killer whale photographic negatives since 1983. He has more experience than any other individual identifying Prince William Sound killer whales from photographic negatives and his accuracy has been certified by repeated testing.

Harold Jurk Harald is a Phd. candidated at the University of British Columbia and specalizing in cetacean acoustics. He is conducting analysis and interpretation of killer whale acoustic data collected over the past 13 years in Prince William Sound/Kenai Fjords from vessels and from remote hydrophones.

LITERATURE CITED

Matkin, C.O., G. Ellis, M. Dahlheim, and J. Zeh. 1994. Status of killer whales in Prince William Sound, 1984-1992. in T. Loughlin, ed. Marine Mammals and the *Exxon Valdez.* Academic Press, San Diego, CA.

Saulitis, E. 1993. The behavior and vocalizations of the AT1 group of transient killer whales in Prince William Sound, Alaska. MSC. Thesis, Institiute of Marine Science, University of Alaska. Fairbanks.

Ford, J.K.B. 1991. "Vocal traditions among resident killer whales (Orcinus orca) in coastal waters of British Columbia." Can, J. Zool. 69:1454-1483

Jurk , H., Barrett-Lennard, L., Ford, J.K.B., Matkin, C.M., Saulitis, E., and K. Heise 1998. Clans among resident killer whales (Orcinus orca) in Prince William Sound. Oral presentation at the World Marine Mammal Conference, Monaco.

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

Budget Category:	Authorized FY2000	Proposed FY2001
Personnel		$28,990.0
Travel		$1,700.0
Contractual		$25,000.0
Commodities		$7,590.0
Equipment		$0.0
Subtotal	$0.0	$63,280.0
Indirect		$6,328.0
Project Total	$77,479.0	$69,608.0
Full-time Equivalents (FTE)		8.5
	Dollar amounts are shown in thousands of dollars.	
Other Resources		$9,500.0

LONG RANGE FUNDING REQUIREMENTS					
	Estimated FY2002	Estimated FY2003	Estimated FY2004	Estimated	
	$72,000.0	$75,000.0	$80,000.0		

Comments:

2001

Prepared: April 2000

Project Number: 00112
Project Title: Killer Whale Monitoring
Name: North Gulf Oceanic Society

FORM 4A
Non-Trustee
SUMMARY

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

Personnel Costs:			Months	Monthly		Proposed
Name	Position Description		Budgeted	Costs	Overtime	FY 1998
Craig O. Matkin	P.I. Field Biologist		3.0	4400.0		13,200.0
Graeme Ellis	Photo Analyst		1.0	3500.0		3,500.0
Eva Saulitis	Field Biologist		2.5	2800.0		7,000.0
	Field Assistant		0.7	1500.0		1,050.0
	Data entry technician		0.3	2800.0		840.0
	Acoustic Analyst		1.0	3400.0		3,400.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
	Subtotal		8.5	18400.0	0.0	
					Personnel Total	$28,990.0

Travel Costs:		Ticket	Round	Total	Daily	Proposed
Description		Price	Trips	Days	Per Diem	FY 1998
Homer/Vancouver (RT) CONFERENCE		650.0	1	5	90.0	1,100.0
Homer/AnchorageRT		150.0	2	3	100.0	600.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
					Travel Total	$1,700.0

2001

Prepared:

Project Number: 00112
Project Title: Killer Whale Monitorng
Name: North Gulf Oceanic Society

FORM 4B
Personnel
& Travel
DETAIL

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

Contractual Costs:	Proposed FY 1998
Description	
Sea More Wildlife	
Hydrophone/ equipment lease/ maintenance	4,000.0
34' research vessel (Windwalker) 50 days@ 420/day	21,000.0
Contractual Total	$25,000.0

Commodities Costs:	Proposed FY 1998
Description	
Phone	280.0
Field Food ($16/person/day)	1,800.0
E-mail/Computer	120.0
Fuel	3,000.0
Film/Processing/Printing	1,600.0
Field Supplies	320.0
Shipping	470.0
Commodities Total	$7,590.0

2001

Prepared:

Project Number: 00112
Project Title: Killer Whale Monitoring
Name: North Gulf Oceanic Society

FORM 4B
Contractual & Commodities DETAIL

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

New Equipment Purchases: Description	Number of Units	Unit Price	Proposed FY 1998
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
Those purchases associated with replacement equipment should be indicated by placement of an R.		**New Equipment Total**	$0.0

Existing Equipment Usage: Description	Number of Units	
	1	
	1	

2000

Prepared: 7/8/99

Project Number: 00012
Project Title: Killer Whale Monitoring
Name: North Gulf Oceanic Society

FORM 4B
Equipment
DETAIL

Project Title: Community Involvement and Planning for GEM

Project Number:	01052
Restoration Category:	General Restoration
Proposer:	Chugach Regional Resources Commission
Lead Trustee Agency:	Alaska Department of Fish & Game
Cooperating Agencies:	None
Duration:	2 Years
Cost FY01:	240.7
Cost FY02:	250.0 (implementation of pilot projects)
Geographic Area:	Spill Area Wide
Injured Resource/Service:	Subsistence

ABSTRACT

This project will increase community involvement in the restoration process. The Spill Area Wide Community Involvement Coordinator's work will continue through a contract with the Chugach Regional Resources Commission (CRRC). Through direct communication with a network of local facilitators, the Spill Area Wide Community Involvement Coordinator will continue to actively involve local residents in the restoration program (local facilitators are located in Tatitlek, Chenega Bay, Port Graham, Nanwalek, Cordova, Seward, Seldovia, Valdez, Kodiak, and the Alaska Peninsula).

Additionally, the project will work with staff to address the future of community involvement with regard to the Gulf Ecosystem Monitoring plan. Specifically, project staff will include Hugh Short, Spill Area Wide Community Involvement Coordinator, Henry Huntington, TEK Specialist, Ted Cooney, contract Science Coordinator, 10 Community Facilitators from throughout the spill area, and 3-4 other contract scientists to serve on the Monitoring Committee. The Monitoring Committee, made up of the above mentioned staff, will focus on three objectives: 1) designing a community based monitoring program; 2) identifying specific monitoring activities; and 3) selecting monitoring activities for pilot projects in FY 02.

Scientists invited to advise the development of a community-based monitoring program will make presentations about the importance of citizen monitoring in the context of GEM, will discuss and demonstrate technologies available for data collection, and will introduce modern options for the archival and web-based distribution of information obtained by the program. These individuals have been asked to participate because of their familiarity with the northern Gulf coastal marine ecosystem, their past experience with other monitoring and data logging efforts, and their desire to bring modern net-working power to the process of data gathering, analysis and display. Two of our advisors have lived in Alaska coastal communities and bring that experience to the table as well.

INTRODUCTION

In 1999, the EVOS Trustee Council declared its intent to undertake a program of long-term monitoring and research in the northern Gulf of Alaska. Known as the Gulf Ecosystem Monitoring (GEM) program, the effort will provide sustained, inflation-proofed funding for studies designed to

"foster a healthy and biologically diverse marine ecosystem in the northern Gulf of Alaska through greater understanding of how its productivity is influenced by natural changes and human activities." Central to the success of this program will be studies designed to track the condition of the different coastal environments in the spill affected region each year, and the status of selected resources of high value to subsistence, sport and commercial users.

This proposal is designed specifically to create a long-term community-based marine monitoring program meeting the needs of coastal communities while also providing critical information to GEM. We intend to bring together members of the informed public, the fishing community, industry, the agencies, professional scientists, and the tribes to provide an inclusive planning structure for this purpose. Candidate programs emerging from our planning effort will exhibit a blend of modern measurement science and traditional observation.

Ten local facilitators were hired in FY00 through cooperative agreements with the village councils of Tatitlek, Chenega Bay, Port Graham, Nanwalek, Eyak (Cordova), Ouzinkie, Qutekcak (Seward), Valdez, and the Chignik Lake Tribal Council to involve communities in GEM planning and research and monitoring projects. Hugh Short, the full-time Spill Area Wide Community Involvement Coordinator, will continue his employment with CRRC to coordinate the project out of the Restoration office, to accomplish the following tasks:

1. Increase involvement of community members and local tribal traditional natural resource programs throughout the spill region in restoration projects. This community process will require a Community Facilitator, whose duties are described later.

2. Serve as contact point for the Community Facilitator and Natural Resource Specialist in each of ten participating communities (Tatitlek, Chenega Bay, Port Graham, Nanwalek, Cordova, Seward, Seldovia, Valdez, Ouzinkie, and Chignik Lake). The tasks for the Spill Area Wide Community Involvement Coordinator in relation to the Community Facilitators will be to:

    a. Once a month, fax a brief activities report to the Community Facilitators and Tribal Natural Resource Management programs to keep them informed of Trustee Council actions, Restoration Office activities, upcoming events, new research finding, and all other pertinent information. The report could take the form of bullets or a newsletter with contact information on each issue.

    b. Coordinate the participation of the Community Facilitators in the annual restoration workshop, serve as the lead coordinator for the Monitoring Committee planning effort.

3. Provide input at the Restoration Work Force meetings.

4. Assist in organizing Trustee Council/Restoration Office community meetings held in conjunction with the public input process of the GEM. This may include arranging presentations in specific communities.

5. Attend (in person or by teleconference) all Trustee Council meetings and report to the Community Facilitators on actions taken.

6. Work with the Science Coordinator, Communications Specialist, and TEK Specialist to get research results to communities.

7. Coordinate the provision of technical assistance to the villages by the Trustee Council staff and agency personnel to develop project proposals.

8. Prepare quarterly project status reports and ensure all annual/final reports are submitted on a timely basis by the affected communities.

The specific tasks the Community Facilitators are expected to undertake include the following:

1. Inform the Spill Area Wide Coordinator of community issues, concerns, or questions regarding restoration. These issues could be identified through community meetings conducted by the Community Facilitators, or through other means, and could include ideas for new projects.

2. Work with the Spill Area Wide Coordinator in coordinating Trustee Council community meetings as well as community visits from project PIs. The Community Facilitator will also serve as the initial contact in the village for any project conducted in the traditional use areas of the communities.

3. Work closely with the village council's tribal traditional natural resource program to coordinate all activities that have a direct impact the local community resources and any research projects that will complement the tribe's traditional knowledge of the traditional use areas.

4. Disseminate to community members the monthly update from the Spill Area Wide Coordinator.

5. All Community Facilitators shall attend the annual Restoration Workshop and associated meetings, including certain scientific review sessions. Monitoring Committee communities will be required to attend the Committee Workshops and participate in teleconferences.

6. Provide a quarterly report to the Spill Area Wide Coordinator identifying community issues, concerns, or questions regarding restoration. These issues could be identified through community meetings or other means and should include relevant issues discussed at village council meetings. Ideas for new projects should also be included.

7. Five Community Facilitators will serve on the Monitoring Committee (see further in proposal).

The specific tasks for the Traditional Ecological Knowledge Specialist will be to:

1. Assist in the preparation of the Monitoring Committee workshops. This includes all aspects of planning.

2. Participate in the Monitoring Committee (see below), especially exploring opportunities for incorporating community expertise and TEK into the monitoring program as a whole as well as specific monitoring activities.

3. Assist other PIs as requested in incorporating TEK into their proposals and research as appropriate and working with Tribal natural resource programs.

4. Assist spill area communities and the Community Facilitators as requested in developing methods for documenting TEK and otherwise incorporating it into research and monitoring programs related to the Restoration Program and GEM.

5. Work with the Spill Area Wide Coordinator to coordinate an annual review by Community Facilitators and village councils of restoration project proposals involving indigenous knowledge, and develop recommendations for the Executive Director.

Three or four Scientific Advisors will be selected to serve on the Monitoring Committee (see below). The specific tasks for the Scientific Advisors will be to:

1. Participate in the Monitoring Committee and its meetings.

2. Develop the conceptual outline for a community-based monitoring program.

3. Present technologies and options for a monitoring program to the Monitoring Committee, Community Facilitators, and others, to help in the design of the monitoring program.

4. Help determine appropriate parameters to be monitored and develop appropriate methods for doing so including an extensive training program.

5. Help coordinate community-based monitoring with other research and monitoring activities planned under GEM. Help develop additional monitoring ideas outside of GEM to meet community interests in resource stewardship

6. Scientists invited to advise the development of a community-based monitoring program will make presentations about the importance of citizen monitoring in the context of GEM, will discuss and demonstrate technologies available for data collection, and will introduce modern options for the archival and web-based distribution of information obtained by the program. These individuals have been asked to participate because of their familiarity with the northern Gulf coastal marine ecosystem, their past experience with other monitoring and data logging efforts, and their desire to bring modern net-working power to the process of data gathering, analysis and display. Two of our advisors have lived in Alaska coastal communities and bring that experience to the table as well.

7. One Scientific Advisor (the Science Coordinator) will take the lead in this work, and will also be responsible for serving as the liaison with other scientists as appropriate to get input in the design and implementation of the program.

NEED FOR THE PROJECT

A. Statement of Problem

The *Exxon Valdez* oil spill caused severe disruption of the lives of many people living in the spill impacted area. The spill also caused residents of the area to be concerned about the safety of their wild food

sources, and the integrity of the surrounding natural environment. While scientific studies aimed at restoring the resources and services damaged by the oil spill have occurred throughout the spill area, most of the researcher work for agencies or institutions based in Anchorage, Fairbanks, or outside Alaska. Residents have voiced concern over a lack of involvement by spill area communities in the restoration efforts, and incomplete communication to spill area inhabitants of study proposals and results. While the past several years have facilitated an increasing amount of communication between the scientists and the communities, there still exists a void for meaningful involvement in the restoration process by the community members at the grass roots level. At the same time, researchers have recognized that local residents have traditional knowledge that could help them answer questions they have not been able to answer through conventional scientific means.

In addition, communities in the spill area are very concerned about the long-term stewardship and management of lands and resources important to the subsistence way of life. These communities have been developing their tribal natural resource management programs at the local level to ensure long term health of injured oil spill species, important subsistence resources, and responsible management of lands in proximity to their villages and traditional use area. The Gulf Ecosystem Monitoring Plan is also very concerned with the ecosystem and coordination between the communities and the Trustee Council regarding community-based monitoring and will be necessary to effectively monitor and document change in the Gulf of Alaska ecosystem. The integration of tribal natural resource programs, citizen monitoring, and GEM must take place.

Marine bird, fish and mammal stocks are believed to be profoundly influenced by the marine environment that hosts them and the food-webs that support their production. Variations in annual production and species composition associated with cycles and shifts in ocean climate have been documented. To meet the mission of GEM, the physical condition of the northern Gulf of Alaska and selected target populations must be carefully tracked through time. The emerging "historical records" provide important insight about how the ecosystem responds to environmental fluctuations on scales from weeks and months to decades and ideally centuries. GEM monitoring will be strengthened significantly by the addition of coastal observations in the many sub-environments stretching from Prince William Sound to the Alaska Peninsula. There is a critical need to establish a long-term observational program in coastal waters because the edge-zone of the northern Gulf is used by many sport, subsistence and commercial resources as reproductive and nursery habitat.

B. Rationale

This project furthers the Trustee Council's goals of facilitating the involvement of spill area residents and resource users in the restoration process. It also reaffirms the Trustee Council's dedication to the involvement of people living in the oil spill affected areas in the restoration process. In addition, people living in the spill area have detailed knowledge about the condition of resources, which can significantly add to data collected as part of scientific studies, and enhance the success of restoration efforts. Local people have expressed a desire to be involved in all aspects of restoration projects, and a willingness to work with researchers. GEM must integrate local resource management plans and programs into the overall program to effectively monitor environmental conditions and indicator species. This project would open up the process and bring everyone to the table.

At present, the only systematic and year-round monitoring program of ocean conditions in the northern Gulf of Alaska is maintained in outer Resurrection Bay by the Institute of Marine Science, University of

Alaska Fairbanks (GAK-1 station) and in Cook Inlet by Cook Inlet Keepers. Also, some seasonal records of temperature and plankton volumes have been made over the years by aquaculture corporations in Prince William Sound, lower Cook Inlet, and at Kodiak. These observations, coupled with those undertaken by several private organizations in the region provide evidence that citizen monitors can be important contributors to long-term programs, but also demonstrate that to be effective, these efforts must be standardized and coordinated over time. It is our belief that resource managers charged with sustaining important coastal resources will benefit from any new information arising from serious coastal monitoring programs.

C. Location

This project will be spill area wide. All communities will have a Community Facilitator within their community, with the exception of the Alaska Peninsula and Kodiak, which will be covered by a region-wide Community Facilitator. Five communities will be pilot project communities. These include Tatitlek, Eyak, Port Graham, Nanwalek, and Ouzinkie. Valdez, Chenega Bay, Alaska Peninsula, Qutekcak, and Seldovia will continue to perform their normal Community Facilitator duties. Other regional and community organizations will be encouraged to participate and mold the parameters for the monitoring program.

The project's benefits will be realized both in the communities involved and in the restoration of the injured resources. Better communication among the Trustee Council staff, researchers, and residents of the communities impacted by the spill should improve the effectiveness of restoration efforts.

COMMUNITY INVOLVEMENT

The core of this project is community involvement.

PROJECT DESIGN

A. Objectives

The objectives of the project will be to:

1. Increase the meaningful involvement of spill area communities in the restoration efforts of the Trustee Council;

2. Improve the communication of findings and results of restoration efforts to spill area village councils and inhabitants and the appropriate regional organizations. It is expected that by doing so, this project will increase the effectiveness of overall restoration efforts; and

3. Develop a means by which western science and traditional ecological knowledge and wisdom can be compiled and utilized in a cooperative manner with the intent of furthering the restoration process in a way that is sensitive to the needs of the affected communities.

4. Design a community-based monitoring program. A community-based or citizen monitoring program requires mechanisms for (a) identifying and selecting monitoring activities, (b) developing appropriate methods for the various parameters to be monitored, (c) training monitors and ensuring the quality of data collected, (d) submitting, managing, archiving, and accessing the data generated, (e) providing results and other feedback to monitors, and (f) evaluating the approach and results of the monitoring effort on a regular basis. In FY01, this project seeks to

develop a conceptual model for the structure, scope, scientific guidance, community involvement, cost, funding, and other aspects of establishing and maintaining a community-monitoring program.

5. Identify specific monitoring activities. There are many factors that can be monitored in the northern Gulf of Alaska. We will develop as comprehensive a list as possible of the parameters that can be monitored, the rationale for monitoring them, the feasibility (including cost) of monitoring them as part of a community-based program, and other factors that will help decide what will actually be monitored. The list will identify (a) those activities that comprise a minimum monitoring effort, (b) those activities that relate specifically to the Gulf Ecosystem Monitoring Program (GEM), and (c) other activities that are important to the communities but not funded by EVOS.

6. Select monitoring activities for pilot projects in FY02. After designing the program and identifying what can be monitored, we will select certain monitoring activities to carry out in FY02 (i.e., to include in our proposal for FY02) to test the system. This test will help us evaluate and refine our overall program and aid in the selection of long-term monitoring activities under GEM as well as under other funding programs.

B. Methods

The Spill Area-Wide Coordinator hired by Chugach Regional Resources Commission, the local Community Facilitators, in close coordination with the Tribal Natural Resource Programs, will implement the project. Additionally, outreach to all parties involved in community monitoring programs throughout the spill area will be invited and encouraged to participate in the process of developing the parameters of the program.

The objectives will be achieved using the following methods:

1. A contract will be renewed by ADF&G Subsistence Division to CRRC for overall coordination of the Community Facilitators and Spill Area-Wide Coordinator. The contractor will be expected to arrange for the hiring (where applicable) and coordination of local facilitators in the communities of Chenega Bay, Tatitlek, Port Graham, Nanwalek, Cordova, Seward, Valdez, Seldovia, and regional coordinators for the Kodiak Island and Alaska Peninsula regions.

2. Working with the Community Facilitators, the Spill Area-Wide Coordinator will identify those projects funded by the Trustee Council for which a community outreach component would be appropriate, and will work with the principal investigators of those projects to design and implement community outreach components. The goal of community outreach will be to continue the partnership begun under 95052 between the people of the oil spill region and scientific researchers. Outreach will include communication of traditional knowledge and local interests, as well as communication of research proposals and study results. Outreach and community interest in the Gulf Ecosystem Monitoring program (GEM) will be a large effort of the Spill Area Wide Coordinator.

3. Design a community-based monitoring program. To meet our first objective, we will begin with a scoping meeting in the fall of 2000. Tribal Natural Resource Management Plans developed in FY00 in the Community Involvement Project and in their programs will be used to determine the areas of

interest, ongoing research and monitoring projects undertaken by communities, and the goals and long-term plans of the programs. We will invite representatives of all groups and organizations interested in participating in citizen or community monitoring efforts as well as scientists working on the design of GEM and especially its data management procedures. At this meeting, we will develop the conceptual outline of a monitoring program, addressing the points outlined in the Objectives section above. A small Monitoring Committee, including the Community Involvement Coordinator, TEK Specialist, selected Community Facilitators, and Scientific Advisors will prepare for the meeting and be responsible for using the results of the workshop to develop a detailed model for the monitoring program. Participants in the fall workshop will be asked to think about specific monitoring ideas in preparation for the January workshop (see below). In January 2001, in conjunction with the Restoration Workshop, we will hold a workshop to review the conceptual model and begin to identify monitoring activities. Following this workshop, the Monitoring Committee will complete the conceptual model and determine how it can be tested in FY02 along with the selected monitoring activities.

4. Identify specific monitoring activities. Under the guidance of the Monitoring Committee, we will begin to develop a list of possible monitoring activities and parameters to be monitored in advance of the January 2001 workshop. The workshop will again be an inclusive one, and we hope that the timing will encourage participation by many of the scientists involved in EVOS Restoration Workshop in addition to those who were present at the fall workshop. At the January workshop, we will go over the ideas proposed, and the Monitoring Committee will oversee extending the list, evaluating the various ideas for cost, feasibility, and other factors, and organizing the list as described in the Objectives section above. We will draw on the expertise of the Scientific Advisors as well as the experience of the Community Facilitators and others.

5. Select monitoring activities for pilot projects in FY02. In March 2001, we will hold a smaller workshop with the Community Facilitators and other community representatives as appropriate to select monitoring pilot projects for FY02. These projects will be chosen on the basis of their relevance to community interests, their scientific merit, and their ability to help evaluate the design of the monitoring program as a whole.

6. Further work in FY01. Once the Monitoring Committee has accomplished the above tasks, it will continue its work after submitting a proposal for FY02. Depending on the outcome of the above activities, the committee may do one or more of the following: (a) identify other sources of funding for monitoring activities, (b) continue to refine the ideas presented in the monitoring program design and the specific monitoring activities, (c) explore closer ties with monitoring plans by scientists involved with GEM and others, and (d) explore closer ties with community-based resource management programs, tribal natural resource programs, and citizen monitoring projects currently being developed.

C. Contracts and Other Agency Assistance

A contract will be let to CRRC for overall coordination of a facilitator network through a Spill Area-Wide Coordinator. The contractor will be expected to arrange for the hiring and coordination of local facilitators in the communities of Chenega Bay, Tatitlek, Port Graham, Nanwalek, Cordova, Seward, Valdez, Seldovia, and regional coordinators for the Kodiak Island and Alaska Peninsula regions.

However, all other communities in the oil spill impacted area will also be included in outreach efforts, even though a local facilitator will not be hired in each community.

Additionally, CRRC will contract with Dr. Henry Huntington to serve as the TEK Specialist and Dr. Ted Cooney to serve as the lead Science Coordinator for the Monitoring Committee.

D. Completion Date

Since the objective of this project is to integrate the GEM with tribal natural resource programs and other community resource programs we see a need to continue this program until the spill restoration project is complete. The project should be evaluated on a yearly basis to determine how it can best serve the needs of the Trustee Council and the local communities.

SCHEDULE

A. Measurable Project Tasks for FY97

October 1, 2000	Contract with CRRC and ADF&G Renewed
October 1, 2000	SAWCIC continues CRRC employment
October 1, 2000	Subcontracts with Communities for Community Facilitators developed or renewed
October 1, 2000	Contract with TEK Specialist renewed
October 1-31, 2000	MOU renewed between ADF&G & CRRC
October 2000	Monitoring Committee identified, CIF contracts signed Monitoring Committee develops conceptual overview of community-based monitoring program, as well as incorporate Tribal Natural Resource Management Plans and GEM Integration Plans
Fall 2000	Broad Scoping Workshop held Monitoring Committee develops model for program
January 2001	Monitoring Committee outlines ideas for monitoring activities Second workshop held (at time of Restoration Workshop) to review model and identify activities
Winter 2001	Monitoring Committee revises model for program Monitoring Committee compiles list of activities and organizes and evaluates them
March 2001	Third workshop held to review activities and select pilot projects
March-April 2001	Monitoring Committee prepares proposal for pilot projects for FY02
Spring-Summer 2001	Monitoring Committee refines model and list of activities, seeks other sources of funding, and explores links to community programs and scientific activities.

B. Project Milestone and Endpoints

October 2000	Contracts in place All three workshops scheduled

	Conceptual outline for monitoring program prepared
December 2000	First workshop completed
	Model for monitoring program prepared
January 2001	Second workshop completed
	Model revised
	Monitoring activities identified
March 2001	Monitoring activities evaluated and organized
	Third workshop completed
	Pilot projects selected
April 2001	Pilot project proposals submitted
September 2001	Monitoring Committee makes final report regarding its activities

C. Project Reports

Annual reports will be compiled in coordination with the ADF&G and provided each year by CRRC on April 15th, describing and summarizing the progress made during the previous federal fiscal year. In addition, monthly reports will be provided to the participating communities by the Spill Area-Wide Coordinator.

COORDINATION AND INTEGRATION OF RESTORATION EFFORT

This community outreach effort is in fact a novel effort to coordinate the Restoration Program with the traditional natural resource programs and builds on the established relationship between CRRC and the communities in Prince William Sound. Other organizations such as the tribal natural resource programs, Cook Inlet Keepers, Regional Citizen Advisory Councils, Kachemak Bay Research Reserve, Alaska Wilderness Recreation and Tourism Association, and various other organizations.

CRRC is contributing a considerable amount of in-kind services to the project. CRRC's tribal traditional natural resource program development project has been operating for the past two years in four of the villages in the Chugach Region, and Ouzinkie. CRRC, through a BIA contract, is technical assistance in the villages to four natural resource specialists. The Native American Fish & Wildlife Society to provide training and technical assistance at the local level. Part of the normal duties of the Natural Resource Specialists will be to collect traditional harvest and other baseline data (such as population assessments) on the resources in their traditional use areas. This information can then be incorporated into the TEK portion of the project.

ENVIRONMENTAL COMPLIANCE

This project is categorically excluded under NEPA guidelines.

PERSONNEL

Patty Brown-Schwalenberg: Ms. Brown is the Executive Director of the Chugach Regional Resources Commission (CRRC). She has worked for the past 17 years in such positions as Tribal Administrator for her tribe, the Lac du Flambeau Band of Lake Superior Chippewa Indians, Society Administrator for the Native American Fish & Wildlife Society, Office Manager of the Bering Sea Fisheries Development Fund, and as a private consultant, assisting Alaska Native communities in obtaining funding for natural resource management programs, and setting up their natural resource program administrative systems. CRRC and

the previous organizations that Ms. Brown has operated have consistently met all standards of proper management, including annual program and financial audits.

Hugh Short: CRRC will continue to employ Hugh Short as the Spill Area-Wide Community Involvement Coordinator for this project. Hugh has been active in spill area issues for the past two years and has developed an excellent working relationship with people at the community level and the principal investigators. He will be instrumental in working with the communities at developing the training workshops as well as assisting the villages in further developing their tribal natural resource programs.

Dr. Henry Huntington: CRRC has contracted with Huntington to serve as a TEK Specialist. Dr. Huntington received his Ph.D. at the University of Cambridge (U.K.), Scott Polar Research Institute in Polar Studies. He has served as the Environmental Coordinator for the Inuit Circumpolar Conference (ICC), coordinating ICC policy regarding the Arctic Environmental Protection Strategy (AEPS), in cooperation with indigenous organizations in Russia and Scandinavia. He was also responsible for traditional ecological knowledge and other research projects under the auspices of the AEPS.

Dr. Ted Cooney: Dr. R. Ted Cooney has recently retired from the University of Alaska-Fairbanks where he served on the faculty as a biological oceanographer for 29 years. Dr. Cooney has been involved with many studies of Alaska oceanic, shelf and coastal zooplankton stocks. He has worked on, and published extensively in the area of salmon oceanography. Most recently, Dr. Cooney was designated by the EVOS Trustee Council as the Lead Scientist for the Sound Ecosystem Assessment (SEA) Program in Prince William Sound, 1994-1999. His work with the juvenile salmon ecosystem over a 20-year period helped to create the spring-time plankton watch at hatcheries operated by the Prince William Sound Aquaculture Corporation.

2000 EXXON VALDEZ TRUS' :OUNCIL PROJECT BUDGET

October 1, 1999 - September 30, 2000

Budget Category:	Authorized FY 1999	Proposed FY 2000
Personnel		$0.0
Travel		$0.0
Contractual		$232.5
Commodities		$0.0
Equipment		$0.0
Subtotal	$0.0	$232.5
General Administration		$16.5
Project Total	$0.0	$249.0
Full-time Equivalents (FTE)		0.0

LONG RANGE FUNDING REQUIREMENTS					
		Estimated FY 2001	Estimated FY 2002		
		$249.0	$250.0		

Dollar amounts are shown in thousands of dollars.

Other Resources

Comments:

FY01

Prepared: 4-12-00

Project Number: 01052
Project Title: Community Involvement and GEM Planning
Agency: Alaska Department of Fish and Game

FORM 3A
TRUSTEE
AGENCY
SUMMARY

2000 EXXON VALDEZ TRUS COUNCIL PROJECT BUDGET

October 1, 1999 - September 30, 2000

Personnel Costs:		GS/Range/	Months	Monthly		Proposed
Name	Position Description	Step	Budgeted	Costs	Overtime	FY 2000
						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	
					Personnel Total	$0.0

Travel Costs:	Ticket	Round	Total	Daily	Proposed
Description	Price	Trips	Days	Per Diem	FY 2000
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
				Travel Total	$0.0

FY01

Prepared: 4-12-00

Project Number: 01052
Project Title: Community Involvement and GEM Planning
Agency: Alaska Department of Fish and Game

FORM 3B
Personnel
& Travel
DETAIL

2000 EXXON VALDEZ TRUS COUNCIL PROJECT BUDGET

October 1, 1999 - September 30, 2000

Contractual Costs:	Proposed
Description	FY 2000
Contract with Chugach Regional Resources Commission	232.5
	0.0
	0.0
When a non-trustee organization is used, the form 4A is required. **Contractual Total**	$232.5

Commodities Costs:	Proposed
Description	FY 2000
Commodities Total	$0.0

FY01

Prepared: 4-12-00

Project Number: 01052
Project Title: Community Involvement and GEM Planning
Agency: Alaska Department of Fish and Game

FORM 3B
Contractual & Commodities DETAIL

2000 EXXON VALDEZ TRUS' :OUNCIL PROJECT BUDGET

October 1, 1999 - September 30, 2000

New Equipment Purchases: Description	Number of Units	Unit Price	Proposed FY 2000
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
Those purchases associated with replacement equipment should be indicated by placement of an R.		**New Equipment Total**	$0.0

Existing Equipment Usage: Description	Number of Units	Inventory Agency

FY01

Prepared: 4-12-00

Project Number: 01052
Project Title: Community Involvement and GEM Planning
Agency: Alaska Department of Fish and Game

FORM 3B
Equipment
DETAIL

2000 EXXON VALDEZ TRUS COUNCIL PROJECT BUDGET

October 1, 1999 - September 30, 2000

Budget Category:	Authorized FY 1999	Proposed FY 2000
Personnel		$37.5
Travel		$38.0
Contractual		$117.0
Commodities		$15.0
Equipment		$0.0
Subtotal	$0.0	$207.5
Indirect		$20.7
Project Total	$0.0	$228.2
Full-time Equivalents (FTE)		0.8
Other Resources		

LONG RANGE FUNDING REQUIREMENTS

		Estimated FY 2001	Estimated FY 2002		
		$228.2	$230.0		

Dollar amounts are shown in thousands of dollars.

Comments:

FY01

Prepared: 4-12-00

Project Number: 01052
Project Title: Community Involvement and GEM Planning
Agency: Alaska Department of Fish and Game

FORM 4A
Non-Trustee
SUMMARY

2000 EXXON VALDEZ TRUS COUNCIL PROJECT BUDGET

October 1, 1999 - September 30, 2000

Personnel Costs:			Months	Monthly		Proposed
	Name	Position Description	Budgeted	Costs	Overtime	FY 2000
	Hugh Short	Community Involvement Coordinator	9.0	4.1	0.0	37.5
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
		Subtotal	9.0	4.1	0.0	
					Personnel Total	$37.5

Travel Costs:		Ticket	Round	Total	Daily	Proposed
	Description	Price	Trips	Days	Per Diem	FY 2000
	Port Graham - Anchorage	0.2	2	8	0.1	1.2
	Tatitlek - Anchorage	0.5	2	8	0.1	1.8
	Chenega Bay - Anchorage	0.5	2	8	0.1	1.8
	Seldovia - Anchorage	0.3	2	8	0.1	1.4
	Nanwalek - Anchorage	0.2	2	8	0.1	1.2
	Seward - Anchorage	0.2	2	8	0.1	1.2
	Cordova - Anchorage	0.3	2	8	0.1	1.4
	Valdez - Anchorage	0.2	2	8	0.1	1.2
	Ouzinkie - Anchorage	0.7	2	8	0.1	2.2
	Chignik Lake - Anchorage	0.7	2	8	0.1	2.2
	TEK Specialist/Community Involvement Coordinator travel throughout					5.0
	spill area					0.0
					Travel Total	$20.6

FY01

Prepared:

Project Number: 01052
Project Title: Community Involvement and GEM Planning
Agency: Alaska Department of Fish and Game

FORM 4B
Personnel
& Travel
DETAIL

2000 EXXON VALDEZ TRUS COUNCIL PROJECT BUDGET

October 1, 1999 - September 30, 2000

Contractual Costs:	Proposed
Description	FY 2000
TEK Specialist	20.0
Sub-contracts with tribal councils in spill area (10 at $6,000) to provide facilitator and stewardship services	60.0
Sub-contracts with tribal councils in spill area (4 at $3,000) to Monitoring Committee facilitator	12.0
Science Coordinator for Monitoring Committee	10.0
Contract scientists (3 at $5,000 each	15.0
Contractual Total	$117.0

Commodities Costs:	Proposed
Description	FY 2000
Incidental costs for 2 workshops and two committee meetings (meeting space rental, supplies, food, etc.)	15.0
Commodities Total	$2.0

FY01

Prepared: 4-12-00

Project Number: 01052
Project Title: Community Involvement and GEM Planning
Agency: Alaska Department of Fish and Game

FORM 4B
Contractual & Commodities DETAIL

2000 EXXON VALDEZ TRUS COUNCIL PROJECT BUDGET

October 1, 1999 - September 30, 2000

New Equipment Purchases: Description	Number of Units	Unit Price	Proposed FY 2000
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
Those purchases associated with replacement equipment should be indicated by placement of an R.		**New Equipment Total**	$0.0

Existing Equipment Usage: Description	Number of Units	

FY01

Prepared: 4-12-00

Project Number: 01052
Project Title: Community Involvement and GEM Planning
Agency: Alaska Department of Fish and Game

FORM 4B
Equipment
DETAIL

Final Data Analyses and Manuscript Preparation - Prince William Sound Harbor Seal Studies.

Project Number:	01064
Restoration Category:	Monitoring
Proposer:	Kathryn J. Frost, ADF&G
Lead Trustee Agency:	ADF&G
Cooperating Agencies:	none
Alaska Sea Life Center:	no
Duration:	1 year
Cost FY 01:	$ 25,100
Geographic Area:	Prince William Sound
Injured Resource:	Harbor Seals

ABSTRACT

During 1989-1999, the EVOS Trustee Council funded ecological studies of harbor seals in Prince William Sound under project 064, entitled "Monitoring, Habitat Use, and Trophic Interactions of Harbor Seals in Prince William Sound, Alaska." Those studies monitored population status, documented movements and habitat use, and investigated what factors could be responsible for the population decline that was ongoing prior to the spill and that continued thereafter. To date, some of the results of those studies have been published in scientific journals. Additional manuscripts are being prepared and will be submitted during spring and summer 2000.

At the termination of project 064 in September 2000, some data will remain unanalyzed and unpublished. In particular, funding for FY00 includes aerial surveys of the PWS trend count route in mid to late August 2000. Data analysis from those surveys cannot be complete by project termination. Furthermore, several satellite tags attached to seal pups in June 1999 were still transmitting in April 2000. Data from those tags will not be analyzed by project termination. A complete analysis of PWS seal pup tagging data must include 1999-2000 data, as well as data for previous years.

This proposal is to cover analysis and final write-up of the following: a) August 2000 harbor seal aerial surveys; b) a comparison of 2000 counts with previous years (i.e., an updated analysis of population trend); c) 1999 seal pup tagging data; and d) integration of 1999 pup tagging data with other years and a synoptic analysis of movements and diving behavior of harbor seal pups in PWS.

INTRODUCTION

Harbor seals (*Phoca vitulina richardsi*) were one of the wildlife resources damaged by the March 1989 Exxon Valdez oil spill (EVOS) (Frost et al. 1994, Lowry et al. 1994, Spraker et al. 1994). The number of harbor seals in central and eastern Prince William Sound (PWS) was declining before the spill (Frost et al. 1994) and has continued to decline ever since, with an overall reduction in population size of 57% during 1984-1998 (Frost et al. 1999a).

Harbor seal studies began almost immediately after the spill as part of the Natural Resources Damage Assessment (NRDA) program. NRDA studies were conducted by the Alaska Department of Fish and Game (ADF&G), and included aerial surveys to quantify mortality and necropsies to document levels of hydrocarbons and tissue damage in oiled seals. Beginning in 1991 as NRDA studies neared completion, the EVOS Trustee Council funded a harbor seal Restoration Science Study in which ADF&G continued to monitor the trend of harbor seals in PWS and began a research program to investigate the causes of the ongoing population decline. Initially the harbor seal restoration study addressed a broad array of possible causes for the decline including disease, predation, human-caused mortality, reproduction, and food limitation (Frost et al. 1995, 1996).

Investigations conducted in PWS as part of Restoration Study 064 indicate that disease, poor pup production, or emigration are unlikely as causes for the decline. Population modeling studies have suggested that poor survival of juvenile seals was a likely factor, and that the carrying capacity for harbor seals in PWS may have declined (Frost et al. 1996). Consequently, the focus of investigations shifted to studies of harbor seal feeding ecology (Frost et al. 1997, 1998, 1999a). During 1994-1996 we addressed this question relative to adult and subadult segments of the population, and in 1997-1999 for pups and yearlings. Major components of this study have included tagging with satellite-linked depth recorders to study movements and diving behavior, and the determination of diets based on analysis of fatty acid signatures in harbor seal blubber and in their potential prey. Most recently studies have included use of isotope dilution to measure the body fat composition of animals. These analyses indicate substantial geographic, interannual, age, and gender related differences in harbor seal movement patterns, diversity and species composition of diets, and body composition.

FY 2000 has been a close-out year for project 064. The final field season for tagging and sampling harbor seal pups and yearlings was conducted in June-July 1999. Satellite transmitters were attached to seven harbor seal pups at that time. Aerial surveys were conducted in August 1999. Final analysis of blubber and prey fatty acids was completed, as well as deuterium oxide equilibration experiments to determine body composition of PWS harbor seals pups and yearlings. Major effort has been expended on final analysis of movements and diving data for harbor seal adults and subadults tagged in 1992-1996. However, not all of the final analysis will be complete by project termination in September 2000.

We anticipate that the following papers and manuscripts will have been published or submitted for publication by the end of the current FY 00 fiscal year:

1) Frost, K. F, Lowry, L. F., and Ver Hoef, J. M. 1999. Monitoring trends of harbor seals in Prince William Sound, Alaska, after the *Exxon Valdez* oil spill. Marine Mammal Science 15(2): 494-506.

2) Frost, K. J., Simpkins, M. A., and Lowry L. F. Diving behavior of harbor seals in Prince William Sound, Alaska, 1992-1996. *Marine Mammal Science.* (to be submitted early May 2000)
3) Iverson, S. J., Field, C., Bowen, W. D., and Blanchard, W. Quantitative fatty acid signature analysis: statistical modeling of marine mammal diets from fat stores. *Ecology.*
4) Iverson, S. J., Frost, K. J., and Lang, S. Fat and fatty acid composition of fish species in Prince William Sound, Alaska: variation with species, habitat and diet. *Canadian Journal of Fisheries and Aquatic Sciences.*
5) Iverson, S. J., Frost, K. J., and Burns, J. M. Links between diet and energy storage in juvenile harbor seals in Prince William Sound, Alaska. *Journal of Animal Ecology.*
6) Lowry, L. F., Frost, K. J., Ver Hoef, J. M., and DeLong, R. Movements of satellite-tagged harbor seals in Prince William Sound, Alaska, 1992-1997. *Marine Mammal Science.* (to be submitted early May 2000)
7) Ver Hoef, J. M., and Frost, K. J. Bayesian hierarchical models for estimating harbor seal trends in Prince William Sound, Alaska. *(Journal to be determined)*

Proposed work in 2001. During FY 2001 we propose to conclude final write-up and manuscript preparation for aspects of study 064 that could not be completed prior to September 2000. This will include the following: analysis and write-up of aerial surveys conducted in August 2000; an updated trend analysis for PWS harbor seals for 1989-2000; analysis of 1999 seal pup tagging data (some tags are still transmitting as of April 2000); integration of 1999 pup tagging data with other years for a synoptic analysis of movements and diving behavior of harbor seal pups in PWS.

NEED FOR THE PROJECT

A. Statement of Problem

From 1984-1988, harbor seal counts at 25 trend sites in PWS declined by 43% due to unknown causes. The decline continued in 1989, aggravated in oiled areas by the EVOS. Counts of seals at oiled trend count sites declined by 45%, compared to 11% at unoiled sites. More than 300 harbor seals (36% of the estimated total population in oiled areas) were estimated to have died in PWS due to the spill (Frost et al 1994).

During 1990-1998, harbor seal numbers in the trend count area of PWS continued to decline at an average rate of about 2.4% per year. There were 18% fewer seals in 1998 than in 1990, and 57% fewer than in 1984 (Frost et al. 1999a). It appears that the decline has slowed in recent years and the PWS harbor seal population may be starting to stabilize, but future surveys will be required to confirm that.

B. Rationale

Harbor seals are important to residents of PWS for subsistence. In 1985-1989, harbor seals made up 13%-27% of the subsistence foods harvested in Tatitlek and Chenega Bay. During 1992-1995, the annual harvest at those two villages was less than half of what it was before the spill. Native residents have noted the scarcity of seals and the impact that has had on subsistence

hunting. Harbor seals are also watched and photographed by tourists and recreational users of PWS, and they interact with and are incidentally killed by commercial fisheries.

Like all marine mammals, harbor seals have special federal protection under the Marine Mammal Protection Act. Because of the ongoing decline, it is essential that current population data be available so that inappropriate restrictions on human activities are not implemented. The National Marine Fisheries Service is currently conducting a Population Viability Analysis for harbor seals in Alaska. This analysis will be used to determine whether harbor seals have declined to such a degree that they should be listed as depleted under the MMPA, or threatened/endangered under the Endangered Species Act.

Aerial surveys have documented the downward trend in PWS harbor seal abundance and have provided the information needed to determine whether the recovery objective of "stable or increasing population trend" has been met in the spill area. However, they are not adequate for determining what is causing the seal population to decline, or whether it is realistic to expect the population to increase given existing carrying capacity in PWS.

The Restoration Program has funded a strong field research program to test hypotheses about the health, condition, and foraging behavior of harbor seal adults and sub-adults within PWS. In recent years, attention has been focused more on the youngest age classes within the population, pups and yearlings. This attention is warranted because survival rates of juveniles are significantly lower than for older animals, and recruitment of juveniles is critical for population recovery. It is essential that these data are completely analyzed and published in the peer-reviewed literature.

C. Location

This project entails no field work. It will be conducted out of the ADF&G office in Fairbanks.

COMMUNITY INVOLVEMENT

Information will be presented at the 2001 oil spill symposia, where the general public may learn about results of this study.

PROJECT DESIGN

A. Objectives

1. Analyze data from August 2000 aerial surveys of the PWS trend count route, prepare a final analysis of PWS trend count data since 1989, and prepare a manuscript for publication.

2. Conduct final analysis of data from seven harbor seal pups that were satellite tagged in June-July 1999, integrate tagging data from 1999 seal pups with data from previous years, and prepare data for publication in the peer-reviewed literature.

3. Prepare manuscript on spatial and temporal scales of diet and foraging patterns of PWS harbor seals based on fatty acids signature analysis.

B. Methods

Data will be analyzed and manuscripts prepared by the investigators who were primarily responsible for the research. Responsibilities will be as follows: a) aerial surveys – Frost and Ver Hoef; b) movements and hauling out behavior – Lowry; c) diving behavior – Frost; d) fatty acids analysis – Iverson and Frost.

C. Contracts and Other Agency Assistance

Fatty acid and D_2O analyses, interpretation and manuscript preparation will be done by Dr. Sara Iverson at Dalhousie University under an existing Cooperative Agreement between ADF&G and Dalhousie. Dr. Iverson has conducted all previous fatty acid signature analyses and body composition work for PWS harbor seal studies.

Lloyd Lowry at the University of Alaska Fairbanks will conduct final analysis and manuscript preparation for data regarding movements and hauling out behavior of harbor seal pups through a Reimbursable Services Agreement with UAF. Mr. Lowry has analyzed all previous PWS tagging data and has been involved in the project since its inception..

SCHEDULE

A. Measurable Project Tasks for FY 00 (October 1, 2000 - September 30, 2001)

FY 01: October 1, 2000- September 30, 2001

October – December:	Analysis of aerial survey data
October – December	Preparation of manuscript on spatial and temporal scales of foraging of PWS harbor seals
October-December	Analysis of 1999 satellite tag data for PWS harbor seal pups, and preparation of manuscript on movements and hauling out behavior.
January (3-4 days)	Attend Annual Restoration Workshop
January – March	Preparation of manuscript about harbor seal trends in PWS
January – March	Preparation of manuscript on diving behavior of PWS harbor seal pups.

B. Project Milestones and Endpoints

December 2000:	Submit manuscript on spatial and temporal scaled of foraging of PWS harbor seals
December 2000:	Submit manuscript on movements and hauling out behavior of PWS harbor seal pups
March 2001:	Submit manuscript on recent harbor seals trends in PWS
March 2001:	Submit manuscript on diving behavior of PWS harbor seal pups.

C. Completion Date

This project will include one fiscal year, FY 01, and will be completed by September 30, 2001.

PUBLICATIONS AND REPORTS

1) Iverson, S. J., Frost, K. J. and Lowry, L. F. Spatial and temporal scales of diet and foraging patterns of harbor seals in Prince William Sound, Alaska. *Ecological Applications.* (This may be split into two manuscripts.)

2) Frost, K. F, Lowry, L. F., and Ver Hoef, J. M. Trends in harbor seal abundance in Prince William Sound, Alaska, based on molting-period counts during 1984-2000. *Marine Mammal Science.*

3) Lowry, L. F., Frost, K. J., and Ver Hoef, J. M. Movements of satellite-tagged harbor seal pups in Prince William Sound, Alaska, 1997-2000. *Marine Mammal Science.*

4) Frost, K. J., Simpkins, M. A., and Lowry L. F. Diving behavior of harbor seal pups in Prince William Sound, Alaska, 1997-2000. *Marine Mammal Science.*

PROFESSIONAL CONFERENCES

None anticipated in 2000-2001

NORMAL AGENCY MANAGEMENT

This project is funded entirely by the Trustee Council as a restoration project. ADF&G has no management responsibility for harbor seals. ADF&G biologists are conducting this research as principal investigators because of their many years of experience investigating the biology of seals and other marine mammals in Alaska.

ADF&G is conducting studies of harbor seals in southeast Alaska and near Kodiak with funding from NOAA/NMFS. Those studies contain similar components to the PWS study and are closely coordinated to ensure that data are collected and analyzed in a similar manner. This will facilitate comparisons of data. It is anticipated that joint publications will be prepared comparing various aspects of harbor seal behavior in PWS and other parts of Alaska.

COORDINATION AND INTEGRATION OF RESTORATION EFFORT

ADF&G receives funding from NOAA to conduct complementary studies of harbor seals in the northern GOA and southeast AK. Results of those studies and PWS studies are compared, and in the future will be included in joint, comparative publications.

EXPLANATION OF CHANGES IN CONTINUING PROJECTS

This project is a follow-up to Project 064, which will allow final analysis and reporting of data collected too late in the year to be completed by September 30, 2000. This includes data from

August 2000 aerial surveys and from satellite tags attached to pups in June/July 1999 that were still transmitting in late spring 2000.

PROPOSED PRINCIPAL INVESTIGATOR

Kathryn J. Frost
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Phone (907) 459-7214
Fax (907) 452-6410
E-mail kathy_frost@fishgame.state.ak.us

PERSONNEL QUALIFICATIONS

Kathryn Frost (the principal investigator) has conducted research on marine mammals in Alaska since 1975. She has undertaken extensive research on natural history and ecology of seals, including aerial surveys; studies of food habits and trophic interactions; and studies of habitat use using satellite tags. She has conducted extensive aerial surveys of harbor seals in PWS and boat-based observations and sampling of harbor seals as part of NRDA studies following the EVOS. She has conducted satellite tagging studies of harbor seals in PWS from 1991 through 1999.

Lloyd Lowry is an Affiliate Associate Professor of Marine Science at the School of Fisheries and Ocean Sciences, University of Alaska Fairbanks. He has conducted research on marine mammals in Alaska since 1975, including studies of the natural history, ecology, distribution, abundance, and food habits of seals. He has participated in all NRDA and Restoration studies on harbor seals, including the development of methods to catch and attach satellite tags to harbor seals. He has been responsible for project coordination and management of state and federally funded research projects, and is familiar with the federal marine mammal permit system.

Dr. Sara Iverson is an Assistant Professor at the University of Dalhousie. She is currently conducting research at Sable Island, Nova Scotia, on the lipid metabolism of seals and the use of fatty acids to determine marine food webs. She received her Ph.D. in nutritional sciences, conducting studies of the energetics of reproduction and fatty acid metabolism in seals. She developed procedures for analysis of lipids in milk, blubber and tissues of pinnipeds. Dr. Iverson has published extensively on those subjects.

Dr. Jay Ver Hoef is a Biometrician for ADF&G. He has been responsible for statistical analysis of all harbor seal data during NRDA and Restoration studies. He has participated in field work in PWS and is familiar with seal catching and tagging techniques.

KEY PERSONNEL

Kathryn Frost:	Project management and coordination, data analysis, reporting
Lloyd Lowry:	Data analysis and reporting
Jay Ver Hoef:	Statistical analysis of data, reporting
Sara Iverson:	Fatty acid and body composition analysis, interpretation and reporting

LITERATURE CITED

Frost, K. J., L. F. Lowry, E. Sinclair, J. Ver Hoef, and D. C. McAllister. 1994. Impacts on distribution, abundance, and productivity of harbor seals. Pages 97-118 *in*: T. R. Loughlin (ed.). Marine Mammals and the *Exxon Valdez*. Academic Press, San Diego, CA.

Frost, K. F., L. F. Lowry, and J. Ver Hoef. 1995. Habitat use, behavior, and monitoring of harbor seals in Prince William Sound, Alaska. Ann. Rep. to the EVOS Trustee Council. Restoration Study No. 94064 and 94320-F. 88 pp.

Frost, K. F., L. F. Lowry, R. J. Small, and S. J. Iverson. 1996. Monitoring, habitat use, and trophic interactions of harbor seals in Prince William Sound, Alaska. Ann. Rep. to the EVOS Trustee Council. Restoration Study No. 95064. 133 pp.

Frost, K. F., L. F. Lowry, J. M. Ver Hoef, and S. J. Iverson. 1997. Monitoring, habitat use, and trophic interactions of harbor seals in Prince William Sound, Alaska. Ann. Rep. to the EVOS Trustee Council. Restoration Study No. 96064. 115 pp.

Frost, K. F., L. F. Lowry, J. M. Ver Hoef, S. J. Iverson, and T. Gotthardt. 1998. Monitoring, habitat use, and trophic interactions of harbor seals in Prince William Sound, Alaska. Ann. Rep. to the EVOS Trustee Council. Restoration Study No. 97064. 148 pp.

Frost, K. F., L. F. Lowry, J. M. Ver Hoef, and S. J. Iverson. 1999a. Monitoring, habitat use, and trophic interactions of harbor seals in Prince William Sound, Alaska. Ann. Rep. to the EVOS Trustee Council. Restoration Study No. 98064. 145 pp.

Frost, K. J., L. F. Lowry, and J. Ver Hoef. 1999b. Monitoring the trend of harbor seals in Prince William Sound, Alaska after the *Exxon Valdez* oil spill. Marine Mammal Science 15(2): 494-506.

Iverson, S. J., K. J. Frost, and L. F. Lowry. 1997. Fatty acids signatures reveal fine scale structure of foraging distribution of harbor seals and their prey in Prince William Sound, Alaska. Mar. Ecol. Prog. Series 151:255-271.

Lowry, L. F., K. J. Frost, and K. W. Pitcher. 1994b. Observations of oiling of harbor seals in Prince William Sound. Pages 209-225 *in*: T. R. Loughlin (ed.). Marine Mammals and the *Exxon Valdez*. Academic Press, San Diego, CA.

Spraker, T. R., L. F. Lowry, and K. J. Frost. 1994. Gross necropsy and histopathological lesions found in harbor seals. Pages 281-311 *in*: T. R. Loughlin (ed.). Marine Mammals and the *Exxon Valdez*. Academic Press, San Diego, CA.

Ver Hoef, J. M., and K. J. Frost. 1999. Bayesian hierarchical models for estimating harbor seal trends in Prince William Sound, Alaska. Pages 104-125 *in*: Monitoring, habitat use, and trophic interactions of harbor seals in Prince William Sound, Alaska. Ann. Rep. to the EVOS Trustee Council. Restoration Study No. 98064. ADF&G, Fairbanks, AK.

2001 EXXON VALDEZ TR E COUNCIL PROJECT BUDGET

October 1, 2000 - September 30, 2001

Budget Category:	Authorized FY 2000	Proposed FY 2001	LONG RANGE FUNDING REQUIREMENTS					
Personnel		$13.0						
Travel		$0.7						
Contractual		$8.6						
Commodities		$0.2						
Equipment		$0.0						
Subtotal	$0.0	$22.5				Estimated FY 2002		
General Administration		$2.6						
Project Total	$0.0	$25.1				$0.0		
Full-time Equivalents (FTE)		0.2						
	Dollar amounts are shown in thousands of dollars.							
Other Resources								

Comments:

This proposal is to conduct final analysis and manuscript preparation for aerial surveys conducted in August 2000, and satellite tags attached in June/July 1999 that were still transmitting in late spring 2000. There is not sufficient time between final data acquisition and the end of the FY 00 contract year to complete these tasks. The proposal covers the final analysis of data and the preparation of 4 manuscripts. These include 1) final trend analysis for harbor seals in PWS; 2) diving behavior of harbor seal pups in PWS, 1997-2000; 3) movements and hauling out of harbor seal pups in PWS, 1997-2000; and 4) spatial and temporal scales of diet and foraging of PWS harbor seals.

None of the costs identified in this budget are for NEPA compliance. Costs for meeting attendance are included under travel, and total $0.7 K. This includes attandance at the annual EVOS workshop.

FY01

Prepared: 3 April 2000

Project Number: 01064
Project Title: Manuscript Preparation - PWS Harbor Seal Studies
Agency: Alaska Department of Fish and Game

FORM 3A
TRUSTEE
AGENCY
SUMMARY

2001 EXXON VALDEZ TR E COUNCIL PROJECT BUDGET

October 1, 2000 - September 30, 2001

Personnel Costs:		GS/Range/	Months	Monthly		Proposed
Name	Position Description	Step	Budgeted	Costs	Overtime	FY 2001
K. Frost	WBIII - Program Coordinator and Mngt	18K	1.5	6.5		9.8
J. Ver Hoef	Biometrician II - survey statistical anal	19F	0.5	6.4		3.2
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
	Subtotal		2.0	12.9	0.0	
					Personnel Total	$13.0

Travel Costs:	Ticket	Round	Total	Daily	Proposed
Description	Price	Trips	Days	Per Diem	FY 2001
Fbks-Anchorage , annual workshop, 1 person	0.2	1	5	0.1	0.7
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
				Travel Total	$0.7

FY01

Prepared:3 April 2000

Project Number: 01064
Project Title: Manuscript Preparation - PWS Harbor Seal Studies
Agency: Alaska Department of Fish and Game

FORM 3B
Personnel
& Travel
DETAIL

2001 EXXON VALDEZ TR E COUNCIL PROJECT BUDGET

October 1, 2000 - September 30, 2001

Contractual Costs:	Proposed
Description	FY 2001
Print/graphics/page charges	0.2
RSA with UAF for L. Lowry	8.4
When a non-trustee organization is used, the form 4A is required. **Contractual Total**	$8.6

Commodities Costs:	Proposed
Description	FY 2001
Computer and print supplies	0.2
Commodities Total	$0.2

FY01

Prepared:3 April 2000

Project Number: 01064
Project Title: Manuscript Preparation - PWS Harbor Seal Studies
Agency: Alaska Department of Fish and Game

FORM 3B
Contractual & Commodities DETAIL

2001 EXXON VALDEZ TRI E COUNCIL PROJECT BUDGET

October 1, 2000 - September 30, 2001

New Equipment Purchases:	Number	Unit	Proposed
Description	of Units	Price	FY 2001
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
Those purchases associated with replacement equipment should be indicated by placement of an R.		**New Equipment Total**	$0.0

Existing Equipment Usage:	Number	Inventory
Description	of Units	Agency

FY01

Project Number: 01064
Project Title: Manuscript Preparation - PWS Harbor Seal Studies
Agency: Alaska Department of Fish and Game

FORM 3B
Equipment
DETAIL

Prepared:3 April 2000

Project Title: Chugach Native Region Clam Restoration

Project Number:	01131
Restoration Category:	General Restoration
Proposer:	Chugach Regional Resources Commission
Lead Trustee Agency:	Alaska Department of Fish & Game
Cooperating Agencies:	Chugach Regional Resources Commission, Native Villages of Tatitlek, Nanwalek, Port Graham and Eyak
Alaska SeaLife Center	
Duration:	6th year, 5-year project
Cost FY 00	0.0
Cost FY 01	$11.5
Geographic Areas:	Native villages in Prince William Sound and lower Cook Inlet
Injured Resource/Service:	Clams/Subsistence

ABSTRACT

Cost effective procedures for establishing easily accessible subsistence clam populations near Native villages in the oil spill region are being established. All fieldwork has been completed on this project. Additional funding is needed to complete data analysis and final report preparation. FY 99 fieldwork and data collection was more costly than anticipated

INTRODUCTION

A. General

The purpose of this project is to develop cost effective procedures for establishing managed populations of clams in areas that are readily accessible from Native villages in the oil spill region. These clams will be used as a source for subsistence food to replace the natural clam resource that has been lost, damaged or depleted. The project was initiated in FY 95 and all fieldwork and data collection was completed in FY 99. The villages Nanwalek, Tatitlek, Port Graham and Eyak took part in the project.

Adverse weather conditions increased the cost of the fieldwork in FY 99. The fieldwork consisted of planting the final batch of littleneck clam seed produced by the Qutekcak Shellfish hatchery and collect growth and mortality data from seed that had been planted previously. Since this was the final year of the project all fieldwork had to be completed prior to October 1, 1999 regardless of the weather. This meant that rather than canceling field trips when the weather was bad, the consultant and field crew were put on standby waiting for the weather to clear.

In addition to the extra cost of the fieldwork in FY 99 the cost for data analysis in FY 98 was greater than expected. These costs were carried over to FY 99 and added to the deficit.

NEED FOR THE PROJECT

A. Statement of Problem

Local shellfish populations, especially clams have been severely reduced as a subsistence food source for Native villages. Part of the reduced use is a loss of confidence in the safety of consuming shellfish as a result of the Exxon Valdez Oil Spill. In addition, local shellfish populations have been greatly reduced as result of hydrocarbon toxicity, sea otter predation, human over harvest and beach changes from the 1964 earthquake.

B. Rationale

This project will accomplish two things. One, it will help restore the clam resource base in the oil spill area, and two, it will enhance subsistence gathering by providing an easily accessible source of clams for subsistence use.

C. Location

The hatchery and pre-nursery work was carried out at the Qutekcak Shellfish Hatchery in Seward. Growout operations and sampling occurred in the area around the villages of Tatitlek and Eyak in Prince William Sound and in the Port Graham/Nanwalek area in Lower Cook Inlet. Pathology work was conducted in Anchorage and Juneau.

COMMUNITY INVOLVEMENT

The communities named in this project were directly involved in it. Each community decided whether or not it wanted to be involved in the project initially. Local residents were heavily relied upon to help locate existing clam populations and the areas for

reseeding. Project work involving the villages was done mostly with local labor. Community leaders were kept appraised of how the project is progressing.

PROJECT DESIGN

A. Objectives

1. Complete data analysis.
2. Complete and submit final report.

B. Methods

Objective 1. Complete Data Analysis
The hatchery staff will conduct data analysis for the hatchery, including the pre-nursery. The hatchery analyses will compare growth and survival against industry standards. Dr. Ken Brooks of Aquatic Environmental Sciences, Port Townsend, WA will conduct analyses on data from the remote nursery and growout portions of the project. The remote nursery analysis will determine the efficacy of producing 10+ mm seed clams. The growout analysis will examine growth and mortality as a function of several parameters including tidal height, rearing density and in the presence or absence of protective predator exclusion devices. All data analysis work will be completed by December 31, 2000.

Objective 2. Complete and Submit Final Report
CRRC staff will compile and edit the final report. The report will be ready for submission by April 15, 2001.

C. Cooperating Agencies, Contracts and Other Agency Assistance

There will be no agency assistance for data analysis or final report completion.

SCHEDULE

A. Measurable Project Tasks for FY 01

10/00 – 12/00
Complete data analyses.

1/01-4/01
Complete final report

B. Project Milestones and Endpoints

Objective 1.
December 31, 2000
All data analyses completed.

Objective 2.
April 15, 2001

Final report submitted

C. Completion Date
The objectives of this project will be met in FY 2001.

PUBLICATIONS AND REPORTS
April 15, 2001
Final report due

PROFESSIONAL CONFERENCES
The staff will not attend any professional conferences under this project in FY 2001.

EXPLANATION OF CHANGES IN CONTINUING PROJECTS

PROPOSED PRINCIPAL INVESTIGATOR(S)

Dave Daisy/Jeff Hetrick/Jon Agosti
Chugach Regional Resources Commission
4201 Tudor Centre Drive, Suite 300
Anchorage, AK 99508
Phone: (907) 562-6647
Fax: (907) 562-4939

PERSONNEL
PATRICIA BROWN SCHWALENBERG
6450 Andover Drive
Anchorage, Alaska 99516
907 345-2187

Employment:
June 1994 to Present: Executive Director Chugach Regional Resource Commission. Responsible for Natural Resource and Fisheries development for the seven native villages in the Chugach region. This includes administering office staff, village projects in mariculture and fisheries and protecting and enhancing subsistence opportunities.

October 92 to June 1994: Office Manager Bering Sea Commercial Fisheries Development Foundation. Responsibilities included maintaining all management systems for the organization including financial, personnel, property and central filing. She was responsible for financial management and accountability of all grants, payroll, taxes and financial statements, and organizing and overseeing public relations.

October 1987 to June 1992 Society Administrator /Public Relations Director. Native American Fish and Wildlife Society. Assisted in the establishment and development of a national office for the Native American Fish and Wildlife Society. Implemented personnel policies and procedures, property management policies, record and financial

management systems. Implemented strategies to obtain goals and objectives of the society.

Education:
Business Administration University of Alaska-Anchorage (ongoing).
Certification of Completion. 1977 Humboldt Institute

DAVID DAISY
3936 Westwood Drive
Anchorage, Alaska 99517
(907) 243-8544

Employment:
October, 1987-Present: Fisheries consultant with emphasis on aquaculture. Contractor to Chugach Regional Resource Commission developing salmonid hatcheries at Port Graham and Nanwalek and oyster mariculture operations at Tatitlek and Chenega Bay. Oversight and management of these projects involves grant writing and financial and activity reporting to granting agencies.

February, 1979 to October, 1987: Regional Program Manager, Region II, Fisheries Rehabilitation, Enhancement and Development (FRED) Division, Alaska Department of Fish & Game. Under general supervision of the FRED Director, responsible for the planning, development, operation and control of the State's salmonid enhancement and rehabilitation program in Region II which encompasses all of Alaska except Southeast.

November, 1977 to February, 1979: Regional Project Manager: Cook Inlet - Prince William Sound, Fisheries Rehabilitation, Enhancement and Development (FRED) Division, Alaska Department of Fish & Game. Under supervision of the Regional Program Manager responsible for the implementation and control of salmon enhancement research and development projects in the Prince William Sound and Cook Inlet areas. Assisted the Regional Program Manager in hatchery development planning.

April, 1968 to February, 1979: Management Biologist, Commercial Fisheries Division, Alaska Department of Fish and Game in the Ketchikan, Cook Inlet and Upper Cook Inlet areas. Oversaw various management projects (weirs, counting towers, fisheries sampling) determined and set fishing periods for herring and salmon and responsible for meeting escapement and recruitment goals.

Education:
B.Sc. Fisheries, University of Massachusetts, Amherst, 1965.

JEFF HETRICK
P. O. Box 7
Moose Pass, Alaska 99631
(907) 288-3667

Employment:
1987- Present: Hatchery Manager Cook Inlet Aquaculture Association. Manage Trail Lakes Hatchery which produces 12 million sockeye salmon fry and 2 million sockeye salmon smolts annually.
1988-Present: Consultant for Shellfish Culture. Clients include:
Chugach Regional Resource Commission- develop oyster farms at Chenega Bay and Tatitlek. Included permitting, farm design, training and marketing.
Qutekcak Native Tribe- Design and develop first shellfish hatchery in Alaska.

1983-1987 Assistant Manager. Alaska Department of Fish and Game.
Assistant manager at Main Bay (Chum and Sockeye Salmon) and Cannery Creek (Pink Salmon) Hatcheries in Prince William Sound.

Education:
MBA California Coast University- Thesis under review
B.Sc. Biological Sciences. University of Maryland, 1980

DR. KENNETH M. BROOKS
644 Old Eaglemount Road
Port Townsend, WA 98368
(360) 732-4464

Employment

1959-1979	U.S. Navy Officer - retired in 1959
1979-1992	Owner/operator of Black Angus ranch
1982-1992	Environmental mediator for Washington state
1988-1990	Battelle Marine Science Laboratory, NORCUS grant
1989-present	President, Aquatic Environmental Sciences, Port Townsend, WA
1993-present	Director, Fisheries Technology Program, Peninsula College

Education
B. Sc. - Physics, Naval Postgraduate School (NPS), 1973
M. Sc. - Physics, NPS, 1974
Ph.D. - College of Ocean Sciences and Fisheries, University of Washington, 1991

John L. Agosti
P. O. Box 369
Seward, AK 99664
(907) 224-5181

Employment

1983-1984	Hatchery Technician, Westcott Bay Sea Farm, Friday Harbor, WA

1984-1986	Research Consultant, Ketron Island Sea Farm, Stellacoom, WA
1986-1996	Assistant Hatchery Manager, Westcott Bay Sea Farm, Friday Harbor, WA
1996-present	Hatchery Manager, Qutekcak Shellfish Hatchery, Seward, AK

Education
B. Sc., Biological Oceanography, Humbolt State University, 1984

David Daisy
2826 54TH ST S
Gulfport, FL 33707-5528
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email: ddaisy@tampabay.rr.com

2001 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2000 - September 30, 2001

Budget Category:	Authorized FY 2000	Proposed FY 2001						
Personnel		$0.0						
Travel		$0.0						
Contractual		$9.9						
Commodities		$0.0						
Equipment		$0.0	LONG RANGE FUNDING REQUIREMENTS					
Subtotal	$0.0	$9.9			Estimated FY 2001	Estimated FY 2002		
General Administration		$0.6						
Project Total	$0.0	$10.5			$10.5	$0.0		
Full-time Equivalents (FTE)		0.0						
	Dollar amounts are shown in thousands of dollars.							
Other Resources								

Comments:

FY01

Prepared: [illegible]-00

Project Number: 01131
Project Title: Chugach Native Region Clam Restoration
Agency: Alaska Department of Fish and Game

FORM 3A
TRUSTEE
AGENCY
SUMMARY

2001 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2000 - September 30, 2001

Personnel Costs:		GS/Range/	Months	Monthly		Proposed
Name	Position Description	Step	Budgeted	Costs	Overtime	FY 2000
						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	
					Personnel Total	$0.0

Travel Costs:	Ticket	Round	Total	Daily	Proposed
Description	Price	Trips	Days	Per Diem	FY 2000
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
				Travel Total	$0.0

FY01

Prepared: 1-12-00

Project Number: 01131
Project Title: Chugach Native Region Clam Restoration
Agency: Alaska Department of Fish and Game

FORM 3B
Personnel
& Travel
DETAIL

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

Contractual Costs:	Proposed
Description	FY 2000
Contract with Chugach Regional Resources Commission	9.9
	0.0
	0.0
When a non-trustee organization is used, the form 4A is required. **Contractual Total**	$9.9

Commodities Costs:	Proposed
Description	FY 2000
Commodities Total	$0.0

FY01

Prepared: 4-12-00

Project Number: 01131
Project Title: Chugach Native Region Clam Restoration
Agency: Alaska Department of Fish and Game

FORM 3B
Contractual & Commodities DETAIL

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

New Equipment Purchases:	Number	Unit	Proposed
Description	of Units	Price	FY 2000
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
Those purchases associated with replacement equipment should be indicated by placement of an R.		**New Equipment Total**	$0.0

Existing Equipment Usage:	Number	Inventory
Description	of Units	Agency

FY01

Project Number: 01131
Project Title: Chugach Native Region Clam Restoration
Agency: Alaska Department of Fish and Game

FORM 3B
Equipment
DETAIL

Prepared: 4-12-00

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

Budget Category:	Authorized FY 2000	Proposed FY 2001
Personnel		$0.0
Travel		$0.0
Contractual		$9.0
Commodities		$0.0
Equipment		$0.0
Subtotal	$0.0	$9.0
Indirect		$0.9
Project Total	$0.0	$9.9
Full-time Equivalents (FTE)		0.0
	Dollar amounts are shown in thousands of dollars.	
Other Resources		

LONG RANGE FUNDING REQUIREMENTS					
		Estimated FY 2001	Estimated FY 2002		
		$9.9	$0.0		

Comments:

FY01

Prepared: [illegible]00

Project Number: 01131
Project Title: Chugach Native Region Clam Restoration
Agency: Alaska Department of Fish and Game

FORM 4A
Non-Trustee
SUMMARY

2001 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2000 - September 30, 2001

Personnel Costs:			Months	Monthly		Proposed
Name	Position Description		Budgeted	Costs	Overtime	FY 2000
						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	Proposed
Description		Price	Trips	Days	Per Diem	FY 2000
					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	0.0
					0.0	0.0
					0.0	0.0
					0.0	0.0
					Travel Total	$0.0

FY01

Prepared:

Project Number: 01131
Project Title: Chugach Native Region Clam Restoration
Agency: Alaska Department of Fish and Game

FORM 4B
Personnel
& Travel
DETAIL

2001 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2000 - September 30, 2001

Contractual Costs:	Proposed
Description	FY 2000
Contract with Dr. Brooks for Final Report preparation	9.0
	0.0
	0.0
	0.0
	0.0
Contractual Total	$9.0

Commodities Costs:	Proposed
Description	FY 2000
	0.0
Commodities Total	$0.0

FY01

Prepared: 4-12-00

Project Number: 01131
Project Title: Chugach Native Region Clam Restoration
Agency: Alaska Department of Fish and Game

FORM 4B
Contractual & Commodities DETAIL

2001 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2000 - September 30, 2001

New Equipment Purchases: Description	Number of Units	Unit Price	Proposed FY 2000
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
Those purchases associated with replacement equipment should be indicated by placement of an R.		**New Equipment Total**	$0.0

Existing Equipment Usage: Description	Number of Units	

FY01

Project Number: 01131
Project Title: Chugach Native Region Clam Restoration
Agency: Alaska Department of Fish and Game

FORM 4B
Equipment
DETAIL

Prepared: 4.12.00

Project Title: Port Dick Creek Tributary Restoration and Development Project.

Project Number: 01139-A2.

Restoration Category: General Restoration.

Proposer: Alaska Department of Fish and Game.

Lead Trustee Agency: Alaska Department of Fish and Game

Cooperating Agency:

Alaska Sea Life Center:

Duration: 5th year, 5 year project

Cost FY 01: $13,900

Cost FY 02: $5,000

Geographic Area: West Arm Port Dick Bay, Outer Gulf Coast of Southern Kenai Peninsula.

Injured Resource/Service: Pink and Chum Salmon. Lost or reduced commercial fishing services.

ABSTRACT

Additional water temperature, water level, salinity and stream discharge along with sedimentologic parameters (bedload transport, accumulated sediments and gravel/cobble transport rates) will be collected and analyzed to include into proposed manuscripts including, *Transactions of the American Fisheries Society, North American Journal of Fisheries Management* and/or The *Journal of Hydrology*, (see project design for proposed titles). These evaluation studies have been conducted annually from 1996 to 2000, and enable streambed stability research to improve future natural enhancements. The major project goal involves the restoration of the native Port Dick Creek salmon stocks, which had been exposed to moderate to heavy oiling during the 1989 *Exxon Valdez* Oil Spill. Actual restoration of the spawning habitat took place in June 1996. An estimated 6,300 adult pink and chum colonized the new habitat and spawned producing over 587,000 out migrant fry. A three-year project evaluation study has recently been completed and a final report submitted in April 2000.

INTRODUCTION

The Port Dick Creek Tributary Restoration Project located on the outer gulf coast of the Kenai Peninsula, (Figure 1) was initiated under the restoration surveys (R105) in FY/91 and FY/92 which resulted in the selection of Port Dick Creek for further instream restoration work. A potential tributary restoration feasibility analysis was initiated at this site in 1992 and was continued through the spring of 1993.

The feasibility studies warranted excavation of 3,000 m^3 of materials in June 1996 to create additional stable spawning habitat in two tributaries to Port Dick Creek. Results of a three-year evaluation project estimated that 6,300 adult pink and chum colonized the new habitat and spawned producing over 587,000 out migrant fry. Field staff have reported juvenile and adult Dolly Varden trout and juvenile coho salmon also using the new habitat.

The restored tributaries were designed to withstand two extremes; very low and very high water discharge events. Continuation of post construction project evaluation in FY01 will continue to montitor changes in the streambed characteristics, sedimentation and bedload transport. These factors help determine the spawning area available for salmon, and greatly improve the design and planning of future gravel-bedded stream enhancements.

The addition of a third water level monitoring station in April 1998 has allowed for the detection of streambed changes following every major flood event, and the consequent effects on spawning area. In addition, it enables the monitoring of surface water energy slope in support of numerical modeling of the stream channel sediment transport. This modeling will be used to solve stream channel optimization problems for restoration projects of this kind that include factors such as meanders, stream channel widening and groundwater-surface water interaction.

The monitoring and analyses project work is being used for three main purposes. The first purpose has been to monitor and compare various hydrologic parameters to data collected by fisheries biologists to support the survivability of salmon to the habitat restoration project. The second purpose is to monitor and analyze sediment transport parameters to resolve problems that stem from surface water dynamics and sediment transport to support the salmon spawning channel project. The third purpose is to disseminate this information and research to the public, Trustees and the peer-reviewed scientific community.

The Port Dick Creek tributary site is shown in Figure 1. The characteristics include a watershed that experienced several feet of uplift from the 1964 earthquake combined with a large change in streambed gradient and groundwater flow caused by the stream channel excavations. A model of surface water-groundwater interaction is important to understand the sediment transport dynamics at a site affected by uplift, in this case causing subterranean tributaries. This interaction can be important in finding solutions to the problem of channel maintenance flows that would preserve the maximum amount of salmon spawning area (a primary project objective).

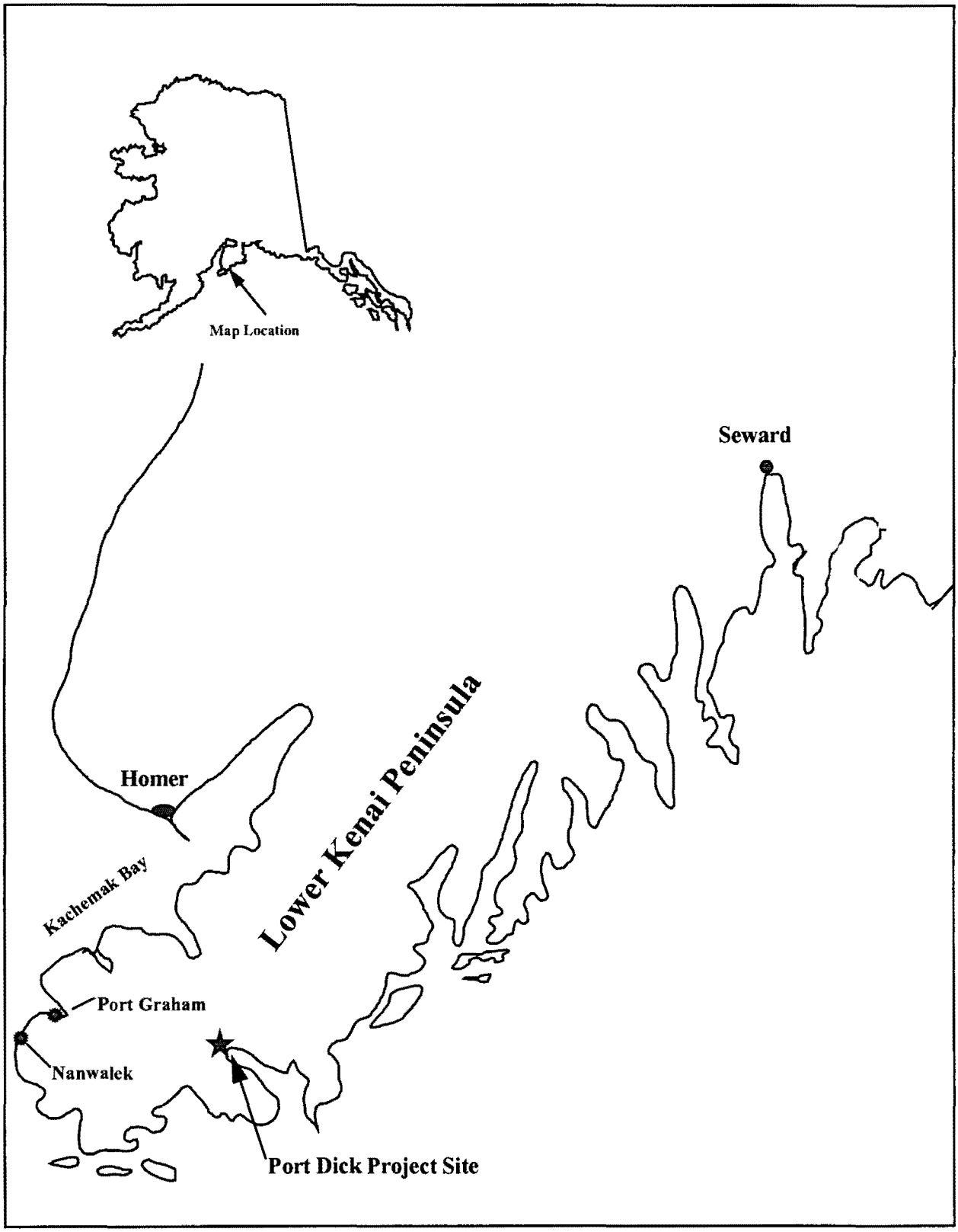

Figure 1. Map of the outer gulf coast of the Kenai Peniunsula showing the location Port Dick Project site.

There are many fundamental differences between this site and what is typically found in the literature. For example, the accuracy of estimates of a channel-maintenance discharge is already generally limited (Wilcock et al., 1996), especially for gravel-bedded channels. This is certainly a problem in the case of this project as the surface water will often visibly decline and wholly disappear upstream of the site. Similarly the surface water discharge onsite receives a significant contribution from groundwater. These facts prevent the routine application of channel geometry and sediment size to the problem of spawning channel design. The onsite monitoring and research are being applied to solutions of problems that will arise in restoration projects of this kind in the future.

Physical parameter monitoring and measurements such as water temperature, water level, salinity and stream discharge are well correlated in the literature with spawning success; egg fertilization and egg to fry survival. Spawning channel enhancement relies on a proper balance of these variables, and it is necessary to monitor them in order to transfer the design work to other systems. The information gained from this project has already been of assistance to similar enhancement projects in Southeast Alaska.

Objectives for the FY01 Detailed Project Description are reduced as it is a publication year, however will continue to evaluate project success through streambed stability, particularly stream discharge. The monitoring and analyses will concentrate on the need to evaluate and adjust the spawning tributaries to optimize salmon spawning habitat. Stream discharge and bedload transport play an important roles in this evaluation. Monitoring bedload transport in an excavated channel includes accounting for sediment accumulation, quantifying the amount and depth of streambed flux and effects of channel discharge on gravel/cobble transport.

In addition, adult salmon production resulting from the restoration efforts will be available from existing ADF&G ground (foot) surveys, which is used to estimate pink and chum spawning escapements. Complete salmon recovery from the EVOS may not occur for decades, and to fully determine the effect that instream habitat restoration has on the ecosystem, it is necessary to perform basic hydrologic measurements and analyses. The results of the 1997, 1998 and 1999 (calendar year) pink and chum emergent fry evaluation study will be published in 2000 to satisfy the transfer of knowledge criteria of this project.

This proposal reduces the cost of long term monitoring by use of high quality sensors and larger capacity datalogging equipment. The benefits of obtaining basic hydrologic and sedimentologic data has proved to be important for this project.

NEED FOR THE PROJECT

A. Statement of Problem

The Port Dick project goals have gradually expanded to include the needs for improved design of long term stream rehabilitation projects in other systems in the Gulf of Alaska, including Southeast Alaska. Similar situations of low water levels exist in this wide area due to extreme

rates of tectonic uplift, and possibly due to climatic shift and other factors as well. These factors make enhancement projects more difficult, though necessary efforts to save genetic stock from extinction in certain cases.

However, needed long term design improvements to increase spawning area are based on the long term data base for the Port Dick Creek Tributary Restoration Project, a unique examination of the long term effectiveness of stream rehabilitation. Significant stream channel changes continue to be recorded at the Port Dick site, and continue to occur after each flood event. It is proposed that the data continue to be collected in FY01 for the benefit of design recommendations, manuscripts and continuity with an upcoming proposal to map alluvial systems in the Gulf of Alaska. The upcoming work will plan ahead for future enhancements in many alluvial systems where salmon genetic stocks is declining.

B. Rationale/Link to Restoration

The ultimate goal of this project is to restore the wild pink and chum salmon stocks of Port Dick Creek. The major hypothesis relates to the theory that the major survival problem occurs during the instream incubation and residence period for both chum and pink salmon. It is theorized that survival problems are caused by the unstable nature of the spawning habitat within the mainstream of Port Dick Creek. There has been a substantial investment, to date, by the EVOS Trustee Council and ADF&G to restore the spawning habitat at Port Dick Creek. This proposal will continue to thoroughly evaluate the effectiveness of this restoration project for publication, given the projected importance of stream restoration projects in the future.

In order to fully achieve the goal of restoration of the wild stocks, several parameters must be monitored to evaluate the success of the project. For example, the chum and pink salmon life history are similar, in that the females of each species migrate upstream to spawn in the summer and fall. They create a gravel cavity or redd and deposit their eggs. The eggs then reside in the gravel substrate until fry emergence in the spring. Clearly the stability of the gravel substrate is an important habitat component that should be monitored in light of the changed post construction streambed hydraulic parameters (streambed slope, meander curvature, placement of riffles and point bars).

Due to the fact that salmon fry emergence occurs in the spring and a salmon run occurs in the summer, it is apparent that the salmon life cycle essentially requires year-round hydrologic monitoring to properly evaluate the spawning channel project. Long term data adjustments have been made, such as the addition of a third water level monitoring station and additional riffle and streambed elevation monitoring.

C. Location

Port Dick Creek is located on the Outer Gulf Coast of the Kenai Peninsula on the exposed coastline of the Gulf of Alaska. The area is characterized and influenced by the warming effect of the maritime currents of the North Gulf Coast, and annual rainfall can exceed 60 inches (ADNR

1994). The predominate vegetation type of the Port Dick Creek drainage is Sitka Spruce and Western Hemlock forest and is considered climax. Sitka Spruce in this area commonly reach a diameter of 24 inches. The creek corridor is narrow (less than 250m) with adjacent slopes in excess of 30% grade. Port Dick Creek is a fresh water creek with the headwaters originating 2 miles to the west of tide water. The soil at the project site is alluvial being poorly drained and low in organic matter.

COMMUNITY INVOLVEMENT

The Alaska Department of Fish and Game is the lead trustee agency for the Port Dick Creek project. A scoping meeting was held in Anchorage at the Alaska Department of Fish and Game Office, 333 Raspberry Road on June 19, 1995. ADF&G (Commercial Fisheries Management and Development Division) communicated with the U.S. Forest Service and ADF&G (Habitat and Restoration Division).

This project was reviewed by the *Exxon Valdez* Trustee Council (TC) in April 1995 and approved the project pending federal NEPA requirements be satisfied prior to further funding. State of Alaska members on the Trustee Council include the Attorney General, and the Commissioners of ADF&G and the Department of Environmental Conservation (DEC). Federal agency members include representatives of the U.S. Departments of the Interior and Agriculture and the National Oceanographic and Atmospheric Administration (NOAA). As part of the review process, the EVOS Trustee Council Public Advisory Group (PAG) reviewed this salmon instream habitat and stock restoration project in 1994 and 1995 prior to preparing recommendations to the Trustee Council. The PAG unanimously approved this type of project in 1994. In 1995, the PAG made no motion to approve or disapprove this project, however the project had received strong public support. In addition, conclusions from the Trustee Council Wild Stock Supplementation Workshop in January 1995 also supported this project. Questions concerning goals, linkage to injury and benefit/cost were addressed and incorporated into the proposal.

A public hearing on the proposed Port Dick Restoration project was held in Homer in April, 1995, by the Oil Spill Restoration Office. There were no negative comments and most people voiced support for the project.

The proposed project has been listed in the Quarterly Chugach National Forest, schedule of proposed actions for environmental analysis since July 1995. This project, among others, is briefly described for interested parties at over 280 addresses. No comment has been received from this effort.

A letter summarizing the scoping meeting and listing the potential issues was drafted and sent to the U. S. Forest Service and other persons and elicited responses from the following: the Cook Inlet Regional Planning Team (CIRPT), Kenai Peninsula Borough Coastal Management Program and members of the Cook Inlet Seiners Association (CISA). All three organizations have endorsed the project.

Mr. Roger MacCampbell, District Ranger for the Kachemak Bay State Wilderness Park has received a draft copy of the Environmental Assessment written for the Port Dick Project. Mr. MacCampbell has responded with written comments and found no objections to the implementation of the proposed action.

In addition to the above community involvement, the marine biology class of the Homer High school in cooperation with ADF&G, entered into a program to test and evaluate instream salmon egg incubators. The incubators were to be used for supplemental colonization at Port Dick Creek should they be needed. The high school class secured a fish transport permit and actually incubated salmon eggs in the incubators in Fritz Creek near Homer.

In December 1996, a slide presentation of project accomplishments was presented at the annual Lower Cook Inlet Seiners Association Membership meeting. It was well received and won unanimous support.

PROJECT DESIGN

A. Objectives

October 1, 2000 through September 31, 2001

The primary and secondary tributaries were excavated in June 1996. Objectives included in this proposal are designed to collect additional hydrological data for analysis and inclusion into selected journals.

1. Continue to evaluate the success of the restored tributaries through data logging and stream discharge measurements and collect additional long term monitoring data for peer review and manuscript publication.
2. Anticipated journals include:

Dickson, M, Coble G R, 2000. Optimization of Instream Salmon Spawning Habitat for Enhancement Projects in an Alluvial Fan, Gulf of Alaska. Manuscript in Progress for Submission to *Transactions of the American Fisheries Society*.

Coble G R, Dickson, M, 2000. Groundwater-Surface Water Interaction for Stream Enhancement in an Alluvial Fan, Gulf of Alaska. Manuscript in Progress for submission to The *Journal of Hydrology*

B. Methods

Part A, *Physical Parameter Evaluation*

Following excavation of the tributaries in June, 1996, 4 types of sensors were installed: water temperature, level, velocity and conductivity. Figure 2 shows the general measurement locations and field arrangement of the equipment. Project methods for FY/01 will continue to measure spawning channel bed-load sediment transport that will address the stability of the spawning habitat created through the restoration project.

The changing channel geometry after construction and sensitivity of salmon eggs to water level necessitates monitoring of water levels after the spawning habitat was restored. The changing channel geometry after construction and sensitivity of salmon eggs to water level necessitated monitoring of water levels after the spawning channel was constructed. This data is collected using pressure transducers accurate to 0.01 ft of water within the pressure range expected at the site. The transducers measure pressure relative to atmospheric pressure so that atmospheric pressure effects need not be taken into account.

Temperature is measured to an accuracy < 0.4 C at least every hour, in both surface water and in the spawning gravels of both tributaries. Temperature effects on salmon cited in the literature (e.g. Pauley, 1988; Wangaard, 1983) correlate fry survival rates to temperature using similar accuracy. When comparing results of the present study to previous studies it is useful to have similar accuracy.

Temperature monitoring locations are shown in Figure 2. There are expected to be some temperature differences between the lower reaches of the spawning channel and the upper reaches, particularly in summer and fall months. The variation of temperature with depth in the spawning channel is not thought to be significant due to the turbulence of the water. The temperature probes are secured within the top 10 cm of substrate to facilitate comparisons of temperature to egg-fry survival rates and to protect the sensors. An additional temperature monitoring point in Port Dick Creek is used to provide a comparison to the known chum and wild pink salmon runs in that reach as shown in Figure 2.

Water velocity measurements are mainly needed to calculate discharge, as well as to characterize low and high stream velocities which can both adversely affect chum salmon. Spawning adult chum salmon use water with velocities varying between 46 and 101 cm/sec (Pauley, 1988). Streamflow therefore regulates the amount of spawning area available: increased flow covers more gravel, thus making more suitable spawning substrate available. Higher stream velocities erode the substrate and suitable spawning is decreased. An improved technique for monitoring spawning area will be used in FY01 which will enable better accuracy of this parameter to be backed out of the Port Dick data.

Salinity can interfere with fertilization of the eggs of chum salmon spawning in or near the intertidal zone. After absorption of the yolk sac, however, chum salmon can tolerate full-strength

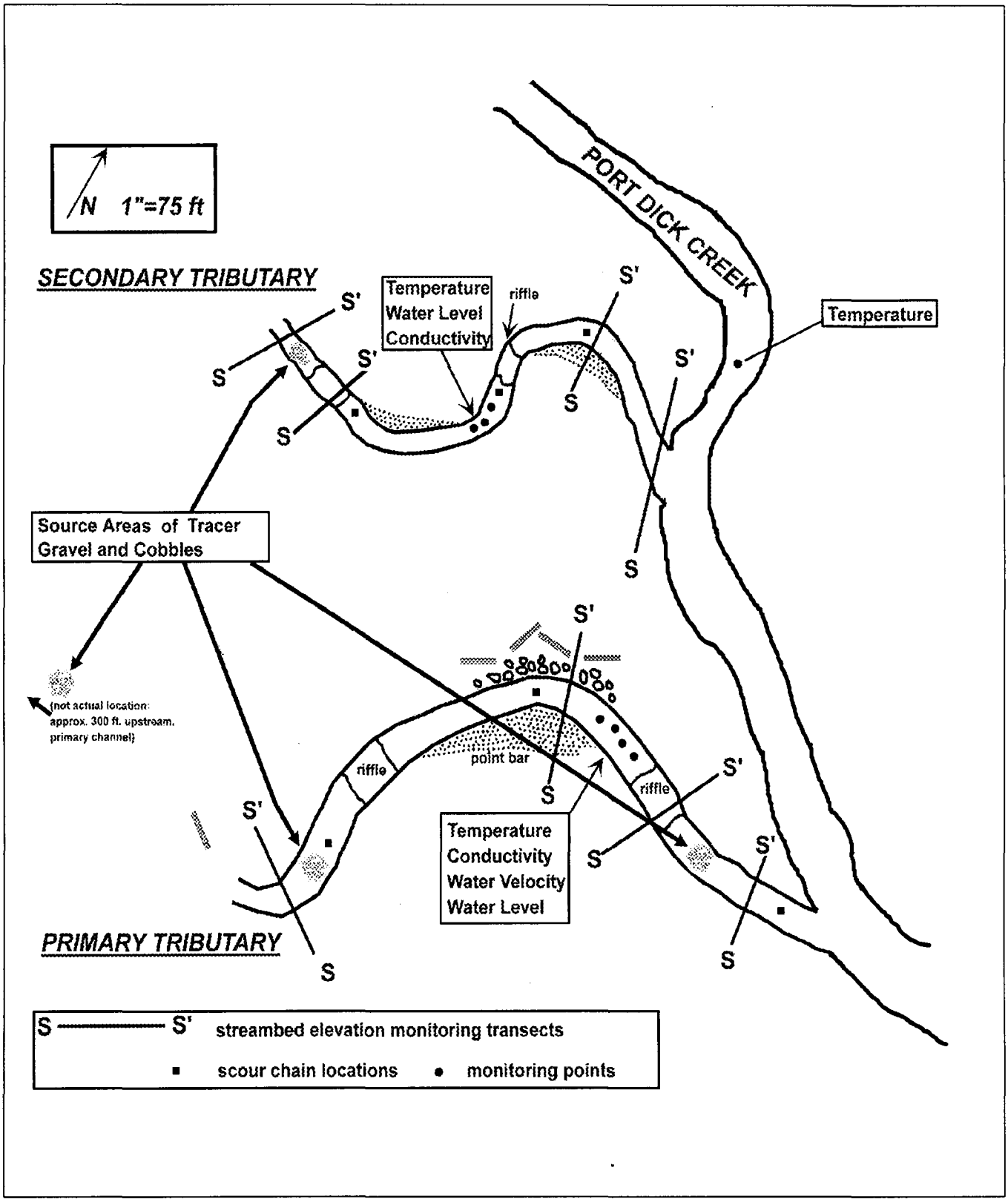

Figure 4. Physical parameter monitoring locations at the Primary and Secondary Tributaries, Port Dick Creek.

sea water. Salinity is correlated to conductivity which is the parameter proposed for measurement. Sea water has a conductivity of approximately 40 to 50 msiemens, which requires an electrode spacing much greater than conductivity sensors for fresh water. The conductivity meter used is calibrated from fresh water to full strength sea water, however the electrode spacing is designed for discerning salinity changes in the spawning channel. The conductivity sensors are attached to the temperature sensors in the substrate at approximate locations shown in Figure 2.

The datalogging equipment used by the sensors easily retains measurements every 30 minutes for 2 months, and a solar panel was added to increase the battery life. Several rapid sampling intervals will be monitored to obtain more information on tidal and flood events, which will help interpret both the biologic and sedimentologic events recorded already.

The datalogging equipment is rugged, and can operate under conditions ranging from -55 to +80 degrees centigrade. Dataloggers and power supplies are housed in fiberglass reinforced and humidity controlled field enclosures for long term monitoring. CGS provides a researcher in the field to provide for situations that have required a change in monitoring objectives, programming and repair of equipment in the field.

Part B, Sediment Transport and Spawning Channel Stability Evaluation:

The stability of stream channels and banks substantially affects the quality of riparian and aquatic habitats. Stream stability is affected by channel morphology and channel material (Myers et al., 1992), both factors of which were changed during spawning channel excavation. The benefits of characterization of sediment transport in the gravel-bedded channels can range from moderately helpful to extremely important.

Sediment and bedload transport in gravel-bedded rivers has received far less attention in the published literature compared to stream channels of finer grained sediments. There has even been controversy in the recent past about the effect of high discharge events on the sediment transport and bed armor of natural gravel-bedded streams and rivers (Ikeda et al., 1989). Discerning the effects of altering a gravel-bedded stream channel on sediment transport and deposition is a side benefit of this study useful for future spawning habitat rehabilitation projects.

As mentioned previously, this salmon spawning channel construction project has provided a unique opportunity to study these effects, in addition to providing needed information on channel stability. Four methods typically used in detailed sediment transport studies of gravel-bedded streams are being used for this project. The methods are designed for inexpensive long term monitoring in conjunction with the hydrologic parameter monitoring. The four methods include measurement and comparison of changes in surveyed stream transects, use of tracer cobbles and gravel, measurement of changes in scour chain orientations and measurements of surface water energy slope. The implementation and justification of each technique is described below.

Stream Transects

Measuring the variation of parameters across a section of a stream channel as depicted in Figure 2 can be a very useful way to monitor streambed stability. Numerous studies have used this technique successfully, e.g. Jacobsen, 1995 in AGU Monograph 89. *Dietrich and Whiting 1989* concluded in their work with gravel-bedded rivers that monitored stream cross sections were very useful for the study of gravel transport. Transects are also useful in the hydrologic parameter objectives for this project for determining estimates of egg mortality due to erosion (McNeil, 1965), which is of particular interest in the few years following excavation of the spawning channel. Therefore monitoring stream transects is an important parameter to consider for all objectives of this project.

Streambed elevation along a transect has been useful for monitoring net erosion and sedimentation of the streambed. The elevation and position of each point along a cross section is obtained using a total station, and compared to previous cross sections to determine a sediment budget. It has also been useful to obtain streambed elevations between and upgradient of the cross sections as another way to determine the long term streambed changes and streambed gradients at the site.

Many studies find streambed elevation changes useful over the very long term by monitoring waves of sediment as they flow by a station (Jacobsen, 1995). In this case the study will be useful in determining relatively short-term changes (a few years) that may be reversed or enhanced by small alterations in the spawning channel geometry.

Certain upgradient cross sections may be affected by the drainage caused by moving the seepage face from the spawning channel sites to upgradient areas. This may mean a cross section will not receive flow at low to average discharge. It is recommended that some of the water velocity measurements used for obtaining the important discharge parameters be taken in the stream channel far upgradient from both channels. This value would be useful to compare to onsite discharge measurements, particularly for a dramatically 'losing' (recharging) stream. Depth-integrated water velocity measurements (using two measurements per station) are more accurate for discharge calculations, though frequently the water is too shallow to apply more than one value (CGS uses the 60% depth for single measurements).

Surveyed markers and marked trees are used to locate stream transect sections. A surveyor tape is stretched between the markers for horizontal reference. Streambed elevations are then measured to ~0.01 ft with the total station at approximately 2 foot intervals across the transect. This is a standard method for monitoring changes in streambed morphology with time, compatible with other detailed studies of stream sediment transport in gravel-bedded streams (e.g. Jacobson, 1995). Eight such transects are currently being used, with approximate locations shown in Figure 2. Subsequent transects will show how much the stream channel adjusts to the designed spawning channel, particularly after high discharge events.

Sediment Transport Analyses

There are many types of sediment transport analyses that benefit the spawning channel project both directly and indirectly.

One example of direct studies involving salmonids is to compare onsite gravel sizes to those preferred by salmonids or to recognize the influence salmonids have on fluvial gravel size (Kondolf, 1993). There have even been studies of gravel morphology on salmon egg mortality (Meehan, 1977).

Perhaps more importantly are concerns over the long term stability and viability of the spawning channels. The best way to approach this is to use onsite data from the sediment transport monitoring is to calculate basic sediment transport parameters via a variety of simple to complex techniques. These sediment transport parameters can then be used in surface water models to help answer questions concerning the long term streambed stability, the short term ability for the channel to maintain its water depth and to determine what changes in the channel geometry could be made to improve the streambed stability. In addition comparison studies can be made with other gravel-bedded stream studies in the literature.

The 'flushing flow' discharge from hydroelectric projects is a current matter of intensive research. This 'flushing flow' is on a small scale directly related to the critical discharge necessary for bedload transport in gravel-bedded streams (e.g. Kondolf, 1990). Other basic parameters that must be derived from onsite data have been discussed previously (shear stress, sedimentologic characteristics, stream width, stream depth profile, variations in discharge etc.). Calculation of parameters as basic as discharge in gravel bedded streams are still a matter of current research (e.g. Bridge, 1992), particularly where there are many obstructions as is the case upgradient of the spawning channels.

Models that use the parameters for gravel-bedded streams are continually being refined, researched and published. For example, Bridge et al. recently published a basic sediment transport model for gravel-bedded streams that includes the critical discharge parameter, Hassan et al. proposed a model for gravel movement using tracer data (1991) and a model for the mixing of bedload downgradient from a source area (1994). Dietrich and Whiting (1993) have worked with models that include meanders in gravel bedded rivers, an important component at this site, and Pizzuto (1991) published an important model concerning gravel channel widening predictions. In addition there are valuable published data sets for comparison studies available for gravel bedded flow, for example from laboratory flume studies (e.g. Pizzuto, 1990).

A final subject that is of interest to the site is studying the influence of small and large drop structures and their effect on gravel sediment transport. These topics often appear in the context of bridge construction, since bridges frequently must be founded on erodible material. The scour of a gravel-bedded river is different at the location of a drop structure, so a variety of studies (e.g. Laursen et al., 1984) indicate the stable sediment size at sloping sills and erosion depth directly below drop structures.

Laursen et al. (1984) proposed a model for the size of riprap needed on the face of a sloping sill similar to the seepage face on the primary tributary. Elements of more specific papers on drop structures can also be useful in deriving models that describe sediment transport at drop structures (e.g. Humpherys, 1986; Fiuzat, 1987; Christodoulou, 1985). A related topic is streambank stability analyses (e.g. Chang, 1990). These topics are useful to keep in mind should future channel changes be deemed necessary.

Mr. Coble has spent his 15-year hydrologic career as a specialist in numerical modeling, and looks forward to applying his knowledge and experience to the interesting problems presented by the Port Dick Project, as might be expected. Manuscripts of the monitored hydrologic and sedimentologic parameters as they relate to salmon spawning habitat and stream channel construction are planned for publication in peer-reviewed publications such as Transactions of the American Fisheries Society, Water Resources Bulletin, Hydrologic Sciences Journal and/or the Journal of Hydrology.

C. Cooperating Agencies, Contracts, and Other Agency Assistance

The actual excavation/restoration of the tributaries was contracted out to the private sector in FY/96. The physical parameter monitoring and the studies to evaluate the stability of the excavated tributaries are contracted to Coble Geophysical Services of Homer.

SCHEDULE

A. Measurable Project Tasks for FY/98 (October 1, 1997 - September 30, 1998)

Continuous through 2001:		Monitor environmental parameters within restored tributary e.g. water temperature, velocity, salinity and water level. Monitor bedload Certain bedload transport activities proposed continuous through 2001.
October 1, 00- Jan. 28, 01:		Prepare materials for possible participation in the annual restoration workshop in January. Prepare quarterly status reports as required.
March 1- April 15	01	Prepare field equipment and arrange logistics for the pending field season. Complete annual report for the EVOS Trustee Council. Develop FY/99 Port Dick Detailed Project Description.
April 15 - Sep. 30:	01	Perform stream stability and hydrologic field work.

B. Project Milestones and Endpoints

June 1996	Excavate spawning tributaries at Port Dick Creek.
June 1996	Install water temperature, velocity, salinity and water level instruments. Install scour chains, install sediment transect markers and tracer gravel/cobbles.
July - August 96-1999	Monitor and enumerate adult escapement and colonization into restored habitat. Supplement colonization if needed. Label individual salmon redds for egg/fry survival estimates.
Continuous through 2001	Monitor environmental parameters within restored tributary e.g. water temperature, velocity, salinity and level. Monitor bed load sediment transport as affected by excavation, proposed through 2002.
May 1997 through 1999	Estimate fry production through on-site emergent fry studies. Correlate and analyze hydrologic, sedimentologic parameters with biologic parameters, publish results.
March 1997 - 1999	Prepare Port Dick Detailed Project Description. Attend symposium to present results of monitoring and analyses.
April 2000	Complete final report. Continue monitoring sediment transport parameters on limited basis for publication/research.
Sept. 2000 -2002	Continue to monitor and analyze sediment transport parameters for inclusion into selected journals.

C. Completion Date

Actual excavation of the tributaries occurred in June 1996, with post excavation evaluation and analysis to be completed in 2001. Limited additional monitoring of sediment transport parameters is proposed through 2002 on a limited basis for publication/research.

PUBLICATIONS AND REPORTS

Manuscripts of the results of the restored spawning habitat are available for publication in peer-reviewed journals. Monitored hydrologic and sedimentologic parameters as they relate to salmon spawning habitat and stream channel construction are planned for publication for FY/00 and beyond in peer-reviewed publications such as Transactions of the American Fisheries Society, and/or the Journal

of Hydrology (see project design for titles). The annual reports will be completed and submitted on April 15th.

PROFESSIONAL CONFERENCES

The conferences that we anticipate attending include the annual Exxon Valdez Oil Spill Trustee Council Restoration Workshop, the annual AWRA-Alaska meeting and either the Spring or Fall 1998 American Geophysical Union (AGU) meeting. Results are also planned for presentation at future AGU meetings, and possibly an International Association of Hydrological Sciences symposium. The project team includes members of these organizations and other professional organizations. Mr. Coble will present this project to the Year 2000 AWRA International Conference on Hydrology in Extreme Environments, for example.

NORMAL AGENCY MANAGEMENT

The Department of Fish and Game does not have the funding ability to respond to unforeseen crisis events such as the *Exxon Valdez* Oil Spill, which impacted the Port Dick area with moderate to heavy oiling. The Port Dick Creek restoration project was originally funded by the Trustee Council in 1991 and is currently funded in FY/97 to conduct project evaluation.

The project was originally proposed to facilitate restoration of the depressed Port Dick Creek pink and chum salmon stocks. This is the first spawning channel/spawning habitat restoration project conducted in the Lower Cook Inlet area.

COORDINATION AND INTEGRATION OF RESTORATION EFFORT

This instream habitat restoration project is the only commercial fisheries EVOS related project on the Outer Gulf Coast of the Kenai Peninsula currently being considered for further funding.

PRINCIPAL INVESTIGATOR

Mark Dickson, Fish and Wildlife Technician IV.

Mr. Dickson has been employed as a fish culturist and fish and game technician with the Alaska Department of Fish and Game for the past 20 seasons. He has considerable experience in fish cultural practices in the field and in the hatchery management projects that restore and enhance sport and commercial fisheries in the Lower Cook Inlet area. Mr. Dickson has worked in the Lower Cook Inlet area participating in and managing salmon restoration projects.

OTHER KEY PERSONNEL

Geoff Coble, Project Geoscientist and Engineer

Mr. Coble is currently the owner and manager of CGS, a local firm specializing in water resources geophysics. Mr. Coble has a multi-disciplinary and academic approach to his career, combining three college degrees in Water Resources Science, Geology and Geophysics with water resources numerical modeling as a specialty. The fact that basic questions concerning transport of gravel in gravel-bedded streams remain unanswered, combined with the unique complexities of this site make it an ideal research project for Mr. Coble.

The Port Dick Creek sedimentology project was selected and defined based on the strengths of Mr. Coble and the value of the project for research. Mr. Coble has a long record of presenting its work for peer review, and has already made agreements for project review with other nationally published experts in hydrology and sediment transport.

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2001EXXON VALDEZ TRU : COUNCIL PROJECT BUDGET

October 1, 2000- September 30, 2001

Budget Category:	Authorized FY 2000	Proposed FY 2001	LONG RANGE FUNDING REQUIREMENTS					
Personnel	$44.0	$0.0						
Travel	$0.6	$0.0						
Contractual	$31.0	$12.2						
Commodities	$1.4	$0.8						
Equipment	$0.0	$0.0						
Subtotal	$77.0	$13.0	Estimated FY 2002	Estimated				
General Administration	$8.8	$0.9						
Project Total	$85.8	$13.9	$5,000					
Full-time Equivalents (FTE)		0.0						
	Dollar amounts are shown in thousands of dollars.							
Other Resources								

Comments:

FY01

Prepared:

Project Number: 01139-A2
Project Title: Port Dick Creek Tributary Restoration
Agency: Alaska Dept of Fish and Game

FORM 3A
TRUSTEE
AGENCY
SUMMARY

2001EXXON VALDEZ TRU : COUNCIL PROJECT BUDGET

October 1, 2000- September 30, 2001

Personnel Costs:		GS/Range/	Months	Monthly		Proposed
Name	Position Description	Step	Budgeted	Costs	Overtime	FY 2001
No trustee agency personnal costs						0.0

Travel Costs:	Ticket	Round	Total	Daily	Proposed
Description	Price	Trips	Days	Per Diem	FY 2001

FY01

Prepared:

Project Number: 01139-A2
Project Title: Port Dick Creek Tributary Restoration
Agency: Alaska Department of Fish and Game

FORM 3B
Personnel
& Travel
DETAIL

Contractual Costs:	Proposed FY 2001
Description	
	0.0
4A Linkage	12.2
When a non-trustee organization is used, the form 4A is required. **Contractual Total**	$12.2

Commodities Costs:	Proposed FY 2001
Description	
page printing costs @ $75.00/page, 10 pages	0.8
(See DPD for titles and journals)	
Commodities Total	$0.8

FY01

Project Number: 00139-A12
Project Title: Port Dick Creek Tributary Restoration
Agency: Alaska Department of Fish and Game

FORM 3B
Contractual & Commodities DETAIL

Prepared:

New Equipment Purchases: Description	Number of Units	Unit Price	Proposed FY 2001
	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
			0.0
Those purchases associated with replacement equipment should be indicated by placement of an R.		**New Equipment Total**	$0.0

Existing Equipment Usage: Description	Number of Units	Inventory Agency

FY01

Project Number: 01139-A2
Project Title: Port Dick Creek Tributary Restoration
Agency: Alaska Department of Fish and Game

FORM 3B
Equipment
DETAIL

Prepared:

2001EXXON VALDEZ TRU : COUNCIL PROJECT BUDGET

October 1, 2000- September 30, 2001

Budget Category:	Authorized FY 1999	Proposed FY 2000						
Personnel		$8.9						
Travel		$0.0						
Contractual		$3.3						
Commodities		$0.0						
Equipment		$0.0	LONG RANGE FUNDING REQUIREMENTS					
Subtotal	$0.0	$12.2	Estimated FY 2002					
Indirect								
Project Total	$0.0	$12.2	$5,000.0					
Full-time Equivalents (FTE)		0.3						
	Dollar amounts are shown in thousands of dollars.							
Other Resources								

Comments:

FY01

Prepared:

Project Number: 01139-A2
Project Title: Port Dick Creek Tributary Restoration
Name: Coble Geophysical Services

FORM 4A
Non-Trustee
SUMMARY

2001EXXON VALDEZ TRU : COUNCIL PROJECT BUDGET

October 1, 2000- September 30, 2001

Personnel Costs:			Months	Monthly		Proposed
	Name	Position Description	Budgeted	Costs	Overtime	FY 2001
	Coble	**Physical parameter monitoring and manuscript development**	2.0	4425.0		8.9
		Subtotal	2.0	4425.0	0.0	
					Personnel Total	$8.9

Travel Costs:		Ticket	Round	Total	Daily	Proposed
	Description	Price	Trips	Days	Per Diem	FY 2001
					Travel Total	

FY01

Prepared:

Project Number: 01139-A2
Project Title: Port Dick Creek Tributary Restoration
Name: Coble Geophysical Services

FORM 4B
Personnel
& Travel
DETAIL

2001EXXON VALDEZ TRU COUNCIL PROJECT BUDGET

October 1, 2000- September 30, 2001

Contractual Costs:	Proposed
Description	FY 2001
Physical Parameter Monitoring	FFY 1997
2 Marsh McBirney water velocity sensors and equipment, rental	0.8
2 Pressure Transducer, Hastelloy diaphragm-stainless casing, rental	0.3
3 Temperature Probe, rental	0.1
2 Conductivity probe, rental	0.3
2 Datalogger, rugged full bridge, half bridge and pulse measurements, rental	0.5
Spawning Channel Stability Evaluation	
1 Total Station, Tripods, Prism Rod, 300 Ft Surveyor's Tape, Rental	0.7
1 metal detector for tracer gravel, 1 meter depth sensitivity, and tracer gravel expendables, rental	0.4
1 Additional Pressure Transducer, Hastelloy diaphragm-stainless casing, rental	0.2
Contractual Total	$3.3
Commodities	FY 2001
Commodities Total	

FY01

Project Number: 01139-A2
Project Title: Port Dick Creek Tributary Restoration
Name: Coble Geophysical Services

FORM 4B
Contractual & Commodities DETAIL

Prepared:

New Equipment Purchases: Description	Number of Units	Unit Price	Proposed FY 2001
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
Those purchases associated with replacement equipment should be indicated by placement of an R.		**New Equipment Total**	$0.0

Existing Equipment Usage: **Description**	Number of Units
Datalogger, rugged full bridge, half bridge and pulse measurements	3
Pressure transducer, Hastelloy diaphragm-stainless casing, 0,01 ft accuracy	3
thermistors, 0.4 degree C accuracy, soil and water measurement	4
data downloading equipment (laptop, optical interface, keypad etc.)	1
data field enclosures for datalogging equipment	4
temperature and conductivity instrument for field calibrations	1
conductivity sensors	2
Helly-Smith bedload sampler, with bags and expendables	1
rotating laser level, stadia rod, detector and 300 ft surveyors tape	1
scour chains, stainless, and installation equipment	1
metal detector for tracer gravel, 1 meter depth sensitivity	1
installation supplies (mounting brackets, conduit for exposed cable, expendables	1

FY01

Project Number: 01139-A2
Project Title: Port Dick Creek Tributary Restoration
Name: Coble Geophysical Services

FORM 4B
Equipment
DETAIL

Prepared:

Common Murre Population Monitoring

Project Number:	01144
Restoration Category:	Restoration Monitoring
Proposer:	DOI-FWS
Lead Trustee Agency:	USFWS
Cooperating Agencies:	None
Alaska SeaLife Center:	
Duration:	1.5 years
Cost FY 01:	$46,500
Cost FY 02:	$14,000
Geographic Area:	Field work will be conducted at the Chiswell Islands murre colonies in FY 01.
Injured Resource/Service:	Common murres

ABSTRACT

This proposed common murre *(Uria aalge)* restoration monitoring project is related to Projects 98144 (a murre population monitoring study that censused the Chiswell Islands nesting colonies in FY 98) and 99144 (another murre population monitoring study that censused the Barren Islands nesting colonies in FY 99). It is based on the recommendation made at the conclusion of the FY 98 study to recount the Chiswell Islands murre colonies in FY 00 or FY 01, and it is designed to collect additional murre population numbers data at this injured nesting complex. Data will be compared with counts made at the Chiswell Islands in 1989-1992 and 1998, and the results of these analyses will be used in combination with results from the 1989-1997 and 1999 Barren Islands murre population monitoring studies to help determine the recovery status of common murres in the spill area.

INTRODUCTION

This proposed restoration monitoring project is designed to collect additional population numbers data on common murres *(Uria aalge)* at the Chiswell Islands. It is related to Project 98144, a study that censused these nesting colonies in FY 98, and it is based on a recommendation made at the conclusion of that study to recount this injured nesting complex in FY 00 or FY 01 (see Roseneau *et al.* 1999). Recounting these colonies in FY 01, well after any lingering affects of the 1997-1998 El Niño and La Niña events have dissipated, will provide a better measurement of the Chiswell Islands postspill murre population. This information, coupled with 1989-1997 and 1999 Barren Islands census data (see Roseneau *et al.* 1999 and 2000) will allow the recovery status of this injured species to be determined more accurately in the spill area.

NEED FOR THE PROJECT

A. Statement of Problem

We censused the Chiswell Islands murre colonies in 1998, six years after the last population counts were made, to see if numbers of breeding birds had increased since the spill (see Roseneau *et al.* 1999). No evidence of an increase was found; instead a negative trend was apparent over the 9-year 1989-1998 postspill interval. However, numbers of murres were highly variable at one of the colonies in 1998, compared to previous years, and when these data were excluded from the analysis, the negative trend disappeared. These results, coupled with other observations of unstable bird numbers at the Chiswell and Barren islands nesting cliffs, suggested that our 1998 population estimate was artificially low and did not accurately reflect the number of birds actually breeding at the Chiswell Islands nesting complex (unstable attendance well beyond the time murres have normally settled down and laid eggs on nesting ledges was probably related to the strong 1997-1998 El Niño and La Niña events see Roseneau *et al.* 1999).

B. Rationale/Link to Restoration

Attendance was unstable at one of the six Chiswell Islands common murre colonies during the 1998 population monitoring counts, and as a result, the 1998 population estimate was artificially low and did not accurately reflect the number of birds actually breeding at this northern Gulf of Alaska nesting complex (unstable attendance well beyond the time murres have normally settled down and laid eggs on nesting ledges was probably related to the strong 1997-1998 El Niño and La Niña events see Roseneau *et al.* 1999). Therefore, additional data are needed to determine the true status of this injured species at this 6-island nesting complex (i.e., is the total population decreasing, as implied by the 1998 counts, or is it actually stable, or even increasing).

C. Location

The proposed FY 98 common murre population monitoring study will be conducted at the Chiswell Islands, just west of Resurrection Bay near the entrance to Aialik Bay (see Figs. 1 and 2).

COMMUNITY INVOLVEMENT AND TRADITIONAL ECOLOGICAL KNOWLEDGE

A large format, computer-generated color poster summarizing the study results will be prepared and submitted to the Trustee Council for public display after data have been analyzed (similar posters showing results from common murre population monitoring studies 93049, 94039, 96144, 97144, and 99144 have been displayed at the Trustee Council January 1996-2000 restoration workshops). The printed posters are easy to transport and can be used by Trustee Council staff for a variety of purposes, including public displays at oil spill community meetings and schools. The

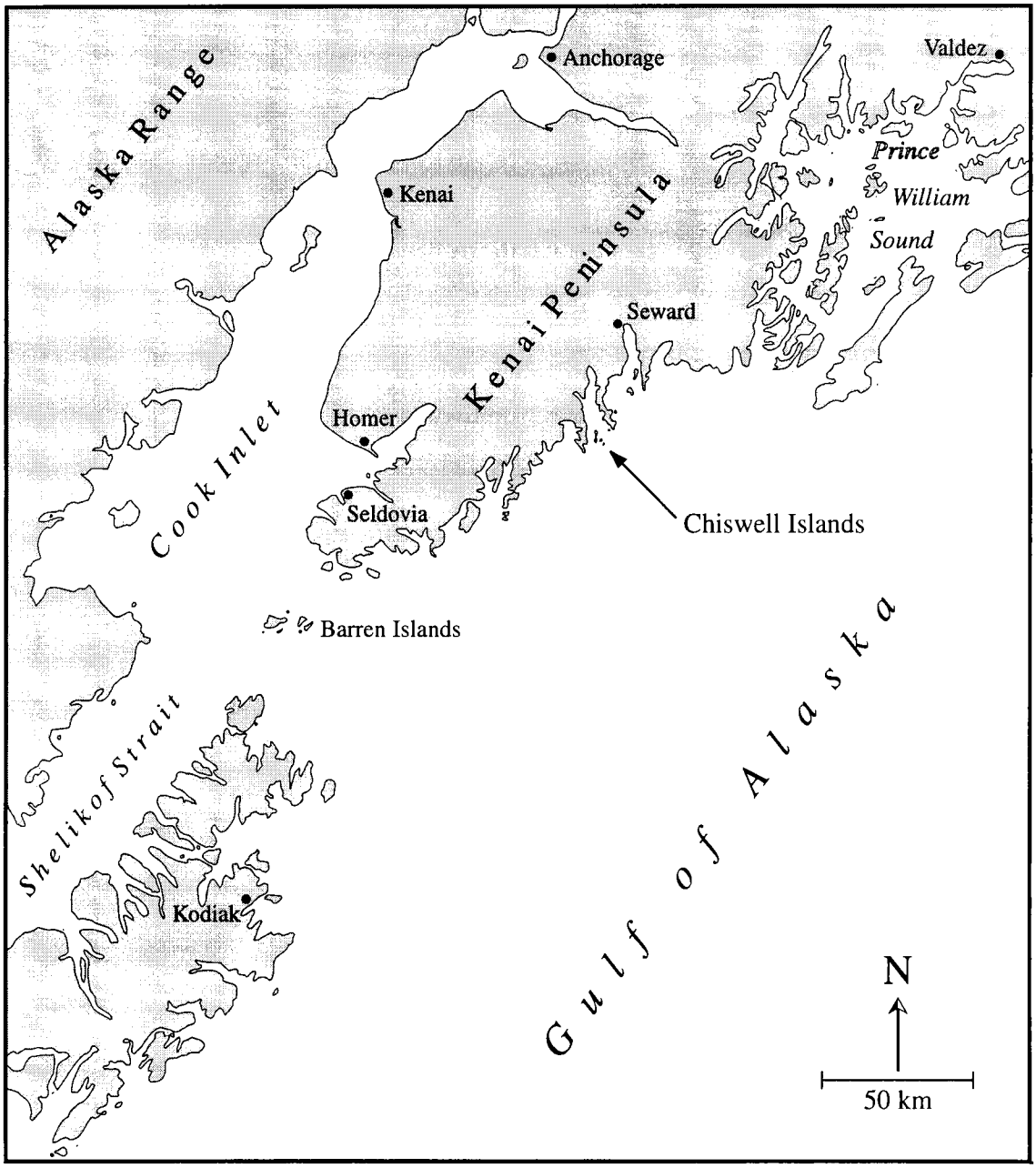

Figure 1. Location of the Chiswell Islands, Alaska.

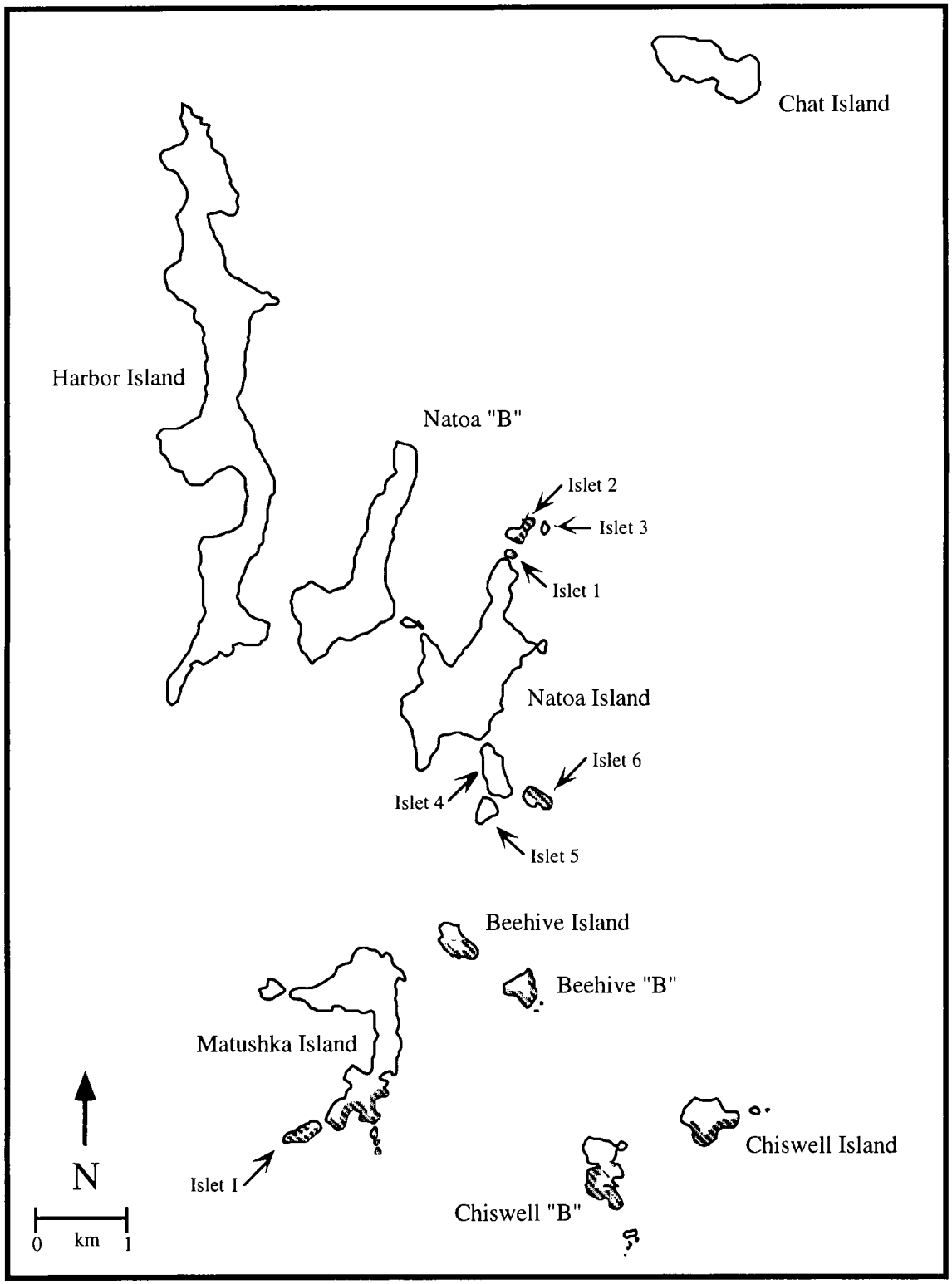

Figure 2. The Chiswell Islands study area (shaded areas show locations of murre nesting habitat).

posters and abstracts summarizing annual findings will also be available on-disk for inclusion in any on-line products that the Trustee Council may develop for public display. Copies of annual and final reports will be available to the public in Homer and Anchorage. Study results will also be presented at public Trustee Council-sponsored meetings and workshops, and in scientific publications. If a FWS research vessel is not available to support the work, a vessel will be chartered locally (e.g., Seward, Homer). Most supplies will also be obtained locally (e.g., fuel, food).

PROJECT DESIGN

A. Objectives

The project objective is to determine if murre populations are increasing at the Chiswell Islands nesting colonies. Specific objectives are to:

1. Census the Natoa, Matuska, Chiswell, Chiswell "B", Beehive, and Beehive "B" murre colonies; pool these counts with 1989-1992 and 1998 FWS scores and 1991 Dames & Moore (D&M) estimates; and analyze the data set for trends and differences among years.

2. Discuss the Chiswell Islands results in context with 1989-1999 Barrens Islands murre population monitoring data.

B. Methods

The project is designed to help test the null hypothesis that murre populations have not increased at nesting colonies in the spill area since the time of the event. The hypothesis will be tested by censusing birds at the six Chiswell Islands nesting colonies and statistically testing the updated data set (i.e., FWS counts made in 1989-1992, 1998, and 2001; and D&M counts made in 1991) for differences among years and trends in population size (see Roseneau *et al.* 1999). Results will also be compared with 1989-1999 Barren Islands murre population numbers data (see Roseneau *et al.* 2000).

Data will be collected and analyzed by the same methods used during the 1998 Chiswell Islands murre population monitoring study (Project 98144; see Roseneau *et al.* 1999). Field work will be conducted during about 15-30 July. A 15-20 m vessel will be hired to transport personnel to and from the study area and support the census work (a relatively large vessel is needed to support personnel at this location because of strong tidal flows and exposure to the open Gulf of Alaska, rapid changes in local weather conditions, lack of suitable camp sites, and distances between the colonies and protected coves and bays; working from a support vessel is also more efficient, because the census team can remain on-station until the job is done, instead of attempting to commute back and forth to the study site).

Data Collection

The two-person census team will include at least one experienced observer (e.g., D.G. Roseneau, A.B. Kettle, G.V. Byrd). The six islands will be treated as plots, and birds will be counted from an inflatable raft using 7x42 binoculars and hand-held tally meters (see Roseneau *et al.* 1999). One team member will record plot scores without revealing his/her own count to the other observer. The recorder will compare the scores to see if they fall within 10% of each other (i.e., within 5% of their average). If they do not and if time allows, plots will be recounted until both scores fall within this range. Counts will be made by 1's or 10's, depending on plot histories, and they will be made during the part of the nesting season and time of day when attendance is most stable (i.e., between the peak of egg-laying and first sea-going of chicks, and during 1100-2000 hrs; e.g., see Byrd 1989; Hatch and Hatch 1989; Roseneau *et al.* 1995, 1996, 1997, 1998, 1999, 2000). The six colonies (Natoa, Matuska, Chiswell, Chiswell "B", Beehive, and Beehive "B") will be counted

at least five separate times on different days to provide adequate power to detect changes in numbers because of daily variation in attendance (e.g., see Byrd 1989, Hatch and Hatch 1989, Roseneau *et al.* 1999).

Data Analysis

Statistical power to detect significant changes in murre numbers is discussed in Appendix 1. Data will be analyzed by the same methods used during the 1998 Chiswell Island murre population monitoring study (Project 98144; see Roseneau *et al.* 1999). To analyze data, 1-day totals will be calculated for the 6-island nesting complex and then these scores will be averaged to obtain a six-island estimate. Results will be pooled with 1989-1992 and 1998 FWS and 1991 D&M scores (i.e., see Nysewander and Dipple 1990, 1991; Dipple and Nysewander 1992; Nysewander *et al.* 1993, Dragoo *et al.* 1995; Erikson 1995; Roseneau *et al.* 1999), and analyzed for trends and differences among years by running linear regressions and one-sample *t*-tests. The 0.1 significance level will be used to increase the power of the tests and reduce Type II error (the 0.9 confidence interval will be adequate for our purposes; see Roseneau *et al.* 1999 and 2000).

C. Cooperating Agencies, Contracts and Other Agency Assistance

A contract will be required to hire a vessel to support the FY 01 Chiswell Islands murre population monitoring counts.

SCHEDULE

A. Measurable Project Tasks for FY 01 (1 October 2000 - 30 September 2001) and FY 02 (1 October 2001 - 30 September 2002)

Schedules for the proposed FY 01 and FY 02 work are provided below.

FY 01

1 Oct 2000 – 31 Jan 2001:	Arrange vessel contract and coordinate plans with Kenai Fjords National Park staff.
1 Feb – 31 Mar 2001:	Arrange for hiring of seasonal employee.
1 – 30 Apr 2001:	Check and repair equipment and gear (e.g., boats, outboard motors, radios, binoculars, survival suits).
1-31 May 2001:	Finalize vessel contract, complete checking and repairing equipment and gear.
1-30 Jun 2001:	Check and update census plot booklets, purchase supplies.
1-14 Jul 2001:	Pack equipment and supplies, travel to Seward.
15 Jul 2001:	Depart Seward for Chiswell Islands study area.
16-30 Jul 2001:	Collect data at Chiswell Islands, as weather permits.
31 Jul 2001:	Depart Chiswell Islands study area and return to Seward.
1 Aug 2001:	Unload vessel, return to Homer.

2-31 Aug 2001:	Clean and store equipment.
1 - 30 Sep 2001:	Enter data.

FY 02

1 Oct – 31 Dec 2001:	Review and analyze 1989-1992 and 1998 FWS and 1991 D&M data.
1 Jan 2002 – 15 Mar 2002:	Prepare draft report, submit draft for in-house review.
16 Mar - 10 Apr 2002:	Finalize project report.
11 Apr 2002:	Submit final project report to Chief Scientist for peer review.

B. Project Milestones and Endpoints

Project milestones and endpoints for the proposed FY 01 and FY 02 work are listed below.

January 2001:	Vessel contract arranged and plans coordinated with Kenai Fjords National Park staff.
May 2001:	Vessel contract finalized.
Mid-July 2001:	Field initiated at Chiswell Islands murre colonies.
Late July 2001:	Field work completed at Chiswell Islands murre colonies.
March 2002:	Draft report on FY 01 Chiswell Islands field activities completed.
April 2002:	Final report on FY 01 Chiswell Islands field activities submitted to Chief Scientist.

C. Completion Date

Field work will be completed in FY 01 and a final report will be submitted to the Chief Scientist by 15 April 2002.

PUBLICATIONS AND REPORTS

A final report on the 2001 Chiswell Islands murre population monitoring study will be submitted to the Chief Scientist by 15 April 2002. Results of the study will also be included in the annual AMNWR seabird monitoring report, and reported in publications on northern Gulf of Alaska murre populations, as appropriate.

PROFESSIONAL CONFERENCES

Results from the 2001 Chiswell Islands murre population monitoring study will be presented at the Alaska Bird Conference in 2002. About $1.5K will be needed to cover the costs of one person to attend this professional meeting (results from the work may also be presented at other conferences in 2002-2003, if they are appropriate forums for the work).

NORMAL AGENCY MANAGEMENT

The proposed common murre population census work at the Chiswell Islands is not something that AMNWR or the FWS is required to do by statute or regulation. The Chiswell Islands are listed as an intermittent monitoring site for seabirds in the refuge's seabird monitoring program, and as such, these colonies are only censused opportunistically about once every 10 years. Also, because the islands are not part of the FWS's highest priority ecosystem, the Bering Sea, support for this type of work will probably not be available until overall FWS priorities change (i.e., from the Bering Sea to other officially designated ecosystems within Alaska). The proposed project is needed to obtain census data to help determine whether common murre populations are increasing at Gulf of Alaska breeding locations affected by the spill. Results of the study will be used to re-evaluate the recovery status of common murres in the spill area and help formulate management strategies for this injured species in the Gulf of Alaska.

COORDINATION AND INTEGRATION OF RESTORATION EFFORT

The proposed restoration monitoring study will be coordinated with Alaska Maritime National Wildlife Refuge work at other locations in the Gulf of Alaska. The refuge will provide several items (e.g., office space and supplies, a vehicle for transporting personnel and equipment between Homer and Seward, survival gear, radios, inflatable rafts, outboard motors, cameras, binoculars) to the project that are not required by these other studies. The project will also be coordinated with Kenai Fjords National Park staff, because the National Park Service may be conducting work in the same general area.

EXPLANATION OF CHANGES IN CONTINUING PROJECTS

No changes have been made to the project design of the FY 01 Chiswell Islands common murre population monitoring study (i.e., the project design, including methods and schedules, are the same as those proposed in the previously approved Project 98144 DPD and reported by *Roseneau et al.* 1999).

PROPOSED PRINCIPAL INVESTIGATOR

Name: David G. Roseneau
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PRINCIPAL INVESTIGATOR

1. David G. Roseneau (Principal Investigator)

David Roseneau received his B.S. degree in wildlife management and M.S. degree in biology from the University of Alaska - Fairbanks in 1967 and 1972, respectively. His thesis research was on the numbers and distribution of gyrfalcons, *Falco rusticolus* on the Seward Peninsula, Alaska. He joined the U.S. Fish and Wildlife Service in January 1993 and was project leader of common murre restoration monitoring studies in the Barren Islands during 1993-1994 (Projects 93049 and 94039). Mr. Roseneau was also principal investigator of the 1995-1999 APEX Barren Islands seabird and large fish as samplers studies (Projects 95163J, 95163K, 96163J, 97163J, 97163K, 98163J, 98163K, 99163J, and 99163K), and the 1996-1997 and 1999 Barren Islands and 1998

Chiswell Islands common murre population monitoring studies (Projects 96144, 97144, 98144, and 99144). Currently, he is principal investigator of the 2000 APEX Barren Islands seabird and large fish as samplers studies (Projects 00163J and 00163K) and the 2000 Barren Islands common murre population monitoring project (Project 00144). Prior to 1993, Mr. Roseneau was a consulting biologist for over 20 years. During that time, he conducted and managed marine bird, raptor, and large mammal projects in Alaska and Canada for government agencies and private-sector clients, and he also participated in several large-scale murre *(Uria* spp.*)* population monitoring projects. In 1976-1983, as co-principal investigator of NOAA/OCSEAP Research Unit 460, he conducted monitoring studies of murres and black-legged kittiwakes *(Rissa tridactyla)* at capes Lisburne, Lewis, and Thompson in the Chukchi Sea, and St. Lawrence, St. Matthew, and Hall islands in the Bering Sea. He also studied auklets *(Aethia* spp.*)* at St. Lawrence and St. Matthew islands, and participated in murre and kittiwake projects at Bluff in Norton Sound. During 1984-1986, he also participated in monitoring studies of murres and kittiwakes in the northeastern Chukchi Sea, and in 1987-1988, 1991-1992, and 1995-1999, he conducted additional murre and kittiwake monitoring work at capes Lisburne and Thompson, and Chamisso and Puffin islands. Mr. Roseneau is experienced in collecting and analyzing data on numbers, productivity, and food habits of seabirds; relating trends in numbers and productivity to changes in food webs and environmental parameters (e.g., air and sea temperatures, current patterns); and assessing potential impacts of petroleum exploration and development on nesting and foraging marine birds. He has broad knowledge of rock climbing techniques and has operated inflatable rafts and other outboard-powered boats in the Bering, Chukchi, and Beaufort seas and on various Alaskan rivers in excess of 3,000 hrs. He has also accrued several hundred additional hours operating time in small boats and larger, more powerful vessels (e.g. 25 ft, 300-400 hp HydroSports and Boston Whalers) in Kachemak Bay, Prince William Sound, and Kenai Peninsula and Barren Island waters. During his career, Mr. Roseneau has authored and co-authored over 80 reports and publications, including about 30 on Alaskan seabirds.

Selected Seabird Publications

Murphy, E.C., A.M. Springer, and D.G. Roseneau. 1991. High annual variability in reproductive success of kittiwakes *(Rissa tridactyla* L.*)* at a colony in western Alaska. J. Anim. Ecol. 60: 515-534.

Springer, A.M., E.C. Murphy, D.G. Roseneau, C.P. McRoy, and B.A. Cooper. 1987. Paradox of pelagic food webs in the northern Bering Sea - I. Seabird food habits. Cont. Shelf Res. 7: 895-911.

Murphy, E.C., A.M. Springer, and D.G. Roseneau. 1986. Population status of *Uria aalge* at a colony in western Alaska: results and simulations. Ibis 128: 348-363.

Springer, A.M., D.G. Roseneau, D.S. Lloyd, C.P. McRoy, and E.C. Murphy. 1986. Seabird responses to fluctuating prey availability in the eastern Bering Sea. Marine Ecol. Prog. Ser. 32: 1-12.

Springer, A.M. and D.G. Roseneau. 1985. Copepod-based food webs: auklets and oceanography in the Bering Sea. Marine Ecol. Prog. Ser. 21: 229-237.

Murphy, E.C., D.G. Roseneau, and P.J. Bente. 1984. An inland nest record for the Kittlitz's murrelet. Condor 86: 218.

Springer, A.M., D.G. Roseneau, E.C. Murphy, and M.I. Springer. 1984. Environmental controls of marine food webs: food habits of seabirds in the eastern Chukchi Sea. Can. J. Fish Aquat. Sci. 41: 1202-1215.

OTHER KEY PERSONNEL

1. G. Vernon Byrd (Project Manager)

Vernon Byrd received a B.S. degree in wildlife management from the University of Georgia in 1968, did post-graduate studies in wildlife biology at the University of Alaska-Fairbanks in 1975, and completed a M.S. degree in wildlife resources management at the University of Idaho in 1989.

His thesis, entitled "Seabirds in the Pribilof Islands, Alaska: Trends and monitoring methods", explored statistical procedures for analyzing kittiwake *(Rissa* spp.*)* and murre *(Uria* spp.*)* population data. Mr. Byrd has worked for the U.S. Fish and Wildlife Service for over 20 years, focusing on studies of marine birds in Alaska and Hawaii. His major interests center around monitoring long-term trends in seabird populations, including numbers of birds and reproductive performance, and he has worked at murre colonies in the Aleutian Islands, the Bering and Chukchi seas, and western Gulf of Alaska. Mr. Byrd was a co-author of the final T/V *Exxon Valdez* oil spill damage assessment report for murres. Also, he was project manager of the 1993-1994 Barren Islands common murre restoration monitoring projects (Projects 93049 and 94039), the 1995-1999 APEX Barren Islands seabird and large fish as samplers studies (Projects 95163J, 95163K, 96163J, 97163J, 97163K, 98163J, 98163K, 99163J, and 99163K), the 1996-1997 and 1999 Barren Islands and 1998 Chiswell Islands common murre population monitoring projects (Project 96144, 97144, and 98144), and EVOS-sponsored work designed to remove predators from seabird nesting habitats (Projects 94041 and 95041). Currently, Mr. Byrd is project manager of the 2000 APEX Barren Islands seabird and large fish as samplers studies (Projects 00163J and 00163K) and the 2000 Barren Islands common murre population monitoring project (Project 00144). He has authored and co-authored over 50 scientific papers and 70 U.S. Fish and Wildlife Service reports on field studies, and has made about 35 presentations on seabirds at scientific conferences and meetings. Mr. Byrd is the supervisory wildlife biologist at the Alaska Maritime National Wildlife Refuge, the premier seabird nesting area in the national public land system.

Selected Seabird Publications

Byrd, G.V., E.C. Murphy, G.W. Kaiser, A.J. Kondratyev, and Y.V. Shibaev. (In press). Status and ecology of offshore fish-feeding alcids (murres and puffins) in the North Pacific Ocean. Proceedings of "Symposium on the Status , Ecology, and Conservation of Marine Birds of the Temperate North Pacific". Canadian Wildlife Service, Ottawa.

Byrd, G.V., and J.C. Williams. Whiskered Auklet. 1993. A chapter describing the biology of the species *in* The birds of North America, No. 76 (A. Poole and F. Gill, eds.). The Academy of Natural Sciences, Philadelphia PA, and the American Ornithologists' Union, Washington, D.C. 12 pp.

Byrd, G.V., and J.C. Williams. Red-legged Kittiwake. 1993. A chapter describing the biology of the species *in* The birds of North America No. 60 (A. Poole and F. Gill, eds.). The Academy of Natural Sciences, Philadelphia PA, and the American Ornithologists' Union, Washington, D.C. 12 pp.

Springer, A.M. and G.V. Byrd. 1989. Seabird dependence on walleye pollock in the southeastern Bering Sea. Pages 667-677 *in* Proceedings of the International Symposium on the Biology and Management of Walleye Pollock. Alaska Sea Grant Rep. No. 89-1, Univ. of Alaska-Fairbanks.

2. Arthur B. Kettle (Biological Technician)

Arthur Kettle received his B.A. degree in Human Ecology from the College of the Atlantic in 1984. Since that time, he has participated in several large-scale seabird research projects at remote locations. He joined the U.S. Fish and Wildlife Service in May 1993, and is currently the field team leader for the upcoming 2000 APEX Barren Islands seabird studies (Project 00163J) and the 2000 Barren Islands common murre population monitoring project (Project 00144). He served as field team leader during the 1995-1999 APEX Barren Islands seabird studies (Projects 95163J, 96163J, 97163J, 98163J, and 99163J), and participated in the 1996-1997 and 1999 Barren Islands and 1998 Chiswell Islands common murre population monitoring projects (Projects 96144, 97144, 98144, and 99144). He was also in charge of field work at East Amatuli Island during the 1993-1994 Barren Islands common murre restoration monitoring projects (Projects 93049 and 94039). Mr. Kettle also censused murres at the East Amatuli Island - Light Rock colony during Exxon-sponsored University of Washington studies in 1990-1992, and in addition to this work, he participated in large-scale University of Washington studies of magellanic penguins *(Spheniscus magellanicus)* in Argentina during 1987-1991, and tufted puffins *(Fratercula cirrhata)* and fork-tailed storm-petrels *(Oceanodroma furcata)* at the Barren Islands in 1990-1992. Mr. Kettle has

over 20 years experience safely operating small boats in the north Atlantic and Pacific oceans (e.g., Maine and Alaska), including 10 consecutive field seasons running outboard-powered craft at the Barren Islands.

Selected Seabird Publications

Boersma, P.D., J.K. Parrish, and A.B. Kettle. 1995. Common murre abundance, phenology, and productivity on the Barren Islands, Alaska: The *Exxon Valdez* oil spill and long-term environmental change. *Exxon Valdez* Oil Spill: Fate and effects in Alaskan waters, ASTM STP 1219, P.G. Wells, J.N. Butler, and J.S. Hughes (eds.), Amer. Soc. for Testing and Materials, Philadelphia, PA.

LITERATURE CITED

Byrd, G.V. 1989. Seabirds in the Pribilof Islands, Alaska: Trends and monitoring methods. M.S. thesis. Univ. of Idaho.

Dipple, C. and D. Nysewander. 1992. Marine bird and mammal censuses in the Barren Islands, 1989 and 1990, with specific emphasis on species potentially impacted by the 1989 *Exxon Valdez* , including supplemental appendices for 1991 murre data. Unpubl. rept., U. S. Fish Wildl. Serv., Homer, Alaska.

Dragoo, D.E., G.V. Byrd, D.G. Roseneau, D.A. Dewhurst, J.A. Cooper, and J.H. McCarthy. 1995. Effects of the *T/V Exxon Valdez* oil spill on murres: A perspective from observations at breeding colonies four years after the spill. Final rept., Restoration Proj. No. 11, U.S. Fish Wildl. Serv., Homer, Alaska.

Erikson, D.E. 1995. Surveys of murre colony attendance in the northern Gulf of Alaska following the *Exxon Valdez* oil spill. Pp. 780-819 *in Exxon Valdez* oil spill: Fate and effects in Alaskan waters, ASTM STP 1219, P.G. Wells, J.N. Butler, and J.S. Hughes (eds.), Amer. Soc. for Testing and Materials, Philadelphia, Pennsylvania.

Gerrodette, T. 1987. A power analysis for detecting trends. Ecology 68:1,364-1,372.

Hatch, S.A. and M.A. Hatch. 1989. Attendance patterns of common and thick-billed murres at breeding sites: Implications for monitoring. J. Wildl. Manage. 53:483-493.

Nysewander, D. and C. Dipple. 1990. Population surveys of seabird nesting colonies in Prince William Sound, the outside coast of the Kenai Peninsula, Barren Islands, and other nearby colonies, with emphasis on changes in numbers and reproduction of murres. Bird Study No. 3. Unpubl. prog. rept., U.S. Fish Wildl. Serv., Homer, Alaska.

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_____, C.H. Dipple, G.V. Byrd, and E.P. Knudtson. 1993. Effects of the *T/V Exxon Valdez* oil spill on murres: A perspective from observations at breeding colonies. Bird Study No. 3. Final rept., U.S. Fish Wildl. Serv., Homer, Alaska.

Roseneau, D.G., A.B. Kettle, and G.V. Byrd. 1995. Common murre restoration monitoring in the Barren Islands, Alaska, 1993. Unpubl. final rept. by the Alaska Maritime National Wildlife Refuge, Homer, Alaska for the *Exxon Valdez* Oil Spill Trustee Council, Anchorage, Alaska (Restoration Project 93049).

_____. 1996. Common murre restoration monitoring in the Barren Islands, Alaska, 1994. Unpubl. final rept. by the Alaska Maritime National Wildlife Refuge, Homer, Alaska for the *Exxon Valdez* Oil Spill Trustee Council, Anchorage, Alaska (Restoration Project 94039).

_____. 1997. Common murre restoration monitoring in the Barren Islands, Alaska, 1996. Unpubl. final rept. by the Alaska Maritime National Wildlife Refuge, Homer, Alaska for the *Exxon Valdez* Oil Spill Trustee Council, Anchorage, Alaska (Restoration Project 96144).

_____. 1998. Common murre restoration monitoring in the Barren Islands, Alaska, 1997. Unpubl. final rept. by the Alaska Maritime National Wildlife Refuge, Homer, Alaska for the *Exxon Valdez* Oil Spill Trustee Council, Anchorage, Alaska (Restoration Project 97144).

_____. 1999. Common murre restoration monitoring in the Chiswell Islands, Alaska, 1998. Unpubl. annual rept. by the Alaska Maritime National Wildlife Refuge, Homer, Alaska for the *Exxon Valdez* Oil Spill Trustee Council, Anchorage, AK (Restoration Project 98144).

_____. 2000. Common murre restoration monitoring in the Barren Islands, Alaska, 1999. Unpubl. annual rept. by the Alaska Maritime National Wildlife Refuge, Homer, Alaska for the *Exxon Valdez* Oil Spill Trustee Council, Anchorage, AK (Restoration Project 99144).

Appendix 1. Power analysis of common murre counts in the Barren Islands, Alaska.[1]

We know from prior work that a total of about 5-7 counts made on separate days are needed in each year to detect among-year differences of 20% at the $P = 0.1$ level with 90% power (see Byrd 1989, Hatch and Hatch 1989). Using a computer program called "TRENDIO" written by T. Gerrodette (i.e., Gerrodette 1987), we ran a series of simulations to predict the number of surveys needed and the number of years required at different survey intervals to detect a significant positive trend in murre populations with the following assumptions:

1. *Rate of Change*: 2 levels (8% yr^{-1} and 13% yr^{-1}) — these levels were chosen because they represent the normal range of values reported in the literature for common murres.

2. *Coefficient of Variation CV)*: 15% was used because that is the average value recorded for counts made in the Barren Islands during 1992-1994.

3. Alpha (α) and Beta (β) Levels: We were more concerned about Type II errors than Type I errors; therefore we relaxed Alpha to 0.1 and set the power at 0.9.

4. *Model Selection*: Murre populations are expected to grow exponentially rather than in a linear fashion.

Table 1. Summary of power analysis simulation for detecting a significant positive trend (1-tailed) in murre populations in the Barren Islands.

Rate of Change ($year^{-1}$)	Years Between Surveys	CV	α	β	Number of Surveys Required[a]	Number of Years Required to Detect Trends
0.8	1	0.15	0.1	0.9	7	7
	2	0.15	0.1	0.9	5	10
	3	0.15	0.1	0.9	4	12
	4	0.15	0.1	0.9	4	16
	5	0.15	0.1	0.9	4	20
0.13	1	0.15	0.1	0.9	5	5
	2	0.15	0.1	0.9	4	8
	3	0.15	0.1	0.9	4	12
	4	0.15	0.1	0.9	3	12
	5	0.15	0.1	0.9	3	15

[a] Each survey would include 5 replicate counts. Increasing the number of replicate counts to 10 would reduce the CV to 0.10 and generally reduce the number of surveys needed by 1 in each category.

Conclusions: If murre populations in the T/V *Exxon Valdez* oil spill area are increasing at 8% yr^{-1}, it would require 7 years of annual surveys (at 5 replicate counts yr^{-1}) to detect a significant trend at the 0.1 level with 90% power. However, if the number of replicates yr^{-1} were increased to 10, it would take only 6 years of annual surveys to detect a significant trend at the same level. If populations were increasing at 13% yr^{-1}, the same comparisons listed above would require 4 and 5 years, respectively. If surveys were conducted every 3 years (5 replicate counts yr^{-1}), it would take 12 years, whether the rate of increase was 8% or 13% (rounding in the reason the values are the same), but increasing the number of replicates yr^{-1} to 10 would reduce the time required to detect a trend to 9 years. Surveys conducted at 5-year intervals would take 15 to 20 years (at 5 replicate counts yr^{-1}) to detect a significant trend in population size.

[1] Information in this power analysis is applicable to the Chiswell Islands murre colonies; copies of the analysis can be obtained from the Alaska Maritime NWR upon request. Contact D.G. Roseneau or G.V. Byrd at (907) 235-6546.

2001 EXXON VALDEZ TRU! COUNCIL PROJECT BUDGET

October 1, 2000 - September 30, 2001

Budget Category:	Authorized FFY 2000	Proposed FFY 2001	LONG RANGE FUNDING REQUIREMENTS					
			Estimated FFY 2002	Estimated FFY 2003	Estimated FFY 2004	Estimated FFY 2005	Estimated FFY 2006	Estimated FFY 2007
Personnel	$11.0	$14.6						
Travel	$2.3	$1.2						
Contractual	$0.0	$24.0						
Commodities	$0.4	$1.8						
Equipment	$0.0	$1.0						
Subtotal	$13.7	$42.6						
General Administration	$1.7	$3.9						
Project Total	$15.4	$46.5	$14.0					
Full-time Equivalents (FTE)	0.3	0.4						
	Dollar amounts are shown in thousands of dollars.							
Other Resources								

Comments: This project is designed to monitor the recovery of murres (*Uria* spp.) at colonies in the Gulf of Alaska affected by the T/V *Exxon Valdez* oil spill. It is based on a recommendation made at the conclusion of Project 98144 to recount the Chiswell Islands murre colonies in 2000 or 2001 (see Roseneau *et al.* 1999).

Travel costs to attend the 2002 EVOS workshop in Anchorage and the 2002 Alaska Bird Conference are included in the estimated FFY 2002 budget.

The FWS is donating up to 1 month of the project manager's time at no extra cost to the project.

2001

Prepared: 03/31/00

Project Number: 01144
Project Title: Common Murre Population Monitoring
Agency: DOI-FWS

FORM 3A
TRUSTEE
AGENCY
SUMMARY

6/12/97

2001 EXXON VALDEZ TRUS COUNCIL PROJECT BUDGET

October 1, 2000 - September 30, 2001

Personnel Costs:		GS/Range/	Months	Monthly		Proposed
Name	Position Description	Step	Budgeted	Costs	Overtime	FFY 2001
David G. Roseneau	Project Leader (Principal Investigator)	GS11/6	2.0	5.4	0.0	10.8
Arthur B. Kettle	Biological Science Tech. (Wildlife)	GS7/1	1.0	3.5	0.3	3.8
G. Vernon Byrd	Project Manager	GS13/1	1.0	0.0	0.0	0.0
C. Berg	Program Manager	GS12	0.5	0.0	0.0	0.0
	Subtotal		4.5	8.9	0.3	
					Personnel Total	$14.6

Travel Costs:	Ticket	Round	Total	Daily	Proposed
Description	Price	Trips	Days	Per Diem	FFY 2001
Travel to Seward to conduct surveys (personnel may need to overnight in Seward because of bad weather (2 people for 3 days @ $200.00/day)			6	0.2	1.2
				Travel Total	$1.2

2001

Prepared: 03/31/00

Project Number: 01144
Project Title: Common Murre Population Monitoring
Agency: DOI-FWS

FORM 3B
Personnel
& Travel
DETAIL

Contractual Costs:	Proposed
Description	FFY 2001
12 vessel days @ $2.0K/day = $24.0K (a large vessel is needed to support the counts & transport census teams to the study area)	24.0
When a non-trustee organization is used, the form 4A is required. **Contractual Total**	$24.0

Commodities Costs:	Proposed
Description	FFY 2001
Fuel (outboard gas & oil; estimated @ $0.15K)	0.2
Other field supplies (maps, notebooks, film =$ 0.1K; boating supplies, including rope, paddles, spark-plugs, emergency flares & other survival gear = $0.6K; replacement of rain gear, rubber boots, waterproof bags = $0.3K)	1.0
Costs of producing & printing 2 large format posters for public display of project results	0.6
[Note: FWS will furnish office materials and additional boating supplies.]	
Commodities Total	$1.8

2001

Prepared: 03/31/00

Project Number: 01144
Project Title: CommonMurre Population Monitoring
Agency: DOI-FWS

FORM 3B
Contractual & Commodities DETAIL

New Equipment Purchases: Description	Number of Units	Unit Price	Proposed FFY 2001
Equipment cleaning/repair/service (includes checking, cleaning, repairing & servicing binoculars, cameras, rafts, radios, outboard motors, survival suits, emergency locator beacons)			1.0
Those purchases associated with replacement equipment should be indicated by placement of an R.		**New Equipment Total**	$1.0

Existing Equipment Usage: Description	Number of Units	Inventory Agency
Inflatable raft	1	FWS
Outboard motors	2	FWS
Hand-held VHF radios	2	FWS
Camera	2	FWS
Computer	1	FWS
Binoculars	4	FWS
[Note: FWS will also supply other items: 4 survival suits, 4 Mustang suits, & emergency gear.]		

2001

Project Number: 01144
Project Title: Common Murre Population Monitoring
Agency: DOI-FWS

FORM 3B
Equipment
DETAIL

Prepared: 03/31/00

Project Title: **Surveys to Monitor Marine Bird Abundance in Prince William Sound during Winter and Summer; Report and Publication Writing**

Project Number:	01159
Restoration Category:	Monitoring
Proposer:	Migratory Bird Management, U. S. Fish and Wildlife Service
Lead Trustee Agency:	U. S. Department of the Interior, Fish and Wildlife Service
Cooperating Agencies:	None
Alaska SeaLife Center:	No
Duration:	7 years of surveys completed from1989 to 2000, plan to continue until recovery occurs or until GEM takes over
Cost FY 01:	$35,700 report and publication writing
Cost FY 02:	$~251,000 surveys
Cost FY 03:	$~50,000 report and publication writing
Geographic Area:	Prince William Sound
Injured Resource/Service:	All marine birds and sea otters

ABSTRACT

We conducted small boat surveys to monitor abundance of marine birds in Prince William Sound, Alaska during March 1990, 1991, 1993, 1994, 1996, 1998 and 2000 and July 1989, 1990, 1991, 1993, 1996, 1998, and 2000. We will use the data to examine trends by determining whether populations in the oiled zone changed at the same rate as those in the unoiled zone. We will also examine overall population trends for Prince William Sound from 1989-2000. We will prepare an annual report and to complete the publication of a paper that has been started in previous years.

INTRODUCTION

The waters and shorelines of Prince William Sound support abundant marine bird and sea otter (*Enhydra lutris*) 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. 1994c), 94159 (Agler et al. 1995a), 96159 (Agler and Kendall 1997), and 98159 (Lance et al. 1999) were initiated to continue monitoring marine bird and sea otter population abundance to assess recovery of injured species. Restoration projects 93045, 94159, 96159, and 98159 continued the original *Exxon Valdez* oil spill damage assessment study (Bird Study Number 2, Burn 1994, Klosiewski and Laing 1994) from 1989-91.

Surveys will be conducted in March and July of 2000. Based on conclusions from a power analysis (Agler 1995), we have proposed conducting the surveys every other year, until restoration has occurred. We will use data collected in 2000 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. 1994c), 1994 (Agler et al. 1995a),1996 (Agler and Kendall 1997) and 1998 (Lance et al. 1999) to examine trends in marine bird and sea otter 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 what species are still of concern.

Funding this year will provide the opportunity to complete an annual report from the 2000 surveys and to revise a paper that has been submitted for publication. We have already written four reports (Agler et al. 1994c, 1995a; Agler and Kendall 1997, Lance et al. 1999) and presented papers on Prince William Sound at scientific meetings. With no field work scheduled for 2001 we plan to use the time to complete the annual report and revise the paper submitted for publication.

NEED FOR THE PROJECT

A. Statement of the Problem

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 300,000 - 645,000 marine birds were killed in Prince William Sound and the northern Gulf of Alaska (Ecological Consulting, Inc. 1991). Garrott et al. (1993) estimated that 2,800 sea otters were killed. These estimates were probably low, because they only included 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. 1988a,b), and several years following the spill (1989, 1990, 1991, Klosiewski and Laing 1994; 1993, Agler et al. 1994c; 1994, Agler et al., 1995a; and 1996, Agler and Kendall 1997, Lance et al. 1999). Additional surveys will be conducted in winter and summer of 2000. 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 six species or species groups.

Burn (1994), using data from the boat surveys, documented declines in sea otter abundance in shoreline habitats of Prince William Sound following the spill. Burn (1994) detected a continuing pattern of significantly lower sea otter densities in oiled coastal areas, suggesting mortality in or displacement of sea otters from these areas.

Agler et al. (1994c, 1995a) and Agler and Kendall (1997) examined whether species shown as injured (Klosiewski and Laing 1994) had recovered. Agler et al. (1995a) found no evidence of recovery for any of the injured species. Inclusion of 1996 survey data (Agler and Kendall 1997) revealed additional information on population trends. Cormorants (*Phalacrocorax* spp.), bald eagles (*Haliaeetus leucocephalus*), and sea otters exhibited significant trends, indicating that these populations show continued injury from the spill. In addition, the other injured species, loons (*Gavia* spp.), harlequin ducks (*Histrionicus histrionicus*), black oystercatchers (*Haematopus bachmani*), common murres (*Uria aalge*), pigeon guillemots (*Cepphus columba*), and marbled murrelets (*Brachyramphus marmoratus*), did not show any significant trends (Agler and Kendall 1997) suggesting these populations have not recovered. Additionally, Agler et al. (1995a) and Agler and Kendall (1997) found that some bird populations not designated as injured (ie. goldeneyes, scoters (*Melanitta* spp.), black-legged kittiwakes (*Rissa tridactyla*), may now be showing trends consistent with injury from an oil spill. The one remaining injured species, Kittlitz's murrelet (*Brachyramphus brevirostris*), exhibited trends consistent with recovery, but since their population was declining in the unoiled zone and slightly increasing in the oiled zone it is questionable if this really indicated recovery (Agler and Kendall 1997).

B. Rationale/Link to Restoration

Restoration of marine bird and sea otter 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 and sea otters 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) found additional populations that were not previously shown to be injured (ie. goldeneyes). Survey data from this project have also been used by investigators of other 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, pers. comm.), sea ducks (D. Rosenberg, 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).

Determination of restoration of marine bird populations requires population estimates to monitor whether recovery is occurring or if species are still affected by the oil spill. This project will benefit marine birds by using data collected from 2000 surveys to monitor population trends of species injured by the *T/V Exxon Valdez* oil spill.

This project relates to the restoration objectives of several species. The *Exxon Valdez Oil Spill Restoration Plan* (*Exxon Valdez* Oil Spill Trustee Council 1994) lists each species' restoration objectives separately. We only included objectives relating to this project:

> Cormorants - "will have recovered when their populations return to prespill levels in the oil-spill area. An increasing population trend in Prince William Sound will indicate that recovery is underway."
>
> Harlequin duck - "will have recovered when breeding and postbreeding season densities and production of young have returned to estimated pre-spill levels, or when there are no differences in these parameters between oiled and unoiled areas."
>
> Black oystercatchers - "will have recovered when populations attain pre-spill levels"
>
> Marbled murrelet - "will have recovered when populations are stable or increasing."
>
> Pigeon guillemot - "will have recovered when populations are stable or increasing."
>
> Sea otter - "will be considered recovered when population abundance and distribution are comparable to pre-spill abundance and distribution"
>
> Common loons - "will have recovered when their populations return to prespill levels in the oil-spill area. An increasing population trend in Prince William Sound will indicate that recovery is underway."
>
> Kittlitz's murrelet - No recovery objective has been identified at this time.

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 use data from a survey of Prince William Sound during March and July 2000 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. 1994c, Klosiewski and Laing 1994, Agler et al. 1995a, Agler and Kendall 1997, Lance et al. 1999) and can be used to examine trends in abundance for these species. There are no other studies currently monitoring the populations of loons, harlequin ducks, pigeon guillemots, marbled murrelets, black osytercqatchers, and cormorants.

Additionally, Klosiewski and Laing (1994) found evidence of oil spill damage for scoters (*Melanitta* spp.), mew gull (*Larus canus*), arctic tern (*Sterna paradisaea*), and northwestern crow (*Corvus caurinus*). These species have never been added to the list of injured species and do not have restoration objectives. At the present time, this proposed study is the only study continuing to consider these species and track their populations.

Frequent monitoring needs to be conducted to ascertain trends in population abundance within Prince William Sound. We proposed conducting biannual surveys, with the years between surveys used to write reports and publications (Agler 1995). By 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 (this is higher than that of 73% of the injured species; (Agler and Kendall 1997) the ability to detect an average annual 10 % change in population is 25% with 5 surveys (Fig. 1). By conducting surveys in 2000 the number of surveys increases to 7 and the power to detect same population change increases (Fig. 1). If we continue biannual surveys, when we have completed 10 surveys the power to detect this change would be 90% (Fig. 1). Thus we feel it is important to continue these surveys to enable us to increase the ability to detect population trends. Also, we need to continue to monitor marine bird populations within the Sound in the unlikely event that another environmental perturbation occurs. Few pre-spill data were available before the *Exxon Valdez* oil spill, making it extremely difficult to determine what species were injured and to what extent (Klosiewski and Laing 1994).

C. Location

This study will be conducted in Prince William Sound. The study area includes all waters within Prince William Sound, as well as land within 100 m of the shore. Villages within Prince William Sound may be interested in the results of this study, since we will be reporting on the status of several wildlife species that are used for subsistence as well as describing the health of the Prince William Sound ecosystem.

COMMUNITY INVOLVEMENT

Copies of our reports and publications will be available for communities within Prince William Sound and other areas affected by the spill. We have and will continue to use charter boats and crews from the local area.

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 and to determine whether additional species may still be affected by the oil spill. The specific objectives of this project include:

1. determine distribution and estimate population abundance, with 95% confidence limits, of marine bird populations in Prince William Sound during March and July 2000;

2. determine whether the marine bird species whose populations declined more in oiled areas than in non-oiled areas of Prince William Sound have recovered;

3. determine whether additional species show any oil spill effects;

4. support restoration studies on harlequin duck, black oystercatcher, pigeon guillemot, marbled murrelet, Kittlitz's murrelet, sea ducks, and sea otters by providing data on population changes, distribution, and habitat use of Prince William Sound populations.

B. Methods

1. Study Area

Our study area includes all waters within Prince William Sound and all land within 100 m of shore (Fig. 2). We exclude Orca Inlet, near Cordova, Alaska and the southern sides of Montague, Hinchinbrook, and Hawkins Islands (Klosiewski and Laing 1994).

2. Sampling Methods

Surveys will be conducted in FY00, using methods described in 1997 detailed project description (Agler 1997).

3. Statistical Analyses

As in previous surveys (Klosiewski and Laing 1994, Agler et al. 1994a,b,c, 1995a,b, Agler and

Kendall 1997), 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. 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).

Population estimates for each species will be combined with other post-oil spill population estimates to determine population trends. We plan to 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. The $\log_{10}$ of each population estimate will be calculated after adding 0.5 to the estimate to prevent effects from using log 0. Significantly different slopes would indicate that population abundance of a species or species group changed at different rates. With the homogeneity of slopes test the probability of finding significant trends may be reduced due to annual variation among populations (J. Bart, pers comm.). To reduce the effect of annual variation, we will calculate the ratio of a species' or species group's estimated population in the oiled zone to that in the unoiled zone. We will then use linear regression analyses to determine whether there is a trend among the ratios (Agler and Kendall 1997). For species or species groups showing a significant difference in slopes or ratios, we will determine the rate of change in each zone by linear regression analyses.

To examine population trends from 1989-2000 for the entire Sound, we will calculate linear regressions of the total population estimates of each species and species group.

To map species distribution, densities will be calculated from the number of sightings on transects. For shoreline transects, we will map the density per transect, but for the pelagic and coastal-pelagic strata, we will map the density by block.

5. Statistical Justification for Proposed Monitoring Schedule

Currently, these surveys are scheduled to occur every 2 years over an unspecified time period. This schedule should be considered in light of the results of a power 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. 1) and when the CV = 0.13 (the mean

summer CV for *Brachyramphus* murrelets, an injured species; Fig. 3). 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 28% with the 6 surveys completed to date (Fig 1). If we continue on a biannual survey schedule, 1 more survey would be completed by 2002. With 8 surveys the probability of detecting a trend would increase to 71%. If 10 surveys were completed the probability would be 92%. For murrelets the power to detect a 10% change is now 80% (Fig. 3). This would increase to 95% with the completion of the 2000 surveys (Fig. 3).

Based on these calculations, we recommend a monitoring schedule of every two years for these surveys. The years between surveys should be used for report and publication writing.

C. Cooperating Agencies, Contracts and Other Agency Assistance

No contracts or other agency assistance will be required for data analysis and publication of results.

SCHEDULE

A. Measurable Project Tasks for FY 01 (October 1, 2000 - September 30, 2001)

October - November:	Re-write the computer programs for data analysis
March 1:	Prepare draft report of 2000 surveys
March 24-27 :	Attend Annual Restoration Workshop
April 15:	Annual report complete

B. Project Milestones and Endpoints

We will examine the project objectives after each set of surveys and publish a report.

C. Completion Date

Work will be complete when all injured species covered by the surveys have met their restoration objective and are listed as recovered.

PUBLICATIONS AND REPORTS

We plan to complete an annual report.

1.) A draft report will be submitted for peer review on March 1, 2001. The annual report will be

completed on April 15, 2001. We estimate 2 months of personnel time provided by *Exxon Valdez* Oil Spill Trustee Council (EVOS) to re-write the computer program and 3 months of personnel time provided by *Exxon Valdez* Oil Spill Trustee Council (EVOS) to prepare the draft report for review and to incorporate the reviewers' comments to revise the manuscript.

PROFESSIONAL CONFERENCES

We request no funds in FY99 from EVOS for travel to professional conferences..

NORMAL AGENCY MANAGEMENT

This project is not a part of normal agency management for the U. S. Fish and Wildlife Service in Alaska. Although considered an important ecosystem within Alaska, there are no agency funds available to survey Prince William Sound or any other region in Alaska. Although there are few agency funds to pay salaries during the report writing and publication preparation phase of the project, the Office of Nongame Migratory Bird Management is committed to this process and will donate funds needed to ensure publication of the results.

COORDINATION AND INTEGRATION OF RESTORATION EFFORT

This project will provide valuable information on the distribution and habitat use of marine birds and sea otters in Prince William Sound. 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, harlequin duck, and pigeon guillemot portions of the nearshore vertebrate predator project (\025); the black-legged kittiwake, marbled murrelet, and seabird foraging portions of the Alaska predator ecosystem experiment (\163); Kittlitz's murrelet status and ecology (\142); and harbor seal monitoring (\064).

EXPLANATION OF CHANGES IN CONTINUING PROJECTS

During FY99 we requested $37,000 for writing reports and publications. This year we are requesting $35,700. In FY01 we plan to rewrite the computer data analysis programs, write a report, and revise a manuscript. The computer programs that were used to analyze the data need to completely rewritten, the programs that we were using were developed in 1991 and were not Y2K compliant and now they cannot be used. After the 1998 surveys, we wrote a paper and have submitted it to the Marine Pollution Bulletin. We anticipate that some time will need to be spent revising it in the next fiscal year.

PROPOSED PRINCIPAL INVESTIGATORS

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PERSONNEL

1. Co-Project Leader - Robert M. Suryan, M.S., Wildlife Biologist, GS-11.

Mr. Suryan received a B.S. degree in wildlife management at Humboldt State University (1989), a M.S. degree in marine science at Moss Landing Marine Laboratories (1995), and has 15 years of experience in field biology. He has conducted studies of terrestrial and marine birds and mammals, involving population assessment, habitat use, foraging ecology, diving behavior, and effects of human disturbance. For the past five years, Mr. Suryan has been a co-project leader for APEX component 163E and has conducted studies of the foraging ecology, reproductive biology, and population dynamics of Black-legged Kittiwakes in Prince William Sound, Alaska. He has also worked of the current project for a season.

Mr. Suryan will be responsible for meeting project objectives, tasks and producing the final report.

Selected Reports and Publications

Suryan, R.M., D.B. Irons, and J. Benson. 2000. Prey switching and variable foraging strategies of Black-legged Kittiwakes and the effect on reproductive success. Condor 102:375-385.

Suryan, R.M. and D.B. Irons. In review. Colony and population dynamics of Black-legged Kittiwakes in a heterogeneous environment. Auk.

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Suryan, R.M. and J.T. Harvey. 1998. Tracking harbor seals (*Phoca vitulina richardsi*) to determine dive behavior, foraging activity, and haul-out site use. Mar. Mamm. Sci. 14(2):361-372.

Suryan, R.M. and J.T. Harvey. 1999. Variation in reaction of harbor seals to disturbance. Fish. Bull. 97(2) 332-339.

Ostrand, W.O., G.S. Drew, R.M. Suryan, and L.L. McDonald. 1998. Evaluation of radio-tracking and strip transect methods for determining foraging ranges of Black-legged Kittiwakes. Condor 100:709-718.

2. Co-Project Leader - David B. Irons, Ph.D., Wildlife Biologist, GS-12.

Dr. Irons received his Ph.D from the University of California, Irvine in 1992. His dissertation was on the foraging ecology and breeding biology of the black-legged kittiwake in Prince William Sound. He received his M.S. from Oregon State University in 1982 where he studied foraging behavior of glaucous-winged gulls in relation to the presence of sea otters. Dr. Irons conducted marine birds and sea otter surveys in Prince William Sound in 1984 and 1985. He has been studying kittiwakes in Prince William Sound for 16 years and completed the *Exxon Valdez* oil spill kittiwake damage assessment study. Dr. Irons has overseen several seabird studies in the

past few years, including marine bird and sea otter surveys of Prince William Sound and Cook Inlet, a seabird monitoring study on Little Diomede Island, and a cost of reproduction study on kittiwakes.

Selected Seabird Publications:

Irons, D. B. 1998. Foraging area fidelity of individual seabirds in relation to tidal cycles and flock feeding. Ecology 70:647-655.

Irons, D. B. 1992. Factors affecting black-legged kittiwake reproductive success. Unpubl. Ph.D Dissertation. Univ. of California, Irvine.

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Golet, G. H., D. B. Irons, and J.A. Estes. 1999. The cost of chick rearing in black-legged kittiwakes. J. of Animal Ecology.

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Hogan, M. E., and D. B Irons. 1986. Waterbirds and marine mammals. Pages *in* M. J. Hameedi, and D. G. Shaw, eds. Environmental management of Port Valdez, Alaska: scientific basis and practical results. Springer-Verlag, New York.

Vermeer, K., and D. B. Irons. 1991. The glaucous-winged gull on the Pacific Coast of North America. Acta Twentieth Congressus Internationalis Ornithogici:2378-83.

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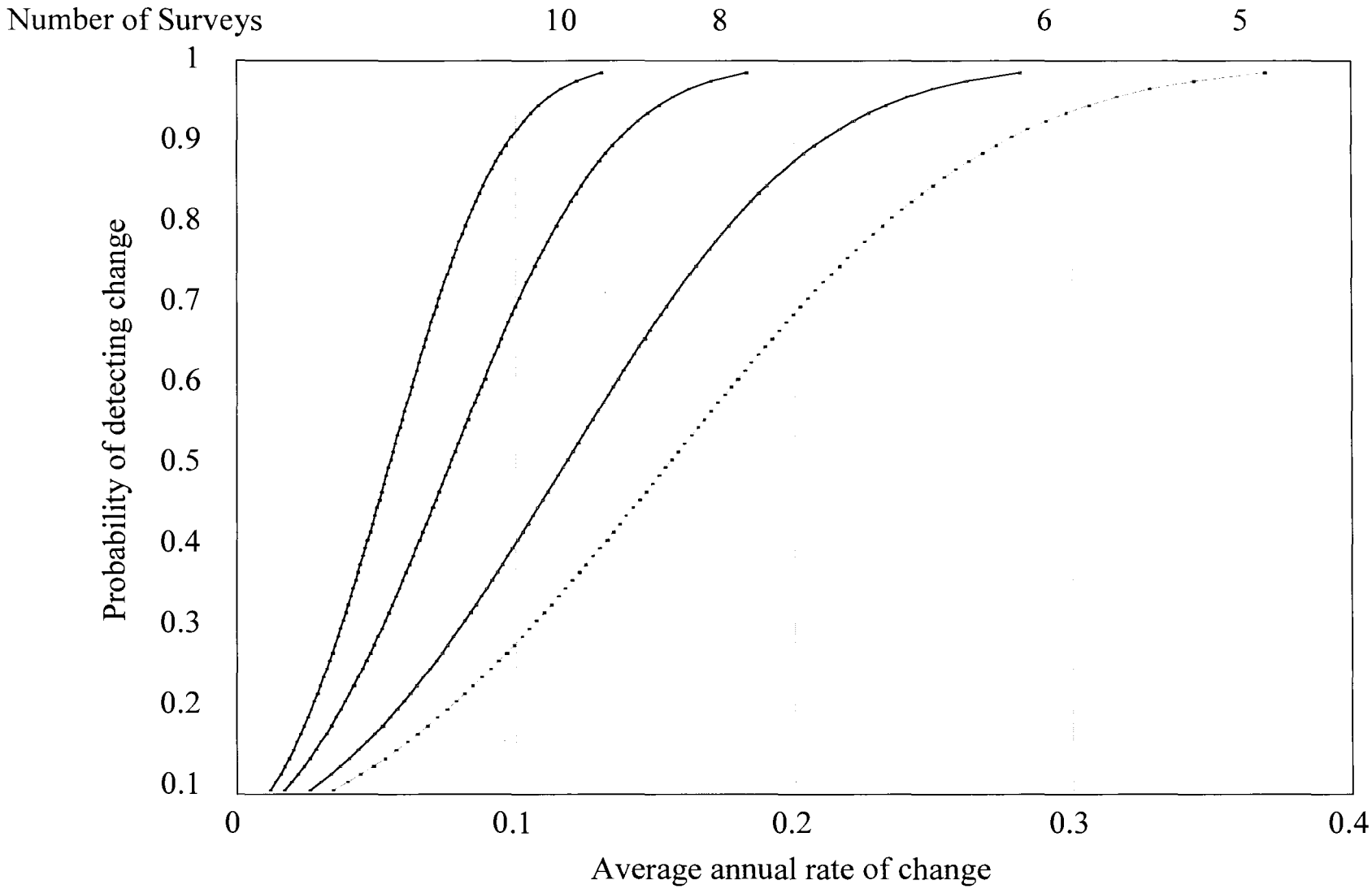

Figure 1. Estimated power (probability of detection) based on number of surveys conducted to detect a trend of marine bird and sea otter populations in Prince William Sound when CV = 0.30.

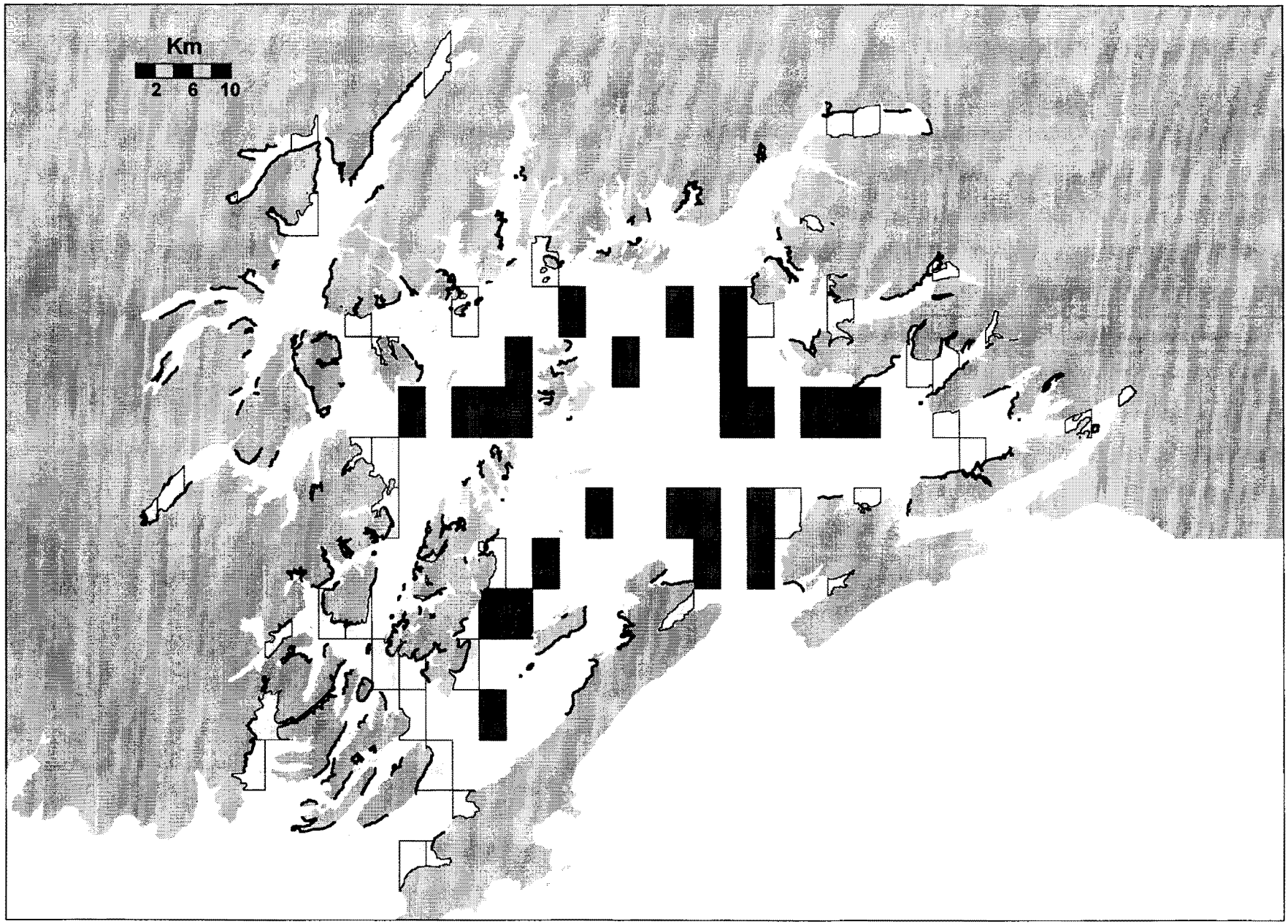

Figure 2. Transects and blocks surveyed during July small boat surveys of Prince William Sound. Transects were classified into 3 strata; the shoreline stratum, (<200 m from land), the coastal-pelagic stratum (lighter shaded blocks), and the pelagic stratum (darker shaded blocks).

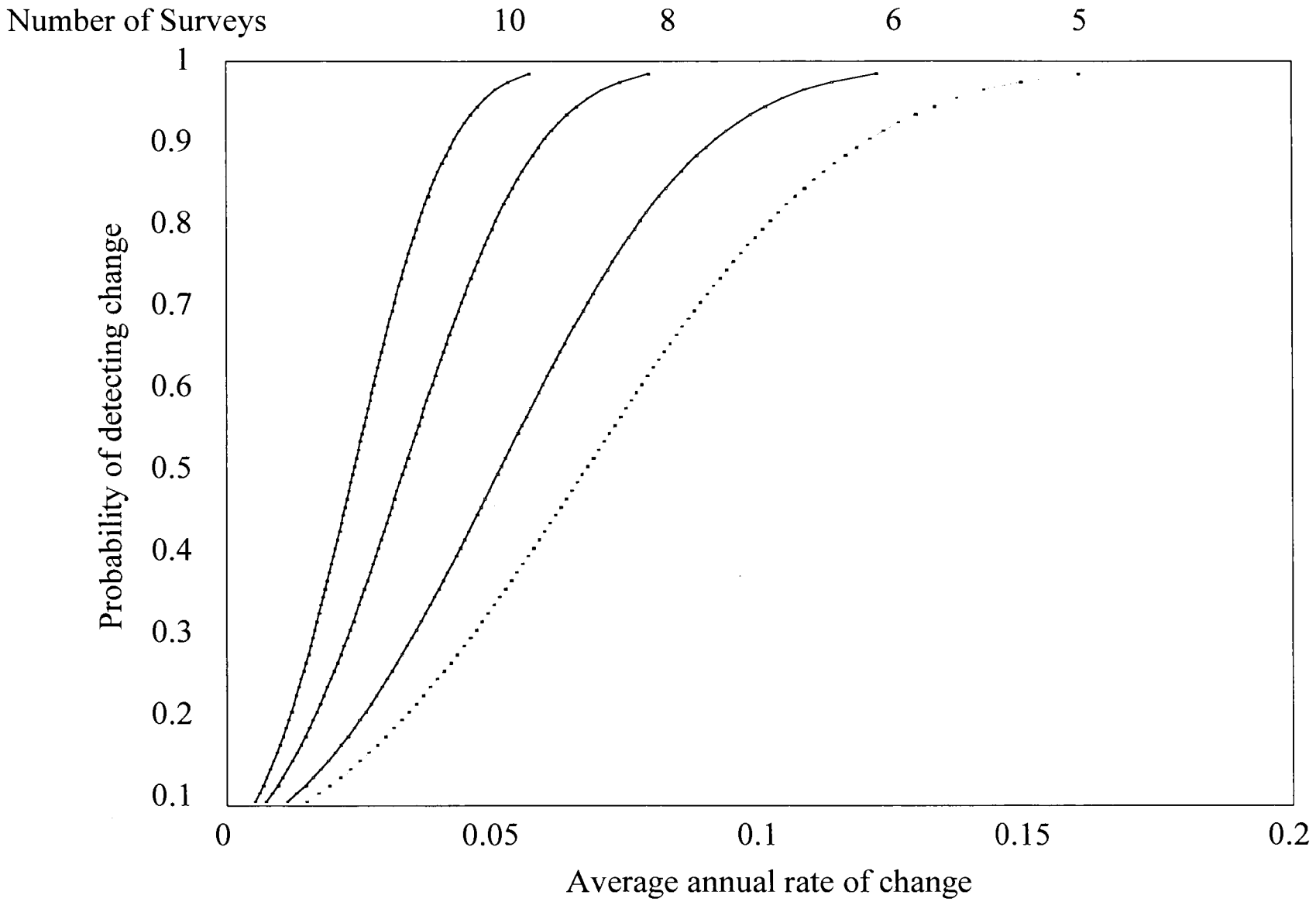

Figure 3. Estimated power (probability of detection) based on numbers of surveys conducted to detect a trend in the July *Brachyramphus* murrelet population in Prince William Sound. The CV = 0.13.

2001 EXXON VALDEZ TRUS' :OUNCIL PROJECT BUDGET

October 1, 2000 - September 30, 2001

Budget Category:	Authorized FFY 2000	Proposed FFY 2001
Personnel		$31.0
Travel		$0.0
Contractual		$0.0
Commodities		$0.0
Equipment		$0.0
Subtotal	$0.0	$31.0
General Administration		$4.7
Project Total	$0.0	$35.7
Full-time Equivalents (FTE)		0.4
Other Resources		

LONG RANGE FUNDING REQUIREMENTS

Estimated FY 2002	Estimated FY 2003		
$251.0	$50.0		

Dollar amounts are shown in thousands of dollars.

Comments: Justification of Personnel Costs:

Publications and & Personnel Time

Final Report, 4.5 months (2 months to re-write all data analysis progroms and 2.5 months to analyze data and write report) (EVOS Funded)

Publication: 0.5 months to revise publication that is currently in review (EVOS funded)

We are requesting money to cover Co-PI Suryan only, Co-PI Irons's salary will be paid for by the US Fish and Wildlife Service.

FY 01

Project Number: 01159

Project Title: Surveys to Monitor Marine Bird Abundance in Prince William Sound during Winter and Summer; Report and Publication Writing

Agency: DOI - Fish and Wildlife Service

FORM 3A AGENCY PROJECT DETAIL

2001 EXXON VALDEZ TRUS' :OUNCIL PROJECT BUDGET

October 1, 2000 - September 30, 2001

Personnel Costs:			GS/Range/	Months	Monthly		Proposed
PM	Name	Position Description	Step	Budgeted	Costs	Overtime	FY 2001
	Suryan	Co-Project Leader	GS11 - 5	5.0	6,200		31.0
	Irons	Co-Project Leader	GS12 - 6	0.0	0		0.0
							0.0
							0.0
							0.0
							0.0
							0.0
							0.0
							0.0
							0.0
							0.0
		Subtotal		5.0	6,200	0	
Those costs associated with program management should be indicated by placement of an *.						**Personnel Total**	$31.0

Travel Costs:		Ticket	Round	Total	Daily	Proposed
PM	Description	Price	Trips	Days	Per Diem	FY 2001
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
Those costs associated with program management should be indicated by placement of an *.					**Travel Total**	$0.0

FY 01

Project Number: 01159
Project Title: Surveys to Monitor Marine Bird Abundance in Prince William Sound during Winter and Summer; Report and Publication Writing
Agency: DOI - Fish and Wildlife Service

FORM 3B
Personnel
& Travel
DETAIL

2001 EXXON VALDEZ TRUS' :OUNCIL PROJECT BUDGET

October 1, 2000 - September 30, 2001

Contractual Costs:	Proposed FY 2001
Description	
When a non-trustee organization is used, the form 4A is required. **Contractual Total**	$0.0

Commodities Costs:	Proposed FY 2001
Description	
Commodities Total	$0.0

FY 01

Project Number: 01159
Project Title: Surveys to Monitor Marine Bird Abundance in Prince William Sound during Winter and Summer; Report and Publication Writing
Agency: DOI - Fish and Wildlife Service

FORM 3B
Contractual & Commodities DETAIL

2001 EXXON VALDEZ TRUS COUNCIL PROJECT BUDGET

October 1, 2000 - September 30, 2001

New Equipment Purchases: Description	Number of Units	Unit Price	Proposed FY 2001
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
Those purchases associated with replacement equipment should be indicated by placement of an R.		**New Equipment Total**	$0.0

Existing Equipment Usage: Description	Number of Units	Inventory Agency

FY 01

4 of 4

Project Number: 01159
Project Title: Surveys to Monitor Marine Bird Abundance in Prince William Sound during Winter and Summer; Report and Publication Writing
Agency: DOI - Fish and Wildlife Service

FORM 3B
Equipment
DETAIL

04/14/2000

APEX: Alaska Predator Ecosystem Experiment in Prince William Sound and the Gulf of Alaska

Project Number:	01163 A-T
Restoration Category:	Research
Proposer:	David Cameron Duffy, Project Leader, Paumanok Solutions.
Cooperating Agencies:	DOI, ADF&G, NOAA
Alaska SeaLife Center:	no
Duration:	Final year of writing up of five-year project
Cost FY 01:	$197.4 K
Cost FY 02:	$ 20.0 K
Geographic Area:	Prince William Sound, Cook Inlet, Northern Gulf of Alaska
Injured Resource/Service:	Common Murre, Marbled Murrelet, Pacific Herring, Pigeon Guillemot.

ABSTRACT

This study uses seabirds as probes of the trophic (foraging) environment of Prince William Sound and Cook Inlet, comparing their reproductive and foraging biologies, including diet. These measurements are compared with hydroacoustic, aerial, and net sampling of fish to calibrate seabird performance with fish distribution and abundance. This will allow us to determine the extent to which food limits the recover of seabirds from the *Exxon Valdez* oil spill. We use historical data from a variety of sources to detect shifts in forage fish abundance and to test hypotheses explaining such shifts. This year represents production of a synthesis of APEX results.

INTRODUCTION

The spill from the oil tanker *Exxon Valdez* resulted in significant mortality of several seabirds and in massive acute damage to Prince William Sound (PWS) and the Gulf of Alaska (GOA) (Piatt et al. 1990). A decade following the spill, several species have not recovered . This may be the result of lingering effects of the oil spill (toxicity of prey or sublethal effects of oil exposure to organisms). Other non-oil factors may also be involved, such as predation, climate-driven ecosystem changes, or even 'random' perturbations.

Both to aid in the recovery of injured resources and to safeguard the long-term health of Prince William Sound and the upper Gulf of Alaska, we need to understand the ecological processes that control the ecosystem. This project focuses on the trophic interactions of seabirds and the forage species they feed on. We chose food as the focus because: 1) much of seabird population theory and several empirical field tests have identified food as an important limiting factor (Ashmole 1963; Cairns 1989; Birt et al. 1987; Furness and Birkhead 1984); 2) seabird/fish researchers in the PWS/GOA complex have concluded that major changes in food have occurred during the period (Springer 1993; Anderson et al. 1994; Piatt and Anderson 1995); 3) other factors such as oil toxicity and climate change might express themselves through the food supply; and 4) knowledge of the forage prey base is critical for other apex predators, such as marine mammals and predatory fish (Pitcher 1980, 1981; Lowry et al. 1989), as well as for any larger effort to manage the marine resources of Prince William Sound, Cook Inlet and the Gulf of Alaska in a sustainable manner.

We studied the distribution and abundance of prey species through acoustic, aerial, and net sampling in relation to environmental conditions. Combined with historical analyses, this helped test hypotheses concerning the physical, behavioral and competitive factors that limit access to these forage species for seabirds. We examined the reproductive consequences of such limitations for pigeon guillemots (*Cepphus columba*), black-legged kittiwakes (*Rissa tridactyla*), tufted puffins (*Fratercula cirrhata*), common murres (*Uria aalge*) and cormorants (*Phalacrocorax* spp.).

By examining the diet and reproductive consequences for a surface-feeder (kittiwake), a benthic diver (pigeon guillemot), and two pelagic divers (puffin and murre), we buildt up a picture of the forage base for the entire seabird community, setting the stage for a long-term, low-cost monitoring program.

NEED FOR THE PROJECT

A. Statement of Problem

Numerous seabird species have declined between surveys in the 1970s and the 1990s in Prince William Sound: cormorants, kittiwake, glaucous-winged gull (*Larus glaucescens*), Arctic tern (*Sterna paradisaea*), Kittlitz's and marbled murrelets (*Brachyramphus brevirostris* and *B. marmoratus*), tufted and horned (*F. corniculata*) puffins, and pigeon guillemot (Agler et al. 1994 a,b; Klosiewski and Laing 1994). Colony trends for kittiwakes in Prince William Sound have been inconsistent, with colonies decreasing in the south and increasing in the north (Irons unpubl. data). The population of pigeon guillemots in PWS has decreased from about 15,000 in the 1970's to about 3,000 in 1993 (Isleib and Kessel 1973; Oakley and Kuletz 1996). Based on censuses taken around the Naked Island complex, pre-spill counts were roughly twice as high as post-spill counts (Oakley and Kuletz 1993). Pigeon guillemots are listed as "Not recovering" in the *Exxon Valdez* Oil Spill Restoration Plan.

Common murres were among the species most damaged by the oil spill (Piatt et al. 1990), but most of the oiled birds nested outside PWS. Murres were also listed as "Not recovering" in the 1994 Exxon Valdez Oil Spill Restoration Plan, but have since been upgraded to "recovering" because productivity has been normal since 1993 (Roseneau et al. 1995, 1996). Marbled Murrelets are also listed as Recovering.

The best evidence for a shift in trophic resources for seabirds within Prince William Sound comes from pigeon guillemots. No long-term diet data sets exist for other species or, like black-legged kittiwakes, diet exhibits great year to year variability. In 1994, sand lance (*Ammodytes hexapterus*) accounted for only about 1% of prey items fed to guillemot chicks at Jackpot Island and about 8% at Naked Island ; in contrast, in 1979 the sand lance component at Naked Island was about 55% (Kuletz 1983; Oakley and Kuletz 1993). Gadids were much more prevalent in the diet of guillemot chicks on Naked Island in 1994 (ca. 30%) than they were in 1979-1981 (< 7%) (Kuletz 1983).

Pre-spill studies of pigeon guillemots breeding at Naked Island suggest that sand lance were preferred prey during chick-rearing (Kuletz 1983). Breeding pairs that specialize on sand lance tended to initiate nesting attempts earlier and produce chicks that grew faster and fledged at higher weights than did breeding pairs that preyed mostly upon blennies and sculpins, at least in years when sand lance were readily available. Consequently, the overall productivity of the guillemot population was higher when sand lance were available.

The decline in the prevalence of sand lance in the diet of guillemots breeding at Naked Island might be a key element in the failure of this species to recover from the oil spill. The schooling behavior of sand lance, coupled with their high lipid content relative to that of gadids and nearshore bottom fish, might make this species a particularly high-quality forage resource for PWS pigeon guillemots. This is consistent with the observation that other seabird species (e.g., puffins, murres, kittiwakes) experience enhanced reproductive success when sand lance are available (Pearson 1968; Harris and Hislop 1978; Vermeer 1979, 1980; Monaghan et al. 1993).

Major oceanographic shifts seen in the northern Gulf of Alaska and North Pacific (Springer 1993; Piatt and Anderson 1995) may have favored pollock (*Theragra chalcogramma*), also an important seabird food (Springer and Byrd 1989) which has become one of the most abundant forage fish species currently available to seabirds (Parks and Zenger 1979; Brodeur and Merati 1993). Pollock may be an important competitor or predator of other forage fish species and may have suppressed populations of these species. Similarly, other species pairs may overlap in diet, such as herring and sand lance (McGurk and Warburton 1992) or pink salmon (*Oncorhynchus gorbuscha*) and sand lance (Sturtevant 1995), raising the possibility that reductions in the trophic role of one species may "release" others from competition for food.

B. Rationale/Link to Restoration

Both scientific theory and common sense suggest that ecosystems change over time and that changes to one species or other component of the ecosystem may reverberate through the entire ecosystem (Pimm 1984; Wolfe and Kjerfve 1986). Such changes have occurred in the North Pacific and Gulf of Alaska (Hatch et al. 1993; Springer 1993; Piatt and Anderson 1995). Climate variations, fishing, or an oil spill may trigger changes that can take years to become apparent (Duffy 1993). Similarly, restoration efforts following the *Exxon Valdez* oil spill might increase injured species that are predators or competitors of other injured species, preventing their recovery several years after oil was removed as an immediate cause. By studying only the species level, we may miss such effects. An ecosystem approach, such as the APEX study of the upper-trophic level predators of Prince William Sound, is designed to look for such indirect links and to improve our understanding of the ecological context lacking from single-species work (Wheelwright 1994).

In conjunction with the former Sound Ecology Assessment and Nearshore Vertebrate Predators projects, ecosystem projects funded by the Exxon Valdez Oil Spill Trustee Council, APEX attempted to give us a basic understanding of the ecological processes that may affect future changes in upper trophic levels that may in turn affect restoration efforts and also helps us to determine when we have finally restored a sustainable and healthy marine environment in the oil spill area.

C. Location

The project will use office-based locations for writing.

COMMUNITY INVOLVEMENT AND TRADITIONAL ECOLOGICAL KNOWLEDGE

None in this phase which draws only upon existing data and reports.

PROJECT DESIGN

A. Objectives

Produce a synthesis that summarizes the insights and take-home messages of the five-year APEX project and publish it (FY 02) in a refereed, scientific journal or book.

B. Methods

APEX set out to determine if food has limited the recovery of seabirds following the spill of the *Exxon Valdez* in 1989. The synthesis is designed to provide an overview of the main conclusions and supporting data for APEX, based on reports and analysis to date. It is not designed as a final report on all the APEX data. Most of the data are already available in the APEX Final Report (September 2000) and many analyses of these data will appear in the primary scientific literature in the future.

APEX had two main goals: determining the relationship between birds and their prey and determining how the environment affected the prey. Because of funding constraints, a decision was made to focus primarily on the fish/bird interactions. As with the bird material, there remains a great well of untapped fish ecology research conducted in APEX that could be further analyzed, to help frame and refine the GEM monitoring program.

The present effort treats APEX as a whole, using variability of energy and biomass across different scales of time and space as the common currencies across the various subprojects, study organisms, and trophic levels.

The synthesis is scale-based, examing the idea that different forces affected fish, birds and their interactions at different scales. For our purposes, macroscale involves years to decades and tens to hundreds to thousands of kilometers; mesoscale involves days to months/years and kilometers to tens of kilometers; microscale involves seconds to hours and meters to kilometers.

The principal authors are indicated in bold. The coauthors are subject to change.

SYNTHESIS OUTLINE

1. Introduction. DUFFY
   Why was APEX started? Spill, litigation; settlement cleared way for science. What did we know and assume at the start? Evidence of change in prey in North Pacific. Roles of El Nino and decadal change. Evolution of the project. Scientific and administrative constraints on a large science project. Links to restoration.

2. MACROSCALE

   A. Macroscale Changes in Prey Species and their Ecosystems in the Northern Gulf of Alaska-- ANDERSON, PIATT

   B. Macroscale Changes in Seabird Species and their Ecologies in the Northern Gulf of Alaska--IRONS

3. MESOSCALE

   A. Mesoscale Distributions and Their Causes for Prey Species in the Northern Gulf of Alaska-- BROWN, SPECKMAN, THEDINGA

   B. Interactions of Prey and Seabird Colonies at the Mesoscale Level in the Northern Gulf of Alaska--PIATT

   C. Mesoscale Foraging Decisions by Seabirds--SURYAN, GOLET, LITZOW

4. MICROSCALE

   A. Microscale Distributions and Interactions of Prey Species. ROBARD, PURCELL, OSTRAND, BROWN, STURTEVANT

   B. Microscale Selection of Foraging Sites--KULETZ, GOLET, LITZOW

   C. Foraging at Microsites: Flocking, Conflict and Facilitation--OSTRAND

5. Understanding the System: Alternative Approaches

   A. Patterns of Variability and Coherence between Prey and Bird Populations--FORD, AINLEY, SCHNEIDER

   B. It's Energetics and Nutrition, Stupid!--JODICE, ROBY, PIATT, IRONS

   C. Response Curves and Population Functions--PIATT

6. Afterword and Afterward: Linking Birds to Prey and Monitoring and Managing the Northern Gulf of Alaska: Lessons from APEX--Duffy and Wright

List of Subprojects

The synthesis will be based on the following APEX subprojects.

Project	PI	Short Title
a.	Thelinga/Hurlbert	Fish population sampling
b.	Ostrand	Seabird foraging
e.	Irons/Suryan	Kittiwake foraging and reproduction
f.	Golet	Guillemot foraging and reproduction
g.	Roby	Seabird reproduction and energetics
i.	Duffy	Project leader
j.	Roseneau	Barrens nesting study
k.	Roseneau	Predatory Fish Diets
l.	Piatt, Anderson & Blackburn	Historical analysis
m.	Piatt	Cook Inlet studies
o.	McDonald	Statistical support
q.	Ainley, Ford & Schneider	Modeling
r.	Kuletz	Marbled Murrelet
s.	Purcell	Jellyfish
t.	Brown/Norcross	Aerial Survey

Methods by Objective

All activities will involve analysis of data and samples and writing up of the material. Details of the original subprojects may be found in the previous, individual FY 00 Detailed Project Descriptions.

C. Cooperating Agencies, Contracts, and other Agency Assistance

Details of the responsibility of each agency and contracts with the private sector and with other government agencies can be found in the appendices describing individual subprojects in the FY 00 Detailed Project Descriptions.

SCHEDULE

A. Measurable Project Tasks for FY 01

2002

September Final Synthesis Manuscripts Due

B. Project Milestones and Endpoints

2002 Final manuscripts for synthesis completed.
2003 Synthesis published.

C. Completion Date

September 30, 2003

PUBLICATIONS AND REPORTS

See methods above for publications. A report on progress toward publication, with manuscripts will be produced by 15 April 2003.

PROFESSIONAL CONFERENCES

None budgeted

NORMAL AGENCY MANAGEMENT

99163 A
Not applicable

99163 B
See explanation under 99163 E

99163 E
The need for the APEX synthesis would not exist if the oil spill and resulting research had not occurred.

99163 F
See explanation under 99163 E

99163 G
Not applicable

99163 I
Not applicable

99163 J
The need for the APEX synthesis would not exist if the oil spill and resulting research had not occurred.

99163 K
Not applicable

99163 L
The need for the APEX synthesis would not exist if the oil spill and resulting research had not occurred.

99163 M
See explanation under 99163 L.

99163 O
Not applicable

99163 Q
Not applicable

99163 R
See explanation under 99163 E.

99163 S
Not applicable

99163 T
Not applicable

COORDINATION AND INTEGRATION OF RESTORATION EFFORT

This project is an integration of the APEX project, designed to provide an accessible synthesis of its results for the public and managers.

EXPLANATION OF CHANGES IN CONTINUING PROJECTS

NA

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PROJECT BUDGET

Agency and other administrative costs are included in these breakdowns.

BAA

OSU: Roby
Jodice $20K

Paumanok: Duffy
Duffy $20K
Brown $10K

University of Maryland: Purcell
Purcell $15K

H. T. Harvey & Associates: Ainley
Ainley $13K
Ford $13K

FWS: Irons

Suryan $20K
Ostrand $20K

NOAA: Wright

Anderson $8.4K
Thedinga $8.0K

US Geological Service: Piatt

Speckman $20K
Robard $20K

University of Alaska: Brown
Brown $10K

TOTAL **$197.4**

Budget Category:	Authorized FFY 2000	Proposed FFY 2001	PROPOSED FFY 2001 TRUSTEE AGENCIES TOTALS					
			ADEC	ADF&G	ADNR	USFS	DOI	NOAA
			$0.0	$0.0	$0.0	$0.0	$79.8	$118.3
Personnel	$626.2	$49.7						
Travel	$7.0	$0.0						
Contractual	$470.2	$131.7						
Commodities	$0.0	$0.0						
Equipment	$0.0	$0.0	LONG RANGE FUNDING REQUIREMENTS					
Subtotal	$1,103.4	$181.4	Estimated FFY 2002	Estimated FFY 2003	Estimated FFY 2004	Estimated FFY 2005	Estimated FFY 2006	Estimated FFY 2006
General Administration	$126.7	$16.7						
Project Total	$1,230.1	$198.1	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Full-time Equivalents (FTE)	12.8	0.7						
	Dollar amounts are shown in thousands of dollars.							
Other Resources								

[illegible] sampling publication.

163D, Puffins as Samplers, was closed out in FY96. 97163H PI withdrew from the project, and 163C and 163N were closed out in FY98. The funds are slated to be redirected within the project.

2001

Project Number: 01163
Project Title: APEX Synthesis
Lead Agency: NOAA

FORM 2A PROJECT DETAIL

2001 EXXON VALDEZ TRU : COUNCIL PROJECT BUDGET

October 1, 200 September 30, 2001

Budget Category:	Authorized FFY 2000	Proposed FFY 2001	[redacted]
Personnel		$15.1	
Travel		$0.0	
Contractual		$94.3	
Commodities		$0.0	
Equipment		$0.0	LONG RANGE FUNDING REQUIREMENTS
Subtotal		$109.4	Estimated FFY 2002 / Estimated FFY 2003
General Administration		$8.9	
Project Total		$118.3	$0.0 / $0.0
Full-time Equivalents (FTE)		0.2	[redacted]
	Dollar amounts are shown in thousands of dollars.		
Other Resources			

Comments: This project was first funded as a component of the Forage Fish Ecosystem Study (94163) then as the APEX project (95163A , 96163A, 97163A, 98163A, then 99163A). The University of Alaska withdrew from this project in FY99, but a small hydroacoustics contract is still likely. NMFS completed the work for this project in FY99, FY00, anf FY01. FYo1 is dedicated for production of an APEX synthesis.

2001

Project Number: 01163
Project Title: APEX Synthesis
Agency: NOAA

FORM 3A AGENCY PROJECT DETAIL

2001 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2000 - September 30, 2001

Personnel Costs:		GS/Range/ Step	Months Budgeted	Monthly Costs	Overtime	Proposed FFY 2000
Name	Position Description					
J. Thedinga	PI for 00163A	GS12	1.0	7,000		7.0
P. Anderson	PI for 00163	GS12	1.1	7,400		8.1
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
Subtotal			2.1	14,400	0	
					Personnel Total	$15.1

Travel Costs:	Ticket Price	Round Trips	Total Days	Daily Per Diem	Proposed FFY 2000
Description					
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
				Travel Total	$0.0

2001

Project Number: 01163
Project Title: APEX Synthesis
Agency: NOAA

FORM 3B
Personnel
& Travel
DETAIL

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

Contractual Costs:	Proposed
Description	FFY 2000
Oregon State University contract (00163 G Energetics/Roby/Jodice)	18.7
Paumanok contract (00163 I/Duffy) subcontract to UAF/00163T/Brown for $9.3K	28.0
University of Maryland contract (00163 S Jellyfish/Purcell)	14.0
H.T. Harvey and Associates contract (00163 Q Modeling/Ainley/Ford)	24.3
University of Alaska contract (00163T/Brown)	9.3
When a non-trustee organization is used, the form 4A is required. **Contractual Total**	$94.3

Commodities Costs:	Proposed
Description	FFY 2000
Commodities Total	$0.0

2001

Project Number: 01163
Project Title: APEX Synthesis
Agency: NOAA

FORM 3B
Contractual
&
Commoditie

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

New Equipment Purchases:	Number	Unit	Proposed
Description	of Units	Price	FFY 2000
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
Those purchases associated with replacement equipment should be indicated by placement of an R.		**New Equipment Total**	$0.0

Existing Equipment Usage:	Number	Inventory
Description	of Units	Agency

2001

Project Number: 01163
Project Title: APEX Synthesis
Agency: NOAA

FORM 3B
Equipment
DETAIL

2001 EXXON VALDEZ TRL E COUNCIL PROJECT BUDGET
October 1, 20.. September 30, 2001

Budget Category:	Authorized FFY 2000	Proposed FFY 2001						
Personnel		$34.6						
Travel		$0.0						
Contractual		$37.4						
Commodities		$0.0						
Equipment		$0.0	LONG RANGE FUNDING REQUIREMENTS					
Subtotal		$72.0	Estimated FFY 2002	Estimated FFY 2003	Estimated FFY 2004	Estimated FFY 2005	Estimated FFY 2006	
General Administration		$7.8						
Project Total		$79.8	$0.0	$0.0				
Full-time Equivalents (FTE)		0.5						
	Dollar amounts are shown in thousands of dollars.							
Other Resources								

Comments: FY 01 are dedicated to sample and data analysis, and write up of final report and manuscripts for publication.

2001

Project Number: 01163
Project Title: APEX Synthesis
Agency: DOI

FORM 3A
AGENCY
PROJECT
DETAIL

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

Personnel Costs:		GS/Range/ Step	Months Budgeted	Monthly Costs	Overtime	Proposed FFY 2000
Name	Position Description					
B. Ostrand	PI for 00163 B	GS11-4	3.2	5,367		17.2
R. Suryan	PI for 00163 E	GS11-4	3.0	5,800		17.4
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
	Subtotal		6.2	11,167	0	
					Personnel Total	$34.6

Travel Costs:	Ticket Price	Round Trips	Total Days	Daily Per Diem	Proposed FFY 2000
Description					
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
				Travel Total	$0.0

2001

Project Number: 01163
Project Title: APEX Synthesis
Agency: DOI

FORM 3B
Personnel
& Travel
DETAIL

Contractual Costs:	Proposed FFY 2000
Description	

S. Speckman (00163 M/Piatt)	18.7
M. Robards (00163 M/Piatt)	18.7
When a non-trustee organization is used, the form 4A is required. **Contractual Total**	$37.4

Commodities Costs:	Proposed
Description	FFY 2000
Commodities Total	$0.0

2001

Project Number: 01163
Project Title: APEX Synthesis
Agency: DOI

FORM 3B
Contractual
&
Commoditie

New Equipment Purchases:	Number	Unit	Proposed
Description	of Units	Price	FFY 2000
8 of 10			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
Those purchases associated with replacement equipment should be indicated by placement of an R.		**New Equipment Total**	$0.0

Existing Equipment Usage:		
Description	Number of Units	Inventory Agency

2001

Project Number: 01163
Project Title: APEX Synthesis
Agency: DOI

FORM 3B
Equipment
DETAIL