

Planning for Long-Term Monitoring in the Nearshore: Designing Studies to Detect Change and Assess Cause

Project Number: 02395
Restoration Category: Research
Proposer: Kachemak Bay Research Reserve and Coastal Resources Assoc.
Lead Trustee Agency: DOI-USGS and ADF&G
Cooperating Agencies: None
Duration: 1 year
Cost FY 02: \$63,600 Cost FY 03: None
Cost FY 04: None
Geographic Area: Gulf of Alaska
Injured Resource/Service: Intertidal and subtidal communities, sea otters, harlequin ducks, sediments, mussels, clams, archeological resources

ABSTRACT

The goal of this proposal is to produce a draft nearshore monitoring plan that provides a framework for future monitoring that focuses on tractable components of the nearshore, and is statistically sensitive to temporal and spatial change. The process we will use to create this plan will be to: 1) formulate hypotheses with respect to potential changes to the nearshore environment, 2) identify systems and approaches to detect changes on varying temporal and spatial scales and 3) draft a plan for nearshore monitoring that can be incorporated into the Gulf Ecosystem Monitoring (GEM) plan. An initial concept will be developed by the Principal Investigators that includes consideration of existing programs in the lower 48 (e.g. PICES and PISCO) and Alaska (e.g. long-term monitoring programs conducted by the Prince William Sound and Cook Inlet RCACs). This plan will then be reviewed by a panel of 4 to 5 independent experts in nearshore marine ecology representing various interests and disciplines. A revised plan will be produced and presented to agencies, stakeholders, and other interested parties at a workshop held in conjunction with the annual EVOS Trustee Council meeting in January 2002. A final plan will then be adopted and presented to the Trustee Council.

INTRODUCTION

The goal of our proposed study is to develop a design for monitoring the nearshore habitat as part of a future GEM program. It is our intent to develop a cost-effective nearshore monitoring program that is statistically sensitive to temporal and spatial changes. Planning a long-term monitoring effort is no trivial task, and advanced planning will help insure that the program gets started on a path that will persist (and no doubt be refined) over time and will provide meaningful insights into how the Gulf of Alaska (GOA) ecosystem functions.

We will design a nearshore monitoring program appropriate for detecting changes that may occur within the nearshore system. The nearshore is explicitly considered as a part of the Draft GEM program presented by the Trustee Council and is a necessary and useful component of any marine monitoring program within the GOA because:

- It is a unique “triple interface” between air, land, and sea and provides an important link between these systems.
- It is particularly vulnerable to a variety of anthropogenic disturbances on a scale ranging from global climate change to localized effects of shoreline development.
- Communities in the nearshore are appropriate for cost-effective study because they are accessible, many of the organisms are sessile or of limited mobility, and there is a well-developed understanding of ecological processes that occur there, allowing development of testable hypotheses.

While much of the focus of the draft plan will likely be on the animals and plants that live in the intertidal zone, we will also consider incorporating components of the nearshore subtidal zone for monitoring, as well as larger mobile predators such as sea otters (*Enhydra lutris*). These are nearshore predators that rely upon intertidal and subtidal resources, are widely distributed throughout the northern GOA, have proven to be important sentinels of the health of nearshore systems, and have a history of ecological research in the GOA that facilitates definition of hypotheses and interpretation of data (e.g. Monson *et al.* 2000). In addition, we will consider incorporation of coastal oceanography, especially as it applies to the transport of larval stages and a mediator of linkages between oceanic and coastal environments. The plan will consider excellent research models such as the PICES and PISCO that have made great strides in establishing such linkages.

The final product of this study will be a draft plan that can be used as a framework for a nearshore component of the more broadly-scoped GEM program. The process we will use to develop this plan will be to identify hypotheses with respect to natural and anthropogenic sources of variation in the nearshore, identify sub-systems and metrics that may be sensitive and powerful tools for addressing these hypotheses.

The process of refining a draft nearshore monitoring plan will be an interactive one in which the Trustee Council, peer reviewers, and stake holders will have input. We will first develop a conceptual framework for a draft plan. This will be presented to a panel of 4 or 5 independent experts in various disciplines of nearshore ecology for comment. These panel members have not been selected, but we anticipate they will include persons that have expertise in nearshore

ecology and monitoring, but that do not have an interest in pursuing such work as part of the GEM program. Our hope is to include persons with varying interests and points of view (e.g. top-down vs. bottom up approaches, oceanographic influences, biomarkers, and ecological modeling). The panel will be convened to discuss the initial concepts for monitoring. The Principal Investigators will develop a draft plan based on this initial meeting, and the plan will be presented to the panel for further review and comment. Existing nearshore monitoring programs (e.g., PICES, PISCO, EPA EMAP, NOAA National Status and Trends, Prince William Sound and Cook Inlet RCAC) will be identified as a possible means of leveraging any work that may eventually be sponsored by the Trustees. The draft plan will then be presented to stakeholders, agency personnel, and other interested parties in a workshop to be held in conjunction with the annual EVOS Trustee Council meetings in January 2002.

NEED FOR THE PROJECT

A. Statement of Problem

A draft Gulf Ecosystem Monitoring (GEM) program has been developed that will likely serve as a blueprint for future GOA monitoring sponsored by the Trustee Council. The draft GEM program recognizes the value of the nearshore and specifically identifies the need for monitoring this portion of the GOA system. However, few specifics are given as to which parts of the nearshore are to be monitored or how the monitoring will be conducted. As with the development of any program of this scope, the devil is often in the detail, and the success of a nearshore monitoring program will depend on careful planning. This project will provide a framework from which a successful plan can be developed and implemented.

B. Rationale/Link to Restoration

The future GEM program will provide a long-term legacy of the EVOS restoration effort. This will assist managers in making reasoned decisions that will lead to long-term efforts to restore and preserve injured resources. Foremost among those injured resources are those in the nearshore zone that this proposal addresses.

C. Location

The final report will be a draft plan for nearshore monitoring to be conducted throughout the Gulf of Alaska.

COMMUNITY INVOLVEMENT AND TRADITIONAL ECOLOGICAL KNOWLEDGE

Community representatives and Native villagers will be asked to review the nearshore monitoring program and to participate in workshops.

PROJECT DESIGN

A. Objectives

The objective of the proposed study is to produce a draft nearshore monitoring plan that provides a framework for cost-effective monitoring of nearshore habitats and the resources that they support.

B. Methods

Overview of the process

The draft plan for nearshore monitoring in GEM will be developed through a series of steps as follows:

1. Identify hypotheses with respect to potential changes in the nearshore.
2. Identify systems that are appropriate for detecting change.
3. Based on the above, develop a preliminary draft plan or alternative plans.
4. Present this plan to a panel of independent experts.
5. Revise the plan and provide to panel members for further review and comment.
6. Present the plan to stakeholders, agencies, and other interested parties in a workshop.
7. Finalize the draft plan and present it to the EVOS Trustee Council.

The project will be directed by conducted by Drs. Thomas Dean, Carl Schoch, and Ginny Eckert. The work will be administered jointly by the Alaska Department of Fish and Game and the Biological Resources Division of the U.S. Geological Survey.

C. Cooperating Agencies, Contracts, and Other Agency Assistance

This proposal is being submitted by the Alaska Department of Fish and Game and USGS, who will fund contracts to the Kachemak Bay Estuarine Research Reserve and Coastal Resources Associates respectively.

SCHEDULE

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

Measurable tasks for FY-02 include:

- Presentation of the plan to the Trustee Council and others in a January 2002 workshop
- Completion and presentation of a draft plan to the Trustee Council by March 31, 2001

B. Project Milestones and Endpoints

Milestones for the project are as follows:

August 2001	Obtain Funding
October, 2002	Convene expert panel
December 15, 2002.	Complete draft plan
January, 2002	Present preliminary plan at a workshop
March 31, 2002	Complete revision of plan and present to the Trustee Council

C. Completion Date

It is anticipated that the project will be completed by April 2002.

PUBLICATIONS AND REPORTS

A final report will be presented to the Trustee Council that outlines the plan for monitoring of nearshore resources as part of GEM.

PROFESSIONAL CONFERENCES

No funding is being requested for attendance at professional conferences in FY01.

NORMAL AGENCY MANAGEMENT

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

COORDINATION AND INTEGRATION OF RESTORATION EFFORT

Under the coordination and integration of restoration effort section, the proposed work relies on analysis of data collected across a number of EVOSTC-funded studies and will require integration and coordination as other potential aspects of the GEM plan are conceived. As described in the introduction, this research relies on incorporation of data from other Trustee sponsored research, including the CHIA, NOAA-HAZMAT and NVP studies. Proposed efforts include use of the results of those studies to aid decisions in designing a cost-effective, sustainable, nearshore monitoring plan. We do not anticipate purchasing equipment under this project and will likely use equipment purchased previously under those EVOSTC projects identified above. Proposed research and data collection and analysis, where necessary, will follow previously established protocols and standards.

EXPLANATION OF CHANGES IN CONTINUING PROJECTS

None

PROPOSED PRINCIPAL INVESTIGATORS

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BIOGRAPHICAL SKETCHES FOR PRINCIPAL INVESTIGATORS

Dr. Thomas A. Dean, Ph.D. University of Delaware, is President of the ecological consulting firm Coastal Resources Associates, Inc. (CRA) in Vista, CA. Dr. Dean has over 20 years of experience in the study of nearshore ecosystems, and has authored over 30 publications, including several dealing with impacts of the *Exxon Valdez* oil spill on nearshore plants and animals. He has extensive experience in long-term monitoring studies, and has played a major role in both intertidal and subtidal EVOS investigations since 1989.

Dr. G. Carl Schoch is the Science Coordinator for the Kachemak Bay Research Reserve in Homer, Alaska (a NOAA National Estuarine Research Reserve). He has a Ph.D. in Oceanography from the College of Oceanic and Atmospheric Sciences at Oregon State University (1999) and continues to work with his post-doc advisors (Lubchenco and Menge) as a Senior Fellow for the Partnership for Interdisciplinary Studies of the Coastal Ocean (PISCO)

studying marine ecosystem dynamics. His research interests are in the linkages and interactions between physical and biological components of the marine nearshore and continental shelf ecosystems. His current research projects include studying larval distributions and forces affecting recruitment, monitoring the variability of primary productivity as a function of ocean climate, and investigating kelp bed community dynamics. He serves as the science advisor for the Olympic Coast National Marine Sanctuary Advisory Council, and is the chair of their Research Advisory Committee. He also serves as the technical advisor to the Sanctuary Marine Conservation Working Group, consulting on the design and development of a marine reserve network on the outer coast of Washington. He also consults to the Washington Department of Natural Resources on intertidal habitat modeling in Puget Sound and Georgia Straits.

Dr. Ginny Eckert received her undergraduate degree in Biology from Dartmouth College in Hanover, New Hampshire. She received her master's degree in Zoology from the University of Florida in Gainesville and her Ph.D. in Ecology from the University of California in Santa Barbara. She is currently an Assistant Professor of Biology at the University of Alaska Southeast in Juneau where she teaches Ecology, Marine Ecology, Invertebrate Zoology and Introductory Biology. Her research interests include the reproductive and larval ecology of marine invertebrates and their implications for management and conservation. She is currently studying recruitment of Dungeness crabs in Glacier Bay, growth and movement of sea cucumbers in Southeast Alaska, and the reproductive biology of snow crabs from the Bering Sea.

2002 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2001 - September 30, 2002

Budget Category:	Authorized FY 2001	Proposed FY 2002	PROPOSED FY 2002 TRUSTEE AGENCIES TOTALS				
			ADEC	ADF&G	ADNR	USFS	DOI
				\$38.3			\$25.3
Personnel	\$0.0	\$11.5					
Travel	\$0.0	\$8.0					
Contractual	\$0.0	\$39.6					
Commodities	\$0.0	\$0.0					
Equipment	\$0.0	\$0.0					
Subtotal	\$0.0	\$59.1	LONG RANGE FUNDING REQUIREMENTS				
General Administration	\$0.0	\$4.5			Estimated FY 2003		
Project Total	\$0.0	\$63.6			\$0.0		
Full-time Equivalents (FTE)	0.0	0.3					
Other Resources	\$0.0	\$0.0					
Dollar amounts are shown in thousands of dollars.							
Comments:							

FY02

Prepared: July 9, 2001

Project Number: 02395
 Project Title: Planning for Long-term Monitoring in the
 Nearshore
 Lead Agency: DOI--USGS

2002 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2001 - September 30, 2002

Budget Category:	Authorized FY 2001	Proposed FY 2002						
Personnel		\$0.0						
Travel		\$0.0						
Contractual		\$23.6						
Commodities		\$0.0						
Equipment		\$0.0						
Subtotal	\$0.0	\$23.6	LONG RANGE FUNDING REQUIREMENTS					
General Administration		\$1.7			Estimated FY 2003			
Project Total	\$0.0	\$25.3						
Full-time Equivalents (FTE)		0.0						
Other Resources								
Dollar amounts are shown in thousands of dollars.								
Comments:								

FY02

Prepared: July 9, 2001

Project Number: 02395
 Project Title: Planning for Long-Term Monitoring in the
 Nearshore
 Agency: DOI--USGS

2002 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2001 - September 30, 2002

Contractual Costs:	P
Description	
4AB Linkage: Coastal Resources Associates	
When a non-trustee organization is used, the form 4A is required.	Contractual Total
Commodities Costs:	P
Description	
	Commodities Total

FY02

Prepared: July 9, 2001

Project Number: 02395
 Project Title: Planning for Long-Term Monitoring in the Nearshore
 Agency: DOI--USGS

2002 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2001 - September 30, 2002

New Equipment Purchases:		Number of Units	Unit Price	P
Description				
Those purchases associated with replacement equipment should be indicated by placement of an R.			New Equipment Total	
Existing Equipment Usage:		Number of Units	Ii	
Description				

FY02

Project Number: 02395
 Project Title: Planning for Long-Term Monitoring in the Nearshore
 Agency: DOI--USGS

Prepared: July 9, 2001

2002 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2001 - September 30, 2002

Budget Category:	Authorized FY 2001	Proposed FY 2002						
Personnel		\$12.0						
Travel		\$1.8						
Contractual		\$0.0						
Commodities		\$0.0						
Equipment		\$0.0	LONG RANGE FUNDING REQUIREMENTS					
Subtotal	\$0.0	\$13.8			Estimated FY 2003	Estimated FY 2004		
Indirect		\$9.8						
Project Total	\$0.0	\$23.6			\$0.0	\$0.0		
Full-time Equivalents (FTE)		0.15						
Other Resources								
Dollar amounts are shown in thousands of dollars.								
<p>Comments: COASTAL RESOURCES INC. Indirect costs calculated as follows: Indirect costs = Overhead + General and Administrative costs + Fee Overhead = 59.5% of personnel costs G&A = 12.85% of personnel + overhead + other direct (excluding contractual) Fee = None</p>								

FY02

Project Number: 02395
 Project Title: Planning for Long-Term Monitoring in the Nearshore
 Agency: USGS --contract to Coastal Resources Assoc.

Prepared: July 9, 2001

2002 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2001 - September 30, 2002

Personnel Costs:				Months Budgeted	Monthly Costs	Overtime	P
Name	Position Description						
T. Dean	Biologist			1.5	8.0		
Indirect costs							
Subtotal				1.5	8.0	0.0	
				Personnel Total			
Travel Costs:			Ticket Price	Round Trips	Total Days	Daily Per Diem	P
Description							
R.T. San diego to Anchorage			0.6	2	6	0.1	
				Travel Total			

FY02

Prepared: July 9, 2001

Project Number: 02395
 Project Title: Planning for Long-Term Monitoring in the Nearshore
 Agency: USGS--Contract to Coastal Resources Assoc.

2002 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2001 - September 30, 2002

Contractual Costs:	P
Description	
Contractual Total	
Commodities Costs:	P
Description	
Commodities Total	

FY02

Prepared: July 9, 2001

Project Number: 02395
 Project Title: Planning for Long-Term Monitoring in the Nearshore
 Agency: USGS--Contract to Coastal Resources Assoc.

2002 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2001 - September 30, 2002

New Equipment Purchases:		Number of Units	Unit Price	P
Description				
Those purchases associated with replacement equipment should be indicated by placement of an R.			New Equipment Total	
Existing Equipment Usage:		Number of Units		
Description				

FY02

Project Number: 02395
 Project Title: Planning for Long-Term Monitoring in the Nearshore
 Agency: USGS--Contract to Coastal Resources Assoc.

Prepared: July 9, 2001

2002 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2001 - September 30, 2002

Budget Category:	Authorized FY 2001	Proposed FY 2002						
Personnel		\$11.5						
Travel		\$8.0						
Contractual		\$16.0						
Commodities		\$0.0						
Equipment		\$0.0	LONG RANGE FUNDING REQUIREMENTS					
Subtotal	\$0.0	\$35.5			Estimated FY 2003			
General Administration		\$2.8						
Project Total	\$0.0	\$38.3						
Full-time Equivalents (FTE)		0.3						
Other Resources			Dollar amounts are shown in thousands of dollars.					
Comments:								

FY02

Prepared: July 9, 2001

Project Number: 02395
 Project Title: Planning for Long-Term Monitoring in the
 Nearshore
 Agency: ADFG

2002 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2001 - September 30, 2002

Personnel Costs:		GS/Range/ Step	Months Budgeted	Monthly Costs	Overtime	P
Name	Position Description					
Dr. Carl Schoch	KBRR Science Coordinator	18B	1.0	5.5		
Kim Donohue	Administrative Clerk II	8A	2.0	3.0		
		Subtotal	3.0	8.5	0.0	
						Personnel Total
Travel Costs:		Ticket Price	Round Trips	Total Days	Daily Per Diem	P
Description						
Travel and Per Diem for Panelist at Fall Monitoring Workshop						
						Travel Total

FY02

Prepared: July 9, 2001

Project Number: 02395
 Project Title: Planning for Long-Term Monitoring in the
 Nearshore
 Agency: ADFG

2002 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2001 - September 30, 2002

Contractual Costs:		P
Description		
Honoraria for Panelist for Fall Workshop (\$1000/day for two days, five people) 4AB Linkage, Univ. of Alaska SE		
When a non-trustee organization is used, the form 4A is required.		Contractual Total
Commodities Costs:		P
Description		
		Commodities Total

FY02

Prepared: July 9, 2001

Project Number: 02395
 Project Title: Planning for Long-Term Monitoring in the
 Nearshore
 Agency: ADFG

2002 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2001 - September 30, 2002

New Equipment Purchases:		Number of Units	Unit Price	P
Description				
Those purchases associated with replacement equipment should be indicated by placement of an R.			New Equipment Total	
Existing Equipment Usage:		Number of Units	Ii	
Description				

FY02

Project Number: 02395
 Project Title: Planning for Long-Term Monitoring in the Nearshore
 Agency: ADFG

Prepared: July 9, 2001

2002 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2001 - September 30, 2002

Budget Category:	Authorized FY 2001	Proposed FY 2002					
Personnel		\$6.0					
Travel		\$0.0					
Contractual		\$0.0					
Commodities		\$0.0					
Equipment		\$0.0					
Subtotal	\$0.0	\$6.0	LONG RANGE FUNDING REQUIREMENTS				
Indirect							
Project Total	\$0.0	\$6.0					
Full-time Equivalents (FTE)		0.1					
Other Resources			Dollar amounts are shown in thousands of dollars.				
Comments:							

FY02

Prepared July 9, 2001

Project Number: 02395
 Project Title: Planning for Long-term Monitoring in the
 Nearshore
 Agency: ADFG contract to University of Alaska/Southeast

2002 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2001 - September 30, 2002

Personnel Costs:				Months Budgeted	Monthly Costs	Overtime	P
Name	Position Description						
Dr. Ginny Eckert (see attached indirect cost waiver)	UAF Faculty			1.0	6.0		
Subtotal				1.0	6.0	0.0	
				Personnel Total			
Travel Costs:			Ticket Price	Round Trips	Total Days	Daily Per Diem	P
Description							
				Travel Total			

FY02

Prepared July 9, 2001

Project Number: 02395
 Project Title: Planning for Long-term Monitoring in the Nearshore
 Agency: ADFG contract to University of Alaska/Southeast

2002 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2001 - September 30, 2002

Contractual Costs:	P
Description	
Contractual Total	
Commodities Costs:	P
Description	
Commodities Total	

FY02

Prepared July 9, 2001

Project Number: 02395
 Project Title: Planning for Long-term Monitoring in the
 Nearshore
 Agency: ADFG contract to University of Alaska/Southeast

2002 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2001 - September 30, 2002

New Equipment Purchases:		Number of Units	Unit Price	P
Description				
Those purchases associated with replacement equipment should be indicated by placement of an R.			New Equipment Total	
Existing Equipment Usage:		Number of Units		
Description				

FY02

Prepared July 9, 2001

Project Number: 02395
 Project Title: Planning for Long-term Monitoring in the Nearshore
 Agency: ADFG contract to University of Alaska/Southeast