

Trustee Council Use Only

Project No: _____050743_____

Date Received: _____ **GEM PROPOSAL SUMMARY PAGE**

(To be filled in by proposer)

Project Title: Connecting with Coastwalk: Linking Shoreline Mapping with Community-based Monitoring

Project Period: FY 05-FY 06

Proposer(s): PI: Steve Baird, Kachemak Bay Research Reserve (ADFG),
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Co-PI: Marilyn Sigman, Center for Alaskan Coastal Studies, cacs@xyz.net

Study Location: Kachemak Bay

Abstract: The project will evaluate and merge citizen-generated biological and human impact data collected over 20 years of an annual Kachemak Bay CoastWalk shoreline survey with high-resolution mapping of the physical structure of the nearshore environment in Kachemak Bay that nests geographically within ShoreZone mapping. Evaluation of data and data collection protocols and the geographic alignment of CoastWalk zones with ShoreZone units and KBRR's shoreline segments will occur during Year 1. Citizen-based data collection efforts aligned with GEM nearshore monitoring SOPs and methods will be pilot-tested in Kachemak Bay. During Year 2, a Kachemak Bay community/scientist workshop will be held to further integrate and synthesize local information into the Kachemak Bay Research Reserve GIS and to apply the GIS results to the selection of nearshore monitoring sites for community-based monitoring. Piloting will continue, with emphasis on involvement of K-12 teachers and students. During Year 3, nearshore monitoring data collection and data management will be further refined and a WEB site and data entry interface developed. This project will advance the development of a community-based nearshore monitoring program for the GEM program.

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|-----------------|-----------------------------------|-------|-----------|-------------------------|
| Funding: | EVOS Funding Requested: | FY 05 | \$ 28,900 | TOTAL: \$ 61,000 |
| | | FY 06 | \$ 20,300 | |
| | | FY 07 | \$ 11,900 | |
| | Non-EVOS Funds to be Used: | FY 05 | \$ 6,000 | TOTAL:\$ 12,000 |
| | | FY 06 | \$ 6,000 | |
| | | FY 07 | \$ | |

Date: April 7, 2004

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GEM RESEARCH PLAN

I. NEED FOR THE PROJECT

A. Statement of Problem

Nearshore habitats provide a variety of benefits to Alaska's coastal communities, from recreation and tourism to transportation and subsistence and commercial harvests. Although a number of coastal inventory efforts have occurred in specific areas such as Kachemak Bay (Dames and Moore 1978, Lees 1977, Lees and Driskell 1980, Lees et al. 1980, Lees et al. 1981, Trasky et al. 1977), an understanding of spatial and temporal variation in these resources is generally lacking and has been the prime motivator for the development of the Gulf of Alaska Ecosystem Monitoring and Research Program (GEM). An improved understanding of current patterns and variation in nearshore biological communities will enable detection of anthropogenic and natural changes, including sudden dramatic changes (such as oil spills) and long-term less dramatic changes that could have an impact on the distribution and abundance of coastal resources.

Existing studies of the intertidal habitat of Kachemak Bay have generally focused on a particular area of the Bay (Crow and Koppen 1977, Dames and Moore 1978) or a limited sample of several habitat types within the bay (Lees et al. 1980). Further studies have attempted to explain processes driving population dynamics (Caroll 1994, Highsmith et al. 2001). Shaw and Wiggs (1980) studied hydrocarbon pollution in intertidal habitats within Kachemak Bay. While all of these studies add to our understanding of the intertidal zone of Kachemak Bay, none include the entire shoreline of the bay.

Ecological studies have traditionally suffered from a lack of long-term data collection, while citizens' monitoring programs have often suffered from a lack of scientific rigor and consistency in data collection. The FY2005 Invitation for Proposals invites the use of ShoreZone mapping to choose specific GEM nearshore sample sites and the development of standard operation procedures (SOPs) and methods that will be common to all sampling. We propose to collaborate in an outstanding opportunity in the Kachemak Bay region to combine the strengths of the Center for Alaskan Coastal Studies' (CACs) CoastWalk program, a long-term volunteer monitoring program to collect biological and human activity information about Kachemak Bay's shoreline, with ShoreZone mapping completed by the Cook Inlet Regional Citizens Advisory Committee (CIRCAC), and additional "nested" high-resolution shoreline mapping completed by the Kachemak Bay Research Reserve (KBRR). This mapping and a review of community shoreline concerns and issues will be used in a collaborative scientist-community process to select "extensive" nearshore sample sites in Kachemak Bay. Further, we plan to assess the utility of using citizen and student monitors to perform long-term low resolution biological monitoring and to refine the existing community-based monitoring program to align the shoreline monitoring units and the SOPs and methods with those that will be developed in response to the Invitation to provide the best possible citizen and community-based data relevant to the GEM program. Alignment with SOP's and monitoring methods will occur through the participation of Marilyn Sigman, co-P.I. on this project, as a sub-contractor for community involvement in another project proposal submitted in response to the FY2005 invitation by James Bodkin and Tom Dean to develop the nearshore SOPs and methods and to select long-term nearshore

monitoring sites. Dr. Dean will be sub-contracted under this proposal to assess the CoastWalk data collection protocols and to assist in selection of SOPs and methods suitable for citizen participation.

In Kachemak Bay, community members have been engaged in an annual survey of the shoreline for 19 of the last 21 years. The Kachemak Bay CoastWalk program, organized and conducted by the Center for Alaskan Coastal Studies (CACs), is focused on monitoring environmental changes in beaches and intertidal communities on a baywide basis and increasing understanding about human impacts on these environments. Data collection efforts focus on marine invertebrates, seaweeds, birds, mammals, unusual observations, and evidence of human activities and impacts to the shoreline. Annual participation has ranged from 80 to 382 people, including school and youth groups in Homer, Seldovia, Nanwalek, and Port Graham; and staff of the Kachemak Bay Research Reserve (KBRR) and Alaska Maritime National Wildlife Refuge. CACS and KBRR have also piloted more intensive draft intertidal monitoring protocols (Mangin 2002) with area schools at seven Kachemak Bay sites as part of the GLOBE (Global Learning and Observations to Benefit the Environment) program supported by the National Science Foundation and NASA. In 2003, CACS developed a K-12 beach monitoring curriculum unit relevant to rocky intertidal communities in Kachemak Bay and the coastal communities within the GEM geographic area (CACs 2004). The curriculum unit provides locally relevant content background for teachers and students aligned with state and national science content standards and highlights the science process skills that would be taught through participation in the beach monitoring program. The U.S. Fish and Wildlife Service Alaska Coastal Program will support a collaborative project by CACS and CIRCAC in 2004-2005 to expand the unit to encompass monitoring in sandy and muddy intertidal areas. The KBRR has completed extensive intertidal habitat mapping in Kachemak Bay (GEM Project 030556) that classifies the physical characteristics of the nearshore environment. This project divided the shoreline of Kachemak Bay into spatially nested series of homogeneous segments, 10-100 meters in length. This provides a high-resolution system to map the physical structure of the shoreline habitats, and is an ideal framework on which to overlay biological or human impact data.

The proposed project would utilize relevant CoastWalk biological and human impact data collected by citizen volunteers and integrate it into the existing Intertidal Habitat Mapping Project's high-resolution geomorphological and physical GIS mapping. This combined biological data and high-resolution mapping can provide the basis for selection of GEM extensive nearshore monitoring sites in Kachemak Bay.

This project will also provide a model for community involvement in the selection of nearshore monitoring sites, consideration of community interests in extensive site selection, and community participation in GEM data collection and information transfer. It thus furthers on-going planning and the development of methodologies for GEM nearshore monitoring and habitat and shoreline mapping (Schoch et. al., 2002; EVOS/GEM April, 2002, workshop summary; EVOS/GEM March, 2003, workshop summary, Bodkin and Dean 2003).

B. Relevance to GEM Program Goals and Scientific Priorities

The proposed project addresses the key GEM Program and Science Plan strategies of fostering community involvement and local knowledge and to a lesser degree, of supporting management applications. It would reward and further a long-term involvement by community members in monitoring and stewardship efforts by integrating the community-based dataset into the GEM nearshore monitoring framework. It will address the key hypothesis with respect to the causes of short-term and long-lasting changes in community structure and dynamics of intertidal and subtidal habitats by nesting documentation of human activities (such as increased urbanization and localized pollution) and data on the variability of selected intertidal plant and animal populations within larger-scale studies of natural forces such as currents and predation in Kachemak Bay being carried out by the KBRR. The CoastWalk focus on observations of marine invertebrates can help fill the information gap about harvested sessile invertebrate species, such as the black gumboot (*Katharina tunicata*), and the mobile sea stars and gastropods that are not harvested but which may be sentinel species in intertidal communities in the GOA region.

The proposal also responds to the initial priority being placed on DETECTION of change by developing the mapping tools that will be required to select nearshore monitoring sites for change detection. It furthers the combination of synoptic, intensive, and extensive sites that will be needed by GEM to monitor the nearshore habitat type at nested scales of time and space (Schoch et. al. 2002). The purpose of extensive sites is for pattern oriented studies and for addressing issues of concern to the local community. This project is thus designed to enlist the participation of specific communities in developing and/or implementing the GEM program. Kachemak Bay is a candidate site for core GEM nearshore monitoring activities based on substantial partnering opportunities, chances for assessing human activities and impacts, and logistics. The coastal habitat assessment programs already in place with the KBRR is a key consideration along with the nearby moorings for oceanographic measurements (GEM Program Document).

The development of data collection protocols that can be carried out by community members and the selection of extensive sites will provide the means to monitor nearshore sentinel populations closely to detect localized impacts that may be occurring in the intertidal and subtidal benthos through harvesting of various invertebrates, trampling, discharge of contaminants, road and home construction, and soil erosion. The data collected will contribute to the goal of UNDERSTANDING the causes of change in the marine ecosystem, including human influences.

The expected results of the project include:

- 1) the engagement of community members, including teachers and K-12 students, in the GEM program by demonstrating the usefulness of historic CoastWalk intertidal data to the development of the GEM nearshore monitoring program.
- 2) the involvement of Kachemak Bay community members in decisions about nearshore sampling locations to address community issues and long-term GEM nearshore monitoring objectives.
- 3) the use of ShoreZone and GIS mapping, including the identification of areas sustaining impact from human activities and biological “hot spots” (such as eelgrass, kelp beds, and sand lance spawning areas) by community members and managers in landowner decisions about shoreline use and development.

Morris (1999) reviewed 24 coastal monitoring programs and summarized the successful attributes as: 1) having training and educational aspects part of an educational institution or having an objective of public education and stewardship, 2) use of the web or other coordination for consistency of methodology or data formats, 3) gathering of data on site-specific or resource-specific issues by NGOs which would not have been gathered by agency groups. Noted program weaknesses were related to program design, including a lack of clear program objectives, failure to specify a site selection protocol within a regional framework, absence of a central body to coordinate data storage and handling, and a lack of quality assurance for programs that relied on volunteers. The intent of this project is to address those attributes that will ensure success and to avoid the weaknesses.

The proposed community/scientist workshop would follow the 21st Annual Kachemak Bay CoastWalk and would serve to INFORM the public with integrated and synthesized information and begin to INVOLVE them in sustained contributions to the GEM Program. It would reach community members who cannot attend the EVOS annual meeting or other workshops held in Anchorage.

II. PROJECT DESIGN

A. Objectives

The objectives of the proposed research are to:

- 1) Evaluate the CoastWalk dataset of biological and human impact data to determine relevance of legacy data and the most appropriate means for integration with the physical and geomorphological shoreline mapping and classification developed by KBRR and ShoreZone mapping for Kachemak Bay;
- 2) Integrate relevant CoastWalk data into the KBRR GIS ;
- 3) Develop and pilot citizen nearshore data collection SOPs and methods in Kachemak Bay;
- 4) Organize and facilitate a Kachemak Bay community workshop as a forum for scientists, community members, and resource managers to: a) discuss broader issues relating to GEM nearshore monitoring strategies and community issues, and b) participate in collaborative selection of extensive nearshore sites;
- 5) Implement GEM citizen-based nearshore monitoring and a supporting WEB site.

We propose to show that biological and human impact data collection using CoastWalk and GLOBE protocols can be integrated into ShoreZone mapping and high-resolution GIS shoreline mapping of geomorphological and physical features to enhance the basis for nearshore monitoring site selection.

The research is significant in demonstrating the integration of data from different sources to create a product and the means to access the data in a way that will further both site selection for long-term nearshore monitoring and community involvement aspects of the GEM Program.

B. Procedural and Scientific Methods

To accomplish the first two objectives listed above, the long-term data from the CoastWalk program will first be assessed to determine consistency of spatial and temporal coverage. With assistance from intertidal specialist Tom Dean, we will then determine which specific biological and human impact data will be extracted for integration into KBRR's habitat mapping GIS database. CoastWalk zones will need to be aligned with KBRR's habitat mapping segments prior to integration into the GIS. Finally, the data will be imported to a database program that will then be linked to the GIS, so that users can access the information by selecting an area of interest.

The proposed methods will combine citizen-generated local information with the KBRR mapping methodology. ShoreZone mapping also exists for Kachemak Bay, and is a recommended regional and statewide standard based for the low-resolution aerial video mapping based on its utility in mapping the shorelines of Washington, British Columbia, as well as a substantial portion of the GEM area. The outcome of ShoreZone mapping, however, is a qualitative, point-in-time inventory useful as a coarse screening tool to locate shoreline segment types for monitoring change over time. The KBRR methodology is separate and parallel to the ShoreZone methodology and nests within it, providing the means to develop predictive models over longer stretches of similar shoreline and to detect and monitor change over time (EVOS/GEM shoreline mapping workshop summary, March 2003). CoastWalk data collection along with the KBRR mapping can also provide the means to ground-truth the ShoreZone classification of bio-bands.

A National Park Service methodology developed for Glacier Bay National Park was also presented at the EVOS-sponsored shoreline mapping workshop by Lewis Sharman in March, 2003. The data collection protocols are more technical than have been employed by the CoastWalk program, but the program's "user-friendly" interactive data-viewing form will serve as a model for development of the interface with the KBRR GIS. Lewis Sharman (pers. comm.) is working on the development of an interactive ArcIMS product that will provide public access to data on the Internet that may be available as a model during the timeframe of this project.

C. Data Analysis and Statistical Methods

Volunteers with a wide range of species identification and technical skills have collected the data to be incorporated into the GIS in this proposal. Thus the data will be fairly straightforward presence or absence data in most cases. The goal is to use these data to help identify potential sites for more rigorous quantitative assessment of intertidal populations, as well as to alert managers and researchers to dramatic changes. The power of this type of data lies in the broad temporal and spatial coverage. We will begin by analyzing the historic CoastWalk data and attempt to identify particular species or types of impacts that have enough existing data to determine patterns of variation. The potential error of such data lies in the differing interests, data collection methods and expertise of the volunteers that have participated. One of the primary goals of this proposal is to refine the data collection protocols, develop QA/QC procedures, and redesign volunteer training to enable CoastWalk volunteers to collect the best possible data relevant to the GEM program.

D. Description of Study Area

The study area for this proposal is Kachemak Bay, off lower Cook Inlet, Alaska. The north, east, south, and west bounding coordinates are 59.8205, -150.8960, 59.3205, and -151.8900, respectively.

E. Coordination and Collaboration with Other Efforts

This project is an extension and will make use of the products of EVOS Project 030556 High Resolution Mapping of the Intertidal and Shallow Subtidal Shores in Kachemak Bay (Carl Schoch, P.I.). It will also be developed in accordance with the findings and recommendations of EVOS Project 030375 Designing a Community Involvement/Community-based Monitoring Plan for GEM (Marilyn Sigman, P.I.) as implemented by EVOSTC staff and the Trustee Council. Because of the on-going nature of the CoastWalk and GLOBE programs in Port Graham and Nanwalek, it will extend the community involvement that occurred as part of EVOS Project 030647 Investigating the Roles of Natural and Shoreline Harvest in Altering the Kenai Peninsula's Rocky Intertidal to be completed in FY2004 (Contacts: Jennifer Ruesink, Anne Salomon), EVOS Project 030561 Evaluating the Feasibility of Developing a Community-based Forage Fish Sampling Project for GEM (Contact: Dave Rosineau, U.S. Fish and Wildlife Service), and EVOS Project 030052 Tribal Natural Resource Stewardship and Meaningful Tribal Involvement in GEM (Contacts: Mimi Hogan, Paul McCollum, Chugach Regional Resources Commission). It will make use of the results of site data and community involvement that occurred for EVOS Project 030666 Alaska Natural Geographic in Shore Areas; Census of Marine Life field project (Contacts: Brenda Konar, Katrina Iken). Jennifer Ruesink, Anne Salomon, Brenda Konar, Katrina Iken, Susan Saupe, and Dave Rosineau have confirmed their interest and availability for participating in the fall, 2005 workshop. The P.I.s that are selected to conduct the development of nearshore sampling SOPs and methods in FY2005 and the selection of nearshore sites in FY2005 and FY2006 will also be invited to play lead roles in the workshop. Travel support is also being requested for the participation of tribal environmental specialists and teachers and students from Seldovia, Nanwalek, and Port Graham in the workshop.

The project will also be coordinated with, make use of, and provide ground-truthing for the ShoreZone mapping that has been completed for Kachemak Bay with funding from the Cook Inlet Regional Citizens Advisory Council (CIRCAC) (Contacts: Susan Saupe, CIRCAC; John Harper, Coastal & Ocean Resources; Mary Mary Morris, Archipelago Marine Research). CACS and CIRCAC will be collaborating to provide community outreach about access and management uses of ShoreZone mapping to in the context of the Kachemak Bay CoastWalk and GLOBE programs in 2004 and 2005 with support from the U.S. Fish and Wildlife Service Alaska Coastal program. It will also complement the ShoreZone mapping funded by EVOS for other oil spill affected areas.

CACS has developed a database for CoastWalk data. An online data entry interface and integration of CoastWalk data into the Citizens Environmental Monitoring Program (CEMP) and the State Integrated Information and Monitoring Management System (SIIMMS) databases is planned. This database development complements past EVOS support for the CEMP and SIIMMS (Contact: Joel Cooper, CIK).

CACS, in partnership with Chugach School District, is planning a Youth Area Watch teacher training in CoastWalk and GLOBE data collection and entry protocols for August 2004, at the CACS Peterson Bay Field Station in Kachemak Bay (Contact: Sheryl Salasky, Youth Area Watch Coordinator, Chugach School District). The Alaska Coastal Program and a State of Alaska Coastal Impact Assistance Program grants will support CACS' staff, travel, equipment, and loan of teaching kits to support on-going school monitoring programs and associated classroom activities in Homer, Anchor Point, Vosnesenka, Seldovia, Nanawalek, and Port Graham to the end of the 2004/2005 school year. These funds can also be used to provide similar program support for Youth Area Watch teachers and students in other communities within the GEM geographic area.

III. SCHEDULE

A. Project Milestones (assumes availability of funds on October 1, 2004)

- Objective 1. Evaluate the CoastWalk dataset of biological and human impact data for utility and the most appropriate means for integration with the physical and geomorphological shoreline mapping and classification developed by KBRR and ShoreZone mapping for Kachemak Bay.
To be met by March 2005.

- Objective 2. Integrate relevant historical CoastWalk data into the KBRR GIS.
To be met by August 2005.

- Objective 3. Develop and pilot citizen nearshore data collection SOPs and methods in Kachemak Bay
Development by June 2005.
Piloting to occur in September, 2005 and April-May, 2006.

- Objective 4. Organize and facilitate a Kachemak Bay community workshop as a forum for scientists, community members, and resource managers to: a) discuss broader issues relating to GEM nearshore monitoring strategies and community issues, and b) participate in collaborative selection of extensive nearshore sites;
To be met by November 2005.

- Objective 5. Implement a GEM citizen-based nearshore monitoring program in Kachemak Bay and a supporting WEB site.
To be met by September 2007.

B. Measurable Project Tasks

FY 05, 1st quarter (October 1, 2004-December 31, 2004)

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|-------------------|---|
| October | Project funding approved by Trustee Council. |
| December 31, 2004 | Complete evaluation of historical CoastWalk dataset and data collection protocols |

FY 05, 2nd quarter (January 1, 2005-March 31, 2005)

January 12-16 (tentative): Annual GEM Workshop

March 31, 2004: Complete geographic alignment of CoastWalk zones with KBRR shoreline habitat units and ShoreZone units.

FY 05, 4th quarter (July 1, 2005-September 30, 2005)

August 31: Complete integration of historic data into KBRR GIS.

September 30: Pilot citizen GEM nearshore SOPs and methods.

FY 06, 1st quarter (October 1, 2004-December 31, 2004)

December 31: Conduct a Kachemak Bay community/public/scientist workshop to select nearshore sites and adapt GEM SOPs and methods for nearshore sampling into citizen SOPs and methods.

Complete data analysis and integration from 2004 CoastWalk into KBRR GIS.

FY 06, 2nd quarter (January 1, 2005-March 31, 2005)

(dates not yet known) Annual GEM Workshop.

FY 06, 3rd quarter (April 1, 2005-June 30, 2005)

Additional piloting of GEM citizen nearshore monitoring SOPs and methods with school groups and community volunteers.

FY 06, 4th quarter (July 1, 2005-September 30, 2005)

September 30: Train CoastWalk volunteers in citizen SOPs and pilot citizen monitoring at nearshore sites

FY07, 1st quarter (October 1, 2005-December 31, 2005)

December 31 Complete data entry for 2005 CoastWalk

FY07, 2nd quarter (January 1-March 30, 2006)

January Attend EVOS Annual meeting

March 30 Complete development of WEB site

FY07, 4th quarter (July 1 2006- September 30, 2006)

September 30 Submit final report to Trustee Council Office.

IV. RESPONSIVENESS TO KEY TRUSTEE COUNCIL STRATEGIES

A. Community Involvement and Traditional Ecological Knowledge (TEK)

CoastWalk has been a sustained, long-term community involvement program to collect local knowledge. It has a track record of participation by schools, youth groups, resource agency staff,

beachfront landowners, and community members throughout the Kachemak Bay region. The annual effort is publicized widely using local media and sustained outreach efforts to past volunteers. Beginning in 2001, the program was expanded into an annual multi-partner “Kachemak Bay Coastweeks” series of educational events and celebrations to raise awareness about the bay’s habitats and stewardship opportunities. Coastweeks combines the CoastWalk with a community celebration of NOAA-sponsored National Estuaries Day, and an annual celebration of National Wildlife Refuges.

Past and new CoastWalk volunteers will be provided with project updates and opportunities to comment and will be interviewed to provide additional local knowledge. ShoreZone mapping will be made available in fall, 2004, revised to add ground-truth information from the 2004 CoastWalk and made available on revised ShoreZone maps in fall, 2005. The final KBRR GIS mapping with a user-friendly means of data retrieval will be publicly available at both KBRR and CACS offices. Hard-copy maps produced from the GIS will also be made available. The KBRR and CACS Web pages are another potential means to make information available.

The proposed workshop will provide an interactive means for both scientists and community members to present information and share knowledge and understanding about GEM’s long-term goals and strategies. This community workshop in Homer is an important component of this proposal in addition to any participation in GEM-sponsored conferences or workshops in Anchorage. The intent of the community workshop is to provide an opportunity for community members participating in the Kachemak Bay CoastWalk and other interested community members to collaborate with professional researchers who have been conducting GEM-sponsored nearshore research in Kachemak Bay. While Homer is relatively close to Anchorage, participation by community members in Anchorage meetings requires either a round-trip plane fare of \$180-240 or a 9-hour round-trip trip by car, overnight lodging in Anchorage, and depending on scheduling, may require time off work. Residents of villages on the south side of Kachemak Bay have an additional round-trip plane fare of \$55-90. This is an effective barrier to participation to many community members, including teachers, students, and natural resource professionals. A community-based workshop is, thus, cost-effective from the standpoint of maximizing participation and limiting travel costs to that required by the researchers and for residents of the villages on the south side of Kachemak Bay to travel to Homer.

Both CACS and KBRR staff participated in the Port Graham-Nanwalek Wisdomkeeper Workshop in September, 2004, and discussed the CACS CoastWalk program as a means to monitor and promote the recovery and sustainability of invertebrate species in the nearshore with community representatives (Chugach Regional Resource Commission 2003). Walt Wrede (City of Homer), Violet Yeaton, Natural Resources staff to Port Graham Tribal Council; Mike Opheim, Tribal Environmental Specialist, Seldovia; Christine Celentano, Chugach Regional Resources Commission Environmental Program Director; and Sheryl Salasky, Chugach School District Youth Area Watch Coordinator for Prince William Sound communities have agreed to work with the proposers in the further development of the community involvement aspects of this proposal.

B. Resource Management Applications

The Kachemak Bay CoastWalk program has goals of: 1) building community awareness of the importance of local marine habitats, 2) gathering data to detect long-term trends in biodiversity, and 3) observing and documenting the effects of human impacts. The development of more intensive data collection protocols and the merger of the dataset with the KBRR's GIS shoreline mapping will address these goals with greater scientific rigor and enable the application of the collected data and trend information to shoreline habitat evaluation and mitigation of the effects of human activities such as shoreline development, point-source pollution, and marine spills. CoastWalk data and trends has been requested and provided to the City of Homer's Beach Policy Committee to assist them in monitoring and regulating uses of city-owned beaches (Sigman 2001) and to natural resource agency reviewers of a proposed 1/2-mile seawall east of the Homer Spit (Contact: Maureen DeZeeuw, U.S. Fish and Wildlife Service). CACS has also applied CoastWalk data to provide recommendations concerning Geographic Response Strategies for oil spill response in specific Kachemak Bay shoreline areas (Contact: Susan Saupe, CIRCAC).

Within the GEM geographic area, natural resource managers and public land managers, and private landowners of the shoreline and nearshore generally lack detailed, site-specific mapping of important or critical intertidal habitat areas such as eelgrass and kelp beds and sand lance and bird-nesting beach habitats that could be altered or lost as a result of shoreline development activities. In Puget Sound, a community-based group, People for Puget Sound have merged data collected using a Rapid Shoreline Inventory protocols with ShoreZone mapping. The program was developed to address the lack of information in that area about the extent and current rate of nearshore habitat loss and a lack of understanding about the relationship between shoreline development and natural resources that rely on healthy beach environments for survival (People for Puget Sound, 2001). Similar to the Puget Sound program, the merger of CoastWalk data with GIS mapping and refined data collection protocols will generate maps of the following datasets: eelgrass coverage, algae coverage, shoreline structure presence/absence, outfall presence/absence, and sand lance beach habitat use areas.

Kachemak Bay has been an important study area for the dynamics of nearshore fish communities. Sand lance, in particular, are important forage fish species that spend the majority of their life cycle buried in intertidal and subtidal substrates. John Harper (pers. comm.) has developed maps of potential sand lance spawning habitat in Kachemak Bay based on mapping attributes for habitat in Puget Sound. These predictions can be verified by the results of past studies that involved beach seining of nearshore areas (Robards et. al. 1999a), by beach seining and random digging (Robards et. al., 1999b, Robards et. al. 2002), and by digging in beach substrates at selected study sites (M. Robards, unpub. data); and then further refined by citizen observations during CoastWalk 2004 and 2005. The expanded observations will provide an "early warning" about changes in the extent of habitat use (Robards et. al., 1999, 2002) for this key prey species for vertebrate predators including seabirds, fishes, and marine mammals in the North Pacific. Variations in abundance of forage fish species on an annual or decadal basis can result in shifts in dependence on sand lance as a key component of the diet and thus may have significant effects on annual production of species such as seabirds (Piatt and Anderson, 1996). The Alaska Maritime Wildlife Refuge has pursued collection of information about the relative abundance of sand lance and other forage fish in the stomachs of harvested halibut because of their key role in marine food chains and has a continued interest in information to complement seabird population monitoring (D. Rosineau, U.S. Fish and Wildlife Service, pers. comm.). The

high site fidelity of sand lance has implications for management strategies to protect areas from oiling or other anthropogenic perturbations that would render the habitat unsuitable (Pinto 1984).

Applications of the data and mapping will be aided by Web accessibility for natural resource managers and community members, including private landowners at local educational facilities such as the Center for Alaskan Coastal Studies. The City of Homer owns and manages the portion of Kachemak Bay tidelands within city limits. The ADFG has management responsibility for the Kachemak Bay and Fox River Flats Critical Habitat Area (CHA) tidelands. Walt Wrede, Homer City Manager, and Colleen Matt, ADFG CHA Manager, have agreed to work with the proposers in developing the resource management aspects of this proposal.

V. PUBLICATIONS AND REPORTS

The product of this work will be used as a foundation for further monitoring of biological resources and human impacts in the shoreline of Kachemak Bay. We do not intend to publish this data in a scientific journal. However, a report of the results of this project will be made available. The ShoreZone mapping and associated ShoreZone data is currently available on a CIRCAC-sponsored Web site and will be available in map form for specific queries on request. The KBRR GIS will combine ShoreZone mapping and data, KBRR zones and data, and CoastWalk zones and data. These GIS layers will be provided electronically to EVOS TC or by request.

VI. PROFESSIONAL CONFERENCES

We anticipate making a presentation at the GEM Annual Conferences in 2005 and 2006 and participating in GEM nearshore monitoring workshops organized by GEM or GEM partners which include a focus on community involvement. We do not anticipate presenting this work at any other professional conferences due to the cost of travel to national or international conferences in relation to the amount of funding available in this category of grants. The results will, however, be reported to networks of environmental educators and environmental monitoring groups through list serve postings to the Kachemak Bay Environmental Education Alliance (KBEEA) and the Alaska Natural Resources and Outdoor Education Association (ANROE). A summary of the project and results will also be sent to the CACS-maintained list of 90 organizations, natural resource agency, and local and tribal governments who expressed an interest in community involvement in GEM under EVOS/GEM Project 030575.

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Shaw, D. G. and J. N. Wiggs. 1980. Hydrocarbons in the intertidal environment of Kachemak Bay, Alaska. Marine Pollution Bulletin 11:297-300.

Sigman, M. 2001. CoastWalk report on the state of Homer beaches. Report to the Homer City Council. 23 pp.

Trasky, L. L., L. B. Flagg, and D. C. Burbank. 1977. Environmental studies of Kachemak Bay and Lower Cook Inlet. 12 vols.

Steve Baird

GIS and Web Specialist, Kachemak Bay Research Reserve
2181 Kachemak Drive, Homer, Alaska 99603
(907 234-6377 ext.236) Email: steve_baird@fishgame.state.ak.us

Education:

Dartmouth College, Hanover, NH. 1988-1996. PhD candidate, Department of Biological Sciences. Voluntary withdrawal, 1996.

College of the Atlantic, Bar Harbor, Maine. 1980-1983. BA in Human Ecology, 1983. Emphasis on ecology.

Colby College, Waterville, Maine. 1978-1980. Environmental Studies/Biology major.

Recent Professional Experience:

Research Analyst II / GIS and Web Specialist. Kachemak Bay Research Reserve. December, 2001 – present. Responsibilities include general and project-specific GIS support for the Research Reserve, web site maintenance and design, and research support on a variety of projects.

GIS Specialist. Cook Inlet Keeper. June- December, 2001. Responsibilities include all aspects of computer mapping and analysis using ArcView GIS. Cook Inlet Keeper is a non-profit group working to protect Alaska's Cook Inlet watershed. Also responsible for updating the Keeper's web-site, computer network system, and email system.

Land Manager. Kachemak Heritage Land Trust. April, 2000- Present. Responsible for all aspects of land stewardship for properties the land trust owns or has easements on. Duties include maintaining stewardship databases and files, assessing properties under consideration for protection, and monitoring those properties already under protection.

Assistant Professor. Antioch New England. Spring 1994. Taught a graduate-level ornithology course. Presented lectures, led field trips and evaluated students.

Expedition Ornithologist. Belize Zoo, Belize, Central America. January 1994. Member of an expedition into a previously unexplored mountainous region of Belize. Responsibilities included censusing bird community and general expedition support.

Graduate Research. Dartmouth College. September, 1990-March 1993. Study designed to assess importance of habitat selection in determining over-winter survival of American Redstarts on their winter grounds in Belize, Central America.

Research Assistant. U.S. Fish and Wildlife Service Habitat Utilization Study. Belize, Central America. January 1989; January 1988. Project studying bird distribution and abundance in agricultural habitats surrounded by tropical forest. Techniques included point count censuses, vegetation surveys, and mist netting and banding.

Island Supervisor. National Audubon Society Puffin Project. July-August 1989; July-August 1988; June-August 1987; May-August 1986; **Research Assistant**, May-August 1985; June-August 1984. Project to re-establish Atlantic Puffins to historic nesting sites, and study the ecology and behavioral biology of Puffins and several other seabird species.

Principle Investigator. Island Institute/Earthwatch Downeast Flyway Project. September-October 1987; September-October 1986; September-October 1985; **Research Intern**, September-October 1984. Responsibilities included designing and running a field study to monitor the migration and feeding behavior of diurnal raptors on islands off the coast of Maine.

Awards:

Fulbright Scholar. September 1991- April 1992. Fulbright Scholarship for foreign study awarded by The Institute of International Education. Provided partial funding for my PhD dissertation research in Belize, Central America.

Collaborations:

Randy Hagenstein, Anchor River Project, The Nature Conservancy, Anchorage, Alaska.

Gale Parsons, Wetlands Science-Art Collaboration, Pratt Museum, Homer, Alaska.

Coowe Walker, Functional Wetland Assessment Tool, Kachemak Bay Research Reserve, Homer, Alaska.

Marilyn J. Sigman
Executive Director, Center for Alaskan Coastal Studies
M.S., Wildlife Management, University of Alaska Fairbanks, 1977
B.A., Human Biology, Stanford University, 1973

Contact Information: P.O. Box 2225, Homer, Alaska 99603
(907) 235-6667 FAX (907) 235-6668
Email: cacs@xyz.net

PROGRAM AND PROJECT MANAGEMENT EXPERIENCE

Principal Investigator, EVOS Project 030575 Designing a Community Involvement/Community-based Monitoring Plan for GEM, FY03
Project Coordinator, Kachemak Bay Science Conference, 2001-2002
Executive Director, Center for Alaskan Coastal Studies, Homer, Alaska, 1998-present.
Executive Director, Montana Natural History Center, Missoula, Montana, 1996-97.
Project Director, EPA Tillamook Bay National Estuary Project, Oregon State University Cooperative Extension faculty appointment, Tillamook, Oregon, 1993-96
Southeast Region Watchable Wildlife Program Coordinator, Alaska Department of Fish and Game, Douglas, Alaska, 1990-93
Alaska Wildlife Curriculum Program Coordinator, Alaska Department of Fish and Game, Douglas, Alaska 1988-92
Education Consultant to Alaska Sea Grant, Milwaukee Public Museum, California Department of Education, Midway Atoll National Wildlife Refuge, Intersea Whale Research, Juneau School District, Wildlife Federation of Alaska

PROFESSIONAL AWARDS AND APPOINTMENTS

Appointed to Kachemak Bay Sea Duck Management Plan Committee of the Alaska Board of Game, 2001
Oregon Governor's Organizational Leadership Award for work in the Tillamook Bay National Estuary Project demonstrating vision, leadership, and citizen involvement, 1995
Appointed by Alaska Commissioner of Education to Alaska Science Standards Committee, 1993-1995
National Outstanding Contribution Award from Director of U.S. Fish and Wildlife Service and National Certificate of Merit from Secretary of the Interior for "Wetlands and Wildlife" curriculum unit, 1992

PUBLICATIONS – relevant to current proposal

Sigman, M.J. 2004. Gulf of Alaska CoastWatch Activity Guide. Center for Alaskan Coastal Studies. Homer, AK.

_____. 2001. Coastwalk Report on the Status of Homer Beaches: report to the City Council. 21 pp.

_____. 1999a. Alaska Coastal Ecology Teacher's Manual. Center for Alaskan Coastal Studies. Homer, AK. 67 pp.

_____. 1999b. Intertidal Atlas for Peterson Bay Field Station. Center for Alaskan Coastal Studies, Homer, AK. 55 pp.

_____, M.E. Hogan, P. McCollum, P. Schwalenberg-Brown, N. Bird, J.J. Spaeder, R. Ted Cooney, and C. Celentano. 2004b. A Plan for Community Involvement and Community-based Monitoring in the Gulf Ecosystem Monitoring Program. GEM Project Final Report G-030575. Exxon Valdez Oil Spill Trustee Council, Anchorage, AK.

COLLABORATIONS

Nancy Bird, Prince William Sound Science Center
Patty Brown-Schwalenberg, Chugach Regional Resources Commission
Kurt Byers, Alaska Sea Grant, University of Alaska Fairbanks
Christine Celentano, Chugachmiut Environmental Program
Joel Cooper, Cook Inlet Keeper
Robin Dublin, Alaska Department of Fish and Game
Derotha Ferraro, Homer Chamber of Commerce
Carmen Field, Kachemak Bay Research Reserve
Rick Foster, Kachemak Bay Research Reserve
Randy Hagenstein, Alaska Nature Conservancy
Stephanie Hoag, Science and Math Consortium for Northwest Schools
Mimi Hogan, Chugach Regional Resources Commission
Henry Huntington, Huntington Consultants
Terry Johnson, Alaska Sea Grant, Marine Advisory Program
Ellen Lance, U.S. Fish and Wildlife Service Endangered Species Program
Katrina Mangin, Biological Sciences Department, University of Arizona
Phil Marshall, SALMON/CAOS Program, IMS/SFOS, University of Alaska Fairbanks
Paul McCollum, Chugach Regional Resources Commission
Kelly Anne Monroe, Tribal Civilian Community Corps (Americorps)
Gale Parsons, Pratt Museum
Sue Mauger, Cook Inlet Keeper
Sheryl Salasky, Youth Area Watch Program, Chugach School District
Melonie Shipman, Alaska Maritime National Wildlife Refuge, U.S. Fish and Wildlife Service
Joseph Spaeder, consultant
Susan Saupe, Cook Inlet Regional Citizens Advisory Council
DeWaine Tollefsrud, Homer Boys and Girls Club
GLOBE Program network: 20-25 teachers and educators in Homer, Vosnesenka, Kachemak Selo, Anchor Point, Seldovia, Nanwalek, and Port Graham

Budget Justification:

FY05:

Personnel (\$6.5):

Steve Baird is the Research Analyst for the KBRR and Principal Investigator. He will carry out an/or supervise the majority of the GIS work and data analysis, and collaborate in the development of revised data collection protocols for the Coastwalk program. The work proposed in this proposal is not a portion of Steve's normal work at KBRR.

Research Assistant (vacant at this time) will assist as needed.

GIS work will include creation of a Coastwalk Zone GIS layer, and alignment and integration of that layer with KBRR's shoreline segments and Harper's ShoreZone mapping. Historic Coastwalk data will then be imported and linked to the GIS layer, and we will begin designing a system for simplified display of those data.

Travel (\$0.5):

RT travel for Steve Baird, co-P.I., to annual meeting.

Contractual (\$19.5)

CACS (\$10.9)

Marilyn Sigman (\$6.3- 1.25 months), is the Executive Director for CACS. As project co-Principal Investigator she will be responsible for reviewing and organizing the historic Coastwalk database, coordinating community involvement and scientific/technical aspects of the project, and supervising the CACS Environmental Educator.

CACS Environmental Educator (\$3.0- 200 hours @ \$15/hr.) will provide technical assistance to the KBRR GIS/Data Specialist with respect to integration of data into the KBRR GIS, interview past Coastwalk volunteers to collect additional site-specific information, and plan the October, 2005 workshop.

RT travel (\$0.5) for Marilyn Sigman, co-P.I., to annual meeting. Air fare \$200 RT + 3 days per diem @ \$100/day.

Commodities (\$1.1): Equipment for intertidal monitoring (quadrats, 100 m. tapes, disposable cameras, field identification guides), and 2 ArcView licenses to be used by CACS staff and for presentation of Coastwalk data to participants and public.

Coastal Resources Associates, Inc (\$8.6): Contract to pay for independent expert analysis of historic Coastwalk data to determine relevance for monitoring purposes and taxonomic accuracy.

FY06:

Personnel (\$2.7):

Steve Baird is the Research Analyst for the KBRR and Principal Investigator. He will assist with analysis of new Coastwalk data and integrate it into the GIS system
Research Assistant (vacant at this time) will assist as needed.

Travel (\$0.5):

RT travel for Steve Baird, co-P.I., to annual meeting.

Contractual (\$15.4)

CACS (\$10.9)

Marilyn Sigman (\$6.3- 1.25 months), is the Executive Director for CACS. As project co-Principal Investigator she will be responsible for overseeing community involvement, coordinating the workshop and supervising the CACS Environmental Educator.

CACS Environmental Educator (\$3.0- 200 hours @ \$15/hr.) will assist with workshop coordination and will coordinate field-testing of revised protocols.

Travel and travel arrangements (\$5.0) for various groups and individuals to participate in workshop in Homer.

RT travel (\$0.5) for Marilyn Sigman, co-P.I., to annual meeting. Air fare \$200 RT + 3 days per diem @ \$100/day.

Commodities (\$0.6): Workshop printing and supplies.

FY07:

Personnel (\$2.4):

Steve Baird is the Research Analyst for the KBRR and Principal Investigator. He will be responsible for integration of new CoastWalk data into the GIS, and assist in development of a WEB interface for data access.

Travel (\$0.5):

RT travel for Steve Baird, co-P.I., to annual meeting.

Contractual (\$8.0)

CACS (\$5.5)

Marilyn Sigman (\$5.0- 1 month), is the Executive Director for CACS. As project co-Principal Investigator she will be responsible for overseeing community involvement, overseeing the CoastWalk and data entry, and assist in development of a WEB interface for data access.

RT travel (\$0.5) for Marilyn Sigman, co-P.I., to annual meeting. Air fare \$200 RT + 3 days per diem @ \$100/day.

To be determined (\$2.5): WEB development technical services. To design and implement a WEB site for data access.

**EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL
DETAILED BUDGET FORM FY 05 - FY 07**

| Budget Category: | Proposed FY 05 | Proposed FY 06 | Proposed FY 07 | TOTAL PROPOSED |
|---|---------------------------|---------------------------|---------------------------|---------------------------|
| Personnel | \$6.5 | \$2.7 | \$2.4 | \$11.6 |
| Travel | \$0.5 | \$0.5 | \$0.5 | \$1.5 |
| Contractual | \$19.5 | \$15.4 | \$8.0 | \$42.9 |
| Commodities | \$0.0 | \$0.0 | \$0.0 | \$0.0 |
| Equipment | \$0.0 | \$0.0 | \$0.0 | \$0.0 |
| Subtotal | \$26.5 | \$18.6 | \$10.9 | \$56.0 |
| General Administration (9% of Subtotal) | \$2.4 | \$1.7 | \$1.0 | \$5.0 |
| Project Total | \$28.9 | \$20.3 | \$11.9 | \$61.0 |
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Cost-share Funds:

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

\$10,500 CACS in-kind personnel (\$2,500 State of Alaska CIAP grant; \$8,000 USFWS Alaska Coastal Program grant) for school and community Coastwalk/coastal monitoring program and ShoreZone mapping outreach support
 \$1,500 USFWS Alaska Coastal Program grant funds for travel to support school-based Coastwalk/coastal monitoring in Kachemak Bay/Kenai Peninsula communities

FY 05-07

Date Prepared:

Project Number: 050743
 Project Title: Connecting with Coastwalk: Linking Shoreline Habitat Mapping with Community-based Nearshore Monitoring in Kachemak Bay
 Agency: ADFG (Kachemak Bay Research Reserve)
 Proposer: Steve Baird

**EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL
DETAILED BUDGET FORM FY 05 - FY 07**

| Personnel Costs: | | GS/Range/ | Months | Monthly | Overtime | Personnel |
|--|----------------------|-----------|-----------|---------|----------|--------------|
| Name | Description | Step | Allocated | Costs | | Sum |
| Steve Baird | GIS Specialist/ RAll | Range 16 | 0.5 | 4.8 | | 2.4 |
| Vacant | Research Assistant | Vacant | 1.2 | 3.4 | | 4.1 |
| | | | | | | 0.0 |
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| | | | | | | 0.0 |
| Subtotal | | | 1.7 | 8.2 | 0.0 | 8.2 |
| Personnel Total | | | | | | \$6.5 |
| Travel Costs: | | Ticket | Round | Total | Daily | Travel |
| Description | | Price | Trips | Days | Per Diem | Sum |
| Travel for Steve Baird to Annual Meeting | | 0.2 | 1 | 3 | 0.1 | 0.5 |
| | | | | | | 0.0 |
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| | | | | | | 0.0 |
| Travel Total | | | | | | \$0.5 |

FY 05

Project Number: 050743
 Project Title: Connecting with Coastwalk:
 Linking Shoreline Habitat Mapping with
 Community-based Nearshore Monitoring in
 Kachemak Bay

**EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL
DETAILED BUDGET FORM FY 05 - FY 07**

| Contractual Costs: | | Contract |
|---|--|---------------|
| Description | | Sum |
| Center for Alaskan Coastal Studies (CACS) | | 10.9 |
| Coastal Resources Associates Inc. 1 mo. | | 8.6 |
| Contractual Total | | \$19.5 |
| Commodities Costs: | | Commodity |
| Description | | Sum |
| Commodities Total | | \$0.0 |

FY 05

Project Number: 050743
 Project Title: Connecting with Coastwalk:
 Linking Shoreline Habitat Mapping with
 Community-based Nearshore Monitoring in
 Kachemak Bay

**EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL
DETAILED BUDGET FORM FY 05 - FY 07**

| New Equipment Purchases: | | Number of Units | Unit Price | Equipment |
|----------------------------------|--|-----------------|------------|--------------|
| Description | | | | Sum |
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| | | | | 0.0 |
| New Equipment Total | | | | \$0.0 |
| Existing Equipment Usage: | | Number of Units | Inventory | |
| Description | | | Agency | |
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FY 05

Project Number: 050743
 Project Title: Connecting with Coastwalk:
 Linking Shoreline Habitat Mapping with
 Community-based Nearshore Monitoring in
 Kachemak Bay

**EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL
DETAILED BUDGET FORM FY 05 - FY 07**

| Personnel Costs: | | GS/Range/ | Months | Monthly | Overtime | Personnel |
|--|----------------------|-----------|-----------|---------|----------|--------------|
| Name | Description | Step | Requested | Costs | | Sum |
| Steve Baird | GIS Specialist/ RAll | Range 16 | 0.5 | 4.8 | | 2.4 |
| Vacant | Research Assistant | Vacant | 0.1 | 3.4 | | 0.3 |
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| Subtotal | | | | 8.2 | 0.0 | |
| Personnel Total | | | | | | \$2.7 |
| Travel Costs: | | Ticket | Round | Total | Daily | Travel |
| Description | | Price | Trips | Days | Per Diem | Sum |
| Travel for Steve Baird to Annual Meeting | | 0.2 | 1 | 3 | 0.1 | 0.5 |
| | | | | | | 0.0 |
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| Travel Total | | | | | | \$0.5 |

FY 06

Project Number: 050743
 Project Title: Connecting with Coastwalk:
 Linking Shoreline Habitat Mapping with
 Community-based Nearshore Monitoring in
 Kachemak Bay

**EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL
DETAILED BUDGET FORM FY 05 - FY 07**

| Contractual Costs: | | Contract Sum |
|--|--|---------------|
| Description | | |
| CACS | | 15.4 |
| If a component of the project will be performed under contract, the 4A and 4B forms are required | | |
| Contractual Total | | \$15.4 |
| Commodities Costs: | | Commodity Sum |
| Description | | |
| | | |
| Commodities Total | | \$0.0 |

FY 06

Project Number: 050743
 Project Title: Connecting with Coastwalk:
 Linking Shoreline Habitat Mapping with
 Community-based Nearshore Monitoring in
 Kachemak Bay

**EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL
DETAILED BUDGET FORM FY 05 - FY 07**

| New Equipment Purchases: | | Number of Units | Unit Price | Equipment |
|----------------------------------|--|-----------------|----------------------------|--------------|
| Description | | | | Sum |
| | | | | 0.0 |
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| | | | New Equipment Total | \$0.0 |
| Existing Equipment Usage: | | Number of Units | Inventory Agency | |
| Description | | | | |
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FY 06

Project Number: 050473
Project Title: Connecting with Coastwalk:
Linking Shoreline Habitat Mapping with
Community-based Nearshore Monitoring in
Kachemak Bay

**EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL
 DETAILED BUDGET FORM FY 05 - FY 07**

| Contractual Costs: | | Contract |
|---|--|--------------|
| Description | | Sum |
| CACS | | 5.5 |
| Contract for WEB development technical services | | 2.5 |
| Contractual Total | | \$8.0 |
| Commodities Costs: | | Commodity |
| Description | | Sum |
| | | |
| Commodities Total | | \$0.0 |

FY 07

Project Number: 050473
 Project Title: Connecting with Coastwalk:
 Linking Shoreline Habitat Mapping with
 Community-based Nearshore Monitoring in
 Kachemak Bay

**EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL
DETAILED BUDGET FORM FY 05 - FY 07**

| New Equipment Purchases: | | Number of Units | Unit Price | Equipment Sum |
|---------------------------------|--|----------------------------|-----------------------|--------------------------|
| Description | | | | |
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| | | | | 0.0 |
| New Equipment Total | | | | \$0.0 |

| Existing Equipment Usage: | | Number of Units | Inventory Agency |
|----------------------------------|--|----------------------------|-----------------------------|
| Description | | | |
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| Project Number: 050473 Project Title: Connecting with Coastwalk: Linking Shoreline Habitat Mapping with Community-based Nearshore Monitoring in Kachemak Bay |
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