

Project Number: EVOS GEM Project Number: 050743

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

Principal Investigators:

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Time Period Covered by Report: October 2004 – August 31, 2005

Date of Report: September 1, 2005

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1. Work Performed

The following tasks were completed during this annual report period:

- 1) The Kachemak CoastWalk dataset of biological and human impact data has been evaluated to determine the 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) CoastWalk zones have been aligned geographically with the KBRR Intertidal Habitat Mapping units (high-resolution geomorphological and physical GIS mapping) and relevant historic CoastWalk data has been integrated into the GIS
- 3) Community members have been involved in the identification of GEM nearshore monitoring sites in Kachemak Bay that are of interest to communities because of important subsistence, sport, or commercial resources and/or on-going community-based research or monitoring.

The Kachemak Bay CoastWalk dataset and sampling program was evaluated by Tom Dean of Coastal Resource Associates, Inc. He divided the legacy data gathered in past surveys into two general classifications, those that were highly dependent on effort and expertise and those that were not.

Metrics he described as relatively independent of effort and expertise included the relative abundance of different types of trash (but not the amount of trash in each category), descriptions of bluff and beach erosion, and assessments of human activities and structures (including archeological sites, garbage dumps, outfalls, and pipes). He described these types of data as relatively invariant over time and therefore less susceptible to sampling biases introduced by variability in sampling effort. Because these types of data are often closely tied to a particular location and spatial variation over time is less of a concern than for counts of animals, he concluded that these data provide an important historical data set that can be used to assess long-term change in the Kachemak Bay environment. He noted that the utility of these data was exemplified in the summary of changes observed over the past 20 years as presented in the 2004 CoastWalk Anniversary edition of the CACS newsletter. Of the 10 trends highlighted in the newsletter, most were with respect to changes in patterns of human use (i.e. changes in types of debris, indicators of human activities, or changes in types of structures) that were relatively independent of effort. He recommended the best way to analyze, present, and preserve data on human activities, bluff and cliff erosion, archeological sites, garbage dumps, and outfalls and pipes to be to enter these data into a geographic information system (GIS) database.

Metrics he described as highly effort and expertise dependent include counts of birds, domestic mammals, land mammals, and marine mammals; categorical estimates of abundance of seaweeds; and estimates of

the amount of trash and pollutants on beaches. He concluded that counts of birds, domestic mammals, land mammals, and marine mammals; categorical estimates of abundance of seaweeds; and estimates of the amount of trash and pollutants on beaches could best be viewed as rough categorical indices that could only be used to detect large-scale changes (e.g. the disappearance of sea otters or Steller sea lions). He recommended that these data be archived in their present form and broadly summarized as lists of animals or types of trash observed in a given year with some broad scale categorical estimate of abundance in each survey year. He also recommended that trash and pollution data be summarized in terms of the categorical abundance or types of trash per segment.

Dean suggested additional types of data collection including the recording of unusual events or observations, such as the occurrence of large numbers of flat-bottomed sea stars (an event documented by CoastWalk observers in several years), could also be very useful in longer-term assessments of change in Kachemak Bay. While he noted that these observations are largely qualitative in nature, he concluded that they could be useful indicators of change that are important to document and that could eventually lead to more quantitative assessments by CoastWalk volunteers or others.

Dean's report included recommended modifications to the CoastWalk sampling strategy and to specific survey protocols. Modifications to the overall sampling strategy included 1) switching from fall to spring sampling, 2) tiering the sampling approach with various tasks to be performed by CoastWalkers are matched to their levels of training and expertise, and 3) sampling a core set of shoreline segments each year using experienced observers. Recommended modifications to survey protocols included:

- 1) Add observations on dead birds and marine mammals
- 2) Collect sea otter skulls (more experienced observers to perform necropsies)
- 3) Collect observations of mass mortalities of invertebrates
- 4) Obtain geographic coordinates for observed items or events using a GPS
- 5) Take digital photos to document items and events
- 6) Modify sampling procedures for counting live birds and mammals
- 7) Modify sampling procedures for smaller trash items
- 8) Change methods for sampling of algae
- 9) Count novel floatable debris items
- 10) Identify areas where herring are spawning

He provided specific protocols, including those under development as GEM Nearshore SOPs, in the context of the appropriate tier of expertise of observers. Finally, Dean suggested a schedule for phasing in the recommended changes and the development of databases, beginning with the first phase to be implemented during the September, 2005 CoastWalk.

A GIS shapefile was created with lines representing each CoastWalk zone. These can be shown in conjunction with KBRR's high-resolution intertidal habitat mapping segments, as well as the ShoreZone flight lines for Kachemak Bay. All historic CoastWalk data was imported into an MS Access database (fulfilling another of Tom Dean's recommendations), and this database will be linked to the CoastWalk Zone shapefile, allowing for simple retrieval and viewing of the data.

A planned community nearshore monitoring workshop that was to be held in Homer in October, 2005, has been postponed until spring, 2006, to expand the focus on nearshore ecology and monitoring with a broader presentation of the results of on-going research in Kachemak Bay in the areas of nearshore, ocean, and watershed components of the ecosystem and in the area of social science/Traditional Ecological Knowledge. The identification of nearshore monitoring sites that was to be an outcome of the workshop has been accomplished through meetings and interviews of key contacts in agencies, citizen organizations, and tribal and city governments. Recommended Kachemak Bay sites are shown in Table 1 and Table 2.

Table 1. Recommended nearshore monitoring sites

Community	Site
Port Graham & Nanwalek	Coal Mine – bidarki study site
Nanwalek	Nanwalek Reef
Port Graham & Nanwalek	Other bidarki study sites
Seldovia	Jakalof Bay Clam Study Sites
	Kasitsna Bay Clam Study Sites
	Outside Beach, east of Seldovia Bay; NaGISA site
Homer	Mud Bay
	Beluga Slough/Bishop’s Beach
	Otter Rock, Peterson Bay
	China Poot Bay
	Neptune Bay
	Elephant Rock, Yukon Island, NaGISA site

Table 2. Bidarki study site transect locations

Site	End of Transect (North End)		Accuracy	Beginning of Transect (South End)		Accuracy
	Lat	Long		Lat	Long	
Outer Nanwalek	N 59° 21.441'	W 151° 55.887'	18 ft			
Pt. Adams	N 59° 15.523'	W 151° 58.727'		N 59° 15.510'	W 151° 58.711'	
Jagged Rock	N 59° 16.512'	W 151° 59.088'	22ft	N 59° 16.509'	W 151° 59.108'	
Golden Rocks	N 59° 17.407'	W 151° 59.086'		N 59° 17.402'	W 151° 59.060'	
Inner Nanwalek	N 59° 21.444'	W 151° 55.650'	20 ft	N 59° 21.438'	W 151° 55.621'	20 ft
Otter rock	N 59° 22.196'	W 151° 53.746'	23.4 ft	N 59° 22.198'	W 151° 53.702'	19.7 ft
Coal Mine	N 59° 23.703'	W 151° 54.474'	19ft	N 59° 23.696'	W 151° 54.455'	18 ft

2. Future Work.

We anticipate our project to continue on schedule, with the exception of the change in the schedule of the community workshop (from October, 2005 to Spring, 2006). By the end of September 2005 we will have begun implementation of Tom Dean’s recommendations for modify the Coastwalk protocols.

3. Coordination/Collaboration.

This project is a collaboration between the Center for Alaskan Coastal Studies and the Kachemak Bay Research Reserve. The evaluation effort performed by Tom Dean provided the means to align revised CoastWalk protocols with those being developed for the GEM Nearshore Monitoring Plan and community-based monitoring site recommendations were provided to them as part of efforts to identify sites in several coastal communities within the GEM geographic area. Recommendations for nearshore

monitoring sites were coordinated with sites employed in other projects with a substantial community involvement component in Kachemak Bay: EVOS Project 030647 Investigating the Roles of Natural and Shoreline Harvest in Altering the Kenai Peninsula's Rocky Intertidal completed in FY2004 (Contacts: Jennifer Ruesink, Anne Salomon) and 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 Tom Dean and Jim Bodkin have confirmed their interest and willingness to participate in the nearshore ecology and monitoring workshop now scheduled for spring, 2006.

The project has been coordinated with outreach about ShoreZone mapping for use by teachers, natural resource managers, and community members. The September, 2005, CoastWalk will adopt the methods and procedures recommended by Tom Dean to increase the scientific value of the results of CoastWalk surveys, including the use of GPSs to obtain coordinates for zone boundaries and identify locations for eagle nests, cliff erosion, human activities, areas of vehicle use, structures on the beach, archeological sites, garbage dumps, outfalls and pipelines; and the adoption of procedures for documenting dead birds, collecting otter skulls, and documenting mass mortalities of invertebrates.

4. Community Involvement/TEK & Resource Management Applications

The overall purpose of the project is to develop a model for community-based nearshore monitoring. The work accomplished has increased the accessibility of historic data collected and will increase the utility of the data beginning in September, 2005, when the first phase of recommended changes to methods are implemented. The evaluation report provides a "blueprint" for the further development of this community involvement activity and the resulting database. TEK has been integrated into site selection and will be featured at the spring workshops. Community involvement in nearshore site selection is described above.

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 has provided the means to address these goals with greater scientific rigor and to 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.

5. Information Transfer

Sigman developed a poster presentation "Community Involvement in the GEM Nearshore Monitoring Program" with co-authors James Bodkin, Tom Dean, and Steve Baird. The poster was presented at the 2005 Alaska Marine Science Symposium in January, 2005. It described the opportunities for involvement in selection of long-term monitoring sites, participation in data collection, the contribution of important data, and data and information sharing. The poster highlighted the use of ShoreZone mapping and the Kachemak Bay CoastWalk program as a model for a GEM citizen monitoring program for nearshore habitats with an emphasis on its integration with the KBRR GIS.

6. Budget

There are no substantial differences between the expected and actual budget expenses.