Exxon Valdez **Oil Spill**
Gulf Ecosystem Monitoring and Research Project Final Report

A Plan for Community Involvement and Community-based Monitoring in the Gulf Ecosystem Monitoring Program

GEM Project G-030575
Final Report

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Study History: Project 030575 originated from the need to provide guidance for implementing the *Exxon Valdez* Oil Spill Trustee Council's commitment to incorporating community involvement and Traditional Knowledge as major strategies of the Gulf Ecosystem Monitoring and Research (GEM) program. Between 1996-2002, the Chugach Regional Resources Commission received *Exxon Valdez* oil spill restoration and GEM funding to facilitate the involvement of local communities in the oil spill restoration program and to improve communications between spill area residents, community councils, regional organizations, scientists, and tribal communities. This project involved multiple partners representing a diversity of community-based efforts and communities with the objectives of: 1) surveying the regional capacity for community involvement, 2) reviewing potentially relevant models, and 3) broadening the planning for meaningful involvement of spill area residents in the GEM program.

Abstract: In this project, we developed a plan for incorporation of community involvement and traditional and local knowledge into the GEM program. The plan was based on a review of the GEM program and governing documents, a survey of 164 potential GEM community partners as to their interest in participating in an array of community involvement activities, a literature review and personal communications to identify potential models for integration of community-based monitoring and research into the GEM program, and the experience of the multi-partner project team, EVOS staff, and the GEM Public Advisory and Scientific-Technical Committees. The four products of the project are: 1) a "stand-alone" plan (with Executive Summary), 2) a report on the context of the plan, issues and approaches for addressing them, and the results on the regional capacity survey, 3) an online searchable database of relevant community-based monitoring projects and programs. and 4) a transmittal to the EVOS staff and Public and Scientific-Technical Committees recommending changes to the GEM project invitation language and project review criteria to promote and provide incentives for community involvement in GEM.

Key Words: community-based monitoring, community-based research, community involvement, community-scientist partnerships, Cook Inlet, Kodiak, online survey, Prince William Sound, local knowledge, Traditional Ecological Knowledge (TEK)

Project Data: *Description of data* – data were collected through: 1) an online survey of organizations and 2) through literature searches and personal communications to develop an online searchable database of community-based monitoring projects and programs relevant to GEM. *Format of the data* – Data were entered into Excel (1) and Access (2) databases. *Custodian*: contact Marilyn Sigman, Center for Alaskan Coastal Studies, 708 Smokey Bay Way, Homer, Alaska 99603 (mailing address: P.O. Box 2225, Homer, Alaska 99603).

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Executive Summary of a Plan for
Community Involvement in the Gulf Ecosystem Monitoring and Research Program

The Gulf Ecosystem Monitoring and Research Program (GEM) is being designed to provide a long-term foundation for supporting and facilitating important marine research and monitoring in the greater Gulf of Alaska ocean system. One of the many challenges in laying out the groundwork for conducting a truly long-term research and monitoring program is in how to meaningfully and effectively involve and collaborate with the many coastal communities in the region. A report on community involvement was prepared by the Center for Alaskan Coastal Studies in partnership with the Chugach Regional Resources Commission and the Prince William Sound Science Center. Details of the material presented in this summary can be found in the full report.

Meaningful community involvement, in the context of GEM, can be defined as a substantive role for communities and community-based organizations in the design, conduct, analysis, and application of monitoring, research, and information sharing, and a similarly substantive role in helping shape the overall GEM Program. In actual projects and activities, the level of involvement may vary widely from leading a project to receiving information from someone else's work. In either case, the community or communities themselves will best be able to determine the effectiveness and appropriateness of their involvement both in individual projects and in GEM as a whole.

The elements of community involvement described below were developed based on information from three sources: a community survey in the GEM region, a review and analysis of other environmental research and monitoring programs that have substantive community involvement, and the experiences of project participants in GEM and other activities in Alaska. The community survey revealed widespread interest in GEM. Of 164 organizations contacted, 95 replied and 89 indicated that they were interested in participating in GEM in one or more of the following nine categories of activity:

1. Setting GEM program priorities
2. Identifying and incorporating specific community issues and concerns
3. Providing input to GEM advisory committees
4. Participating in annual meetings to hear about GEM program results
5. Organizing community forums about the GEM program
6. Receiving and disseminating GEM synthesized information
7. Providing educational programs based on GEM data and information
8. Being on the GEM program email/mailing list for announcements
9. Participating in community-based research or monitoring activities

Following an analysis of these results, the project team developed five elements of community involvement for GEM. (The numbers in parentheses show which of the categories in the list above are addressed by each element.)

a. Effective GEM Program Support for Community Involvement (2,4,5,8)
b. Robust Community-Based Monitoring and Research (2,9)
c. Effective Sharing of GEM Data and Information (6)
d. Application of GEM Information to Management and Stewardship (7)

e. A Strong Community Role in GEM Decision-making and Program Development (1,3)

Under each element, the report presents strategies and implementing actions as well as a description of the costs associated with each action. The table below is a summary of the main elements, without the descriptions contained in the main report. To demonstrate a solid commitment to supporting community involvement across the broad range of activities outlined, GEM must take action in three areas. (The letters in parentheses refer to the specific actions outlined in the Table 1 below.)

Policies that promote community involvement

- Modifying the Program Goals of GEM (I.A.)
- Revising the Science Plan (II.A, II.B.)
- Inviting proposals for community involvement projects and activities and modifying the review criteria by which project proposals are evaluated to encourage and provide incentives for community involvement (I.D., 1.E., I.F., II.B.,II.D.,II.G.,IV.C.)
    - As components of scientist-directed or collaborative projects
    - As community-directed activities and projects
- Creating accountability for community involvement activities (I.G.)

The continuation or modification of current activities

- Information outreach to diverse audiences (I.C.)
- Data management and quality control relevant for community-involvement projects (II.F.)
- Community and public data access (III.A.)
- Creation and dissemination of synthesis of GEM results and information (III.D.)
- Further promoting participation and communication (V.A., V.B.)

The creation of a Community Liaison position (by hire or contract) to carry out many of the implementing actions (I.B.)

- Support a community involvement committee (I.B.)
- Facilitate scientist-community partnerships (I.D.)
- Organize community meetings to prepare for GEM activities (I.E.)
- Prepare suggested policy revisions and oversee comment and review (I.A., I.F., I.G., II.A., II.B., IV.C.)
- Develop guidelines for research agreements, including the incorporation of local and traditional knowledge (II.C., II.E.)
- Promote collaborative interpretation and analysis (II.G.)
- Support open, two-way communication (V.A., V.B.)

These three areas of action must all be addressed. Note that, although some of the recommendations would affect the allocation of GEM funds through the RFP/annual plan review process, the only substantial additional **new** cost element is the creation of the Community Liaison position. There is a large workload associated with the actions outlined here. A Community Involvement Committee could carry out some of the actions, but without a paid position dedicated to making sure all the actions are taken, community involvement is likely to languish as a worthy idea inadequately carried out.

TABLE 1. Elements, Strategies, Implementing Actions, and Costs

Element I: Effective GEM Program Support for Community Involvement

Strategies	*Implementing Actions*	*Costs*
I.A. Expansion of the GEM Program goal of "informing" to "informing and involving"	Revise the GEM Program Document.	Community Liaison time
I.B. Personnel responsible for guidance and oversight of community involvement	Designate, hire, or contract with a Community Liaison to manage the community involvement aspects of the GEM program. Recruit and appoint a Community Involvement subcommittee of the PAC or STAC.	Personnel hire or contract plus travel Meeting support, Community Liaison time
I.C. Personnel responsible for disseminating and sharing GEM information	Continue to provide information outreach through translating technical information into language and formats appropriate to diverse audiences within the GEM area and beyond.	Ongoing activity
I.D. Facilitation of Scientist-Community Partnerships to Address Community Interests and Concerns	GEM Community Liaison staff to solicit information and implement methods for communication. Provide travel support for project planning	Community Liaison time Competitive grants
I.E. Support for Preparatory Work by Communities	Organize community meetings and complete other work to assess priorities and concerns and prepare for participation in GEM.	Meeting support, Competitive grants**,** Community Liaison time
I.F. A Proposal and Review Process Responsive to Community Concerns and Interests in Participating in GEM	Revise the RFP and Review Process & Criteria to better address community involvement needs. Expand the pool of peer reviewers for effective community involvement	Ongoing activity, Community Liaison time, competitive grants

I.G. Accountability and Evaluation	Schedule periodic evaluations of the community involvement program	Ongoing activity, Community Liaison time

Element II: Robust Community-Based Monitoring and Research

Strategies	*Implementing Actions*	*Costs*
II.A. A clear place in the science plan and in the proposal and review process	Draft language was provided by the Project Team in December 2002, and has been incorporated into the Working Draft Science Plan (February 3, 2003).	No cost
II.B. A core community-based monitoring program	Revise the Science Plan to incorporate the development of core community-based monitoring protocols and to identify other monitoring and research activities that can be carried out by community members.	Ongoing activity, Community Liaison time, Competitive grants
II.C. Support for community-scientist partnerships and networks	Encourage life-of-the-project collaboration; see also I.D. and III.C.; Develop guidelines for research agreements	Ongoing activity, Community Liaison time
II.D. Availability of training to meet community needs	Provide training opportunities, including basic programs as well as advanced ones.	Competitive grants
II.E. Facilitate the inclusion of traditional and local knowledge	Develop guidelines for research agreements and data management to address the particular needs of traditional and local knowledge research.	Ongoing activity, Community Liaison time
II.F. Support Data Management for Community-based Monitoring and Research	Develop data quality control procedures for community-based monitoring; support GEM data management functions for community-based activities.	Ongoing activities

II.G. Support and encourage collaborative analysis and interpretation	Promote and support many avenues for interactions between community members and scientists	Ongoing activities, Meeting support, Competitive grants, Community Liaison time

Element III: Effective Sharing of GEM Data and Information

Strategies	*Implementing Actions*	*Costs*
III.A. Access to data	Create a data management system capable of addressing community and general public needs to have access to data.	Ongoing activities
III.B. Personnel responsible for generating and disseminating GEM information	Continue to provide information outreach through translating technical information into language and formats appropriate to diverse audiences within the GEM area and beyond.	Ongoing activities
III.C. Dissemination and sharing of clear, accessible, understandable information	Employ a variety of methods to disseminate and share GEM information.	Ongoing activities
III.D. Information synthesis	Synthesize information using appropriate and timely methods	Ongoing activities

Element IV: Application of GEM Information to Management and Stewardship

Strategies	*Implementing Actions*	*Costs*
IV.A. Support for active and interactive information/education networks	See III.C.	Ongoing activities
IV.B. Support for Data and Information Beyond GEM	Incorporate, by links or other means, other databases into the GEM database.	Ongoing activities
IV.C. Support for community-based applications to management and stewardship	Support community-based applications to management or stewardship.	Ongoing activities, Community Liaison time **Competitive grants**

Element V: A Strong Community Role in GEM Decision-making and Program Development

Strategies	*Implementing Actions*	*Costs*
V.A. Participation in Advisory Committees	Provide continuing participation in the PAC, STAC, and their subcommittees by community members. Develop an annual feedback and evaluation process by community and community partners for the GEM program.	Ongoing activities, Community Liaison time
V.B. Open, two-way communication	Implement appropriate and timely communication methods to seek input on program direction and development.	Ongoing activities, Community Liaison time

GEM Project G-030575 Planning Project Team members: Marilyn Sigman, Nancy Bird Mimi Hogan, Paul McCollum, Henry Huntington, Joseph Spaeder, Ted Cooney, Christine Celentano, Pat Norman, Gary Kompkoff

A Plan for a Community Involvement in the Gulf of Alaska Ecosystem Monitoring and Research Program (GEM)

Community and citizen involvement can greatly strengthen the GEM's science and the application of that science to sound resource management and stewardship. Considerable interest in and capacity for community-based activities exists throughout the GEM region from a broad array of local and regional organizations, natural resource management agencies, and city and tribal governments. In this plan, the term "community" thus refers to a broad array of entities including tribal and city governments and those responding with interest in being involved in GEM through the project's regional capacity survey.

This section presents the elements of a comprehensive and effective program for community involvement. These elements have been designed as an integral part of GEM, providing communities with the opportunity for a full range of participation, from receiving information to carrying out GEM research and helping direct GEM's evolution over time.

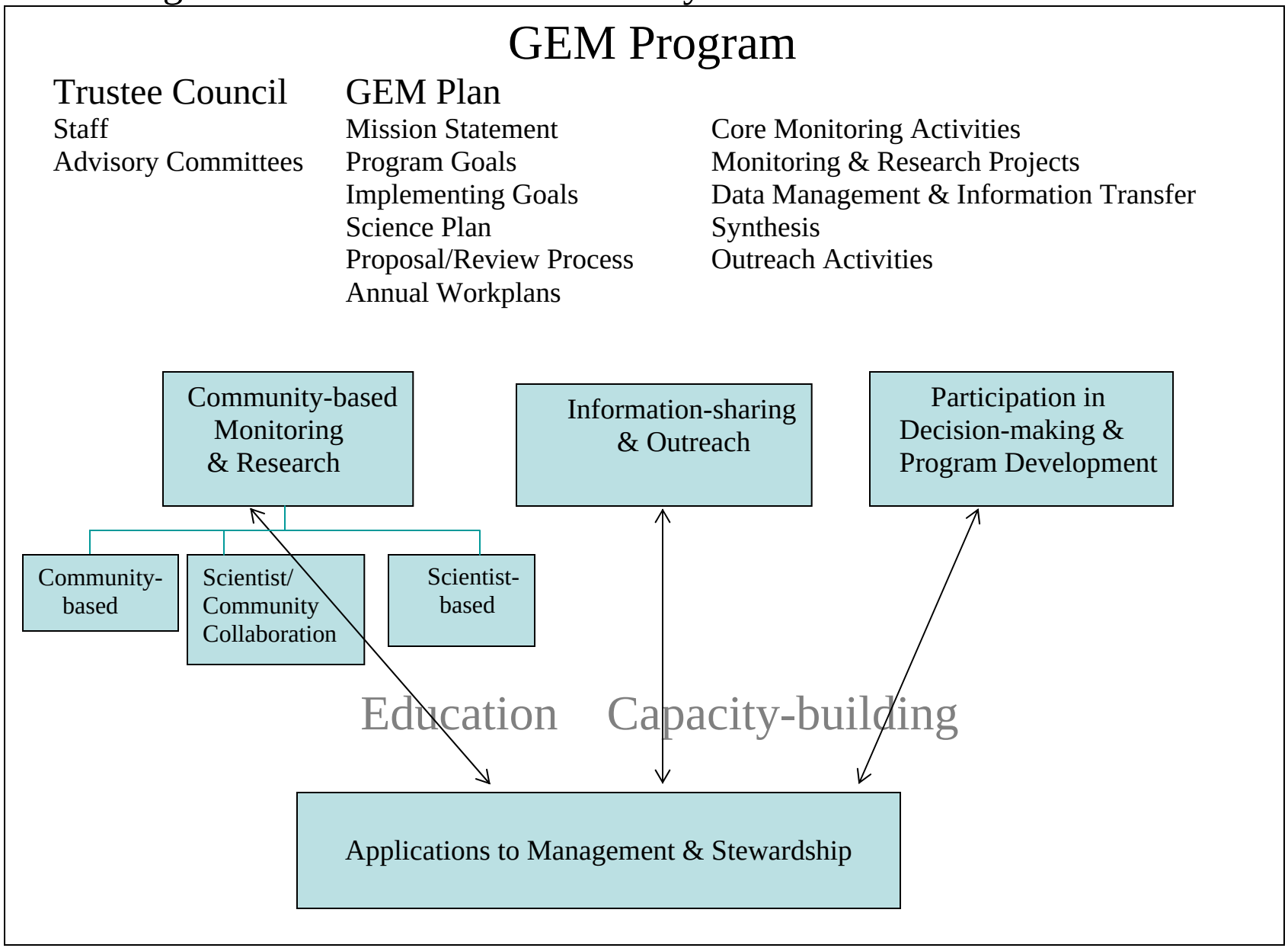
The first element describes the programmatic steps for community involvement in GEM. The four other elements elaborate on specific aspects of community involvement: community-based monitoring and research, outreach and dissemination of information, application of GEM information to management and stewardship, and participation in decision-making about the development of the GEM program. The elements are interrelated, so there is some overlap in the items listed under each heading. Each element is described briefly, followed by a list of strategies and implementing actions.

Creating the elements of community involvement described in the previous section will take several separate actions by different groups. First, or course, the Trustee Council must decide to make sure community involvement happens in GEM. They may select any or all of the elements listed as specific implementing actions, adding other elements as they deem appropriate, and direct the GEM Executive Director and staff to carry out the required actions.

This plan is supported by a report that provides a context for a GEM community involvement plan with a description of communities, tribes, and organizations that are interested in becoming or staying involved in the GEM project, an analysis of various approaches to community involvement in relation to issues relevant to the GEM program, and a more detailed report on a regional capacity survey methods and results. The analysis of issues and recommended elements of a GEM community involvement plan draws upon information about a number of community monitoring and research programs relevant to the GEM Program, which has been compiled into a searchable database that is accessible at www.gemcitizendb.akcoastalstudies.org. Selected case histories of community-based monitoring and research projects and programs are also appended to the report.

GEM Project G-030575 Planning Team members: Marilyn Sigman, Nancy Bird, Mimi Hogan, Paul McCollum, Henry Huntington, Joseph Spaeder, Ted Cooney, Christine Celentano, Pat Norman, Gary Kompkoff

Figure 1. Schematic of Community Involvement Elements



Element I: Effective GEM Program Support for Community Involvement

The structure of GEM must provide a clear place for community involvement, providing support for community-based projects and activities in an integrated fashion with other GEM activities. Without specific mechanisms, community involvement risks being lost amid the other potential contributions to GEM.

Strategies	**Implementing Actions**
I. A. Expansion of the GEM Program goal of "informing" to "informing and involving" The process of informing implies a one-way transfer of information from the GEM program to interested communities and the public. Involvement implies that communities are integral to the program, have ownership in all aspect, and will participate in sustaining a healthy and biologically diverse ecosystem through local stewardship.	*Revise the GEM Program Document.* **Actions required:** Trustee Council to approve, GEM staff (Community Liaison) to implement.
I. B. Personnel responsible for guidance and oversight of community involvement Sufficient staff and appropriate expertise should be devoted to the community involvement aspects of the GEM program. This person would act as the central contact, organizer, and GEM liaison for the communities or community partners to all aspects of the GEM Program. This person should provide support to a Community Involvement advisory subcommittee of scientists and community representatives with expertise in effective community involvement that would advise the STAC, PAC, and other GEM staff.	*Designate, hire, or contract with a Community Liaison to manage the community involvement aspects of the GEM program* **Actions required:** Trustee Council to fund, GEM Executive Director to hire or contract. *Recruit and appoint a Community Involvement subcommittee of the STAC and/ or PAC.* **Actions required:** GEM staff to recruit, Trustee Council to appoint.
I. C. Personnel responsible for disseminating and sharing GEM information Sufficient staff and appropriate expertise should be devoted to managing the flow of GEM information to communities and the public. EVOS/GEM public outreach staff will also need to work closely with GEM data management staff to ensure appropriate community and public access to GEM data.	*Continue to provide information/outreach through translation of technical information into language and formats appropriate to diverse audiences within the GEM area and beyond.* **Actions required:** Executive Director to recruit appropriate staff and provide direction.

I. D. Facilitation of Scientist-Community Partnerships to Address Community Interests and Concerns For Community Involvement to be an effective and integral part of GEM, there must be good communications not only within and among communities but also between communities and others working under GEM. Communications in this context includes making information about interested communities and their specific concerns and priorities available and helping to connect communities and scientists. Several methods should be used, including: • a web directory with information that can be added and updated, • workshops where community members and other researchers can interact, • planning grants to support exploration of mutual interests and development of collaborative projects, • opportunity and encouragement of the submission of letters of interest prior to proposal submission so that community involvement personnel can help connect communities and researchers with similar interests.	Solicit information and implement appropriate and effective methods of communication. **Actions required:** GEM Community Liaison staff to implement. *Provide travel grants for project planning.* **Actions required:** Executive Director to develop grant funding opportunities to support travel by scientists and managers to community workshops and other aspects of planning. Implement through RFP/project review process.

I.E. Support for Preparatory Work by Communities For communities to participate effectively in GEM, they must do preparatory work to assess their interests and priorities, to explore the opportunities GEM offers, to make contact with other researchers and communities to identify potential partnerships. The results of preparatory work can be made available through the web directory described above.	*Organize community meetings and complete other work to assess priorities and concerns and prepare for participation in GEM.* **Actions required:** Communities, community partners, or tribes to identify needs for preparatory work, GEM staff to provide assistance as requested and/or invite proposals through RFP/project review process.

I. F. A Proposal and Review Process Responsive to Community Concerns and Interests in Participating in GEM The current proposal and review process for monitoring and research projects emphasizes scientific rigor and review criteria to ensure selection of cost-effective proposals with high technical merit which best meet GEM Science Plan objectives. Community involvement is not required or given weight and the expertise needed to properly evaluate the potential effectiveness of proposed community involvement projects or components has not been developed to the same degree as for the review of the scientific/technical aspects of the proposals. These revisions would expand the factors to be considered in line with the GEM mission and goals without diluting the importance of scientific merit. The GEM proposal and review process has also invited community involvement proposals for other types of activities including on-going programs such as Youth Area Watch. The survey of potential GEM community partners indicated strong interest in participation in GEM outreach and education activities. The types of projects for which proposals are requested should be expanded to provide a broader scope of opportunity to participate in both GEM outreach and information dissemination and in management applications of GEM information.	*Revise the RFP to provide:* ➢ *opportunities and incentives for community-generated and collaborative scientist/community projects with meaningful community involvement.* ➢ *opportunities for community-based outreach/ education and management and stewardship applications of GEM data and* *Expand the criteria to provide reviewers with the means to evaluate the potential effectiveness and appropriate-ness of proposed community involvement and applications of GEM information to management and stewardship.* **Actions required:** GEM staff and advisory committees to review the recommended changes provided by the Community Involvement Project (030575) Team and implement through RFP/project review process. GEM staff to recruit and expand the pool of peer reviewers to include people with identified expertise in community involvement, in community outreach, and in the application of ecosystem information to management and stewardship.

I. G. Accountability and Evaluation To make sure that the community involvement program is serving the interests of both GEM and the communities, it must be accountable to EVOS staff, the Trustee Council, and to the communities. Individual projects with community involvement components should also be held accountable for their results, and communities, too, will be expected to fulfill their commitments. The periodic evaluation of the community involvement program should examine the degree to which it has been successful in stimulating and supporting community involvement across the range of elements in this plan.	*Schedule periodic evaluations of the community involvement program, for example every five years.* **Actions required:** Trustee Council to establish an evaluation schedule and provide oversight, GEM Community Liaison to implement the evaluation with input from community members and the public and make changes if needed in response to the results of the evaluation.

Element II: Robust Community-Based Monitoring and Research

GEM is, at its core, a long-term scientific monitoring and research program. Accordingly, the active participation by communities in monitoring and research should be at the heart of community involvement in GEM. Community members can extend the capability of the whole GEM program by helping generate data and information, and communities can also direct their activities to address their priority interests and needs. Participation in community-based monitoring and research will also help community members better understand the nature of the data generated by GEM and how it can be used in resource management and stewardship, enhancing their capacity to contribute to all aspects of GEM. Community-based research and monitoring should be established through several mechanisms described in the Strategies and Implementing Actions sections below.

Strategies	**Implementing Actions**
II. A. A clear place in the science plan and in the proposal and review process for community-based monitoring and research The role of community-based monitoring and research should be spelled out clearly and in detail in the GEM science plan, noting the significance of this work both for generating data and for getting communities engaged in all aspects of GEM. Review criteria for community-based monitoring and research should address scientific rigor but weight should also be given to benefit of community involvement through sustained inclusion of citizen-generated data and information in the GEM program	**Actions required:** Draft language was provided by the Project Team in December, 2002, and has been incorporated into the Working Draft Science Plan (February 3, 2003).
II. B. A core community-based monitoring program As the core GEM monitoring program is developed for each habitat, a set of core data collection activities that can be carried out by community members should be identified and their development and implementation supported. These core monitoring activities will establish a foundation upon which additional monitoring and research projects and activities can be built as desired to address community issues or to extend other GEM data collection efforts. Participants would collect core measurements and observations according to scientifically rigorous protocols and enter them into a database.	*Revise the Science Plan to incorporate the development of core community-based monitoring protocols and to identify other monitoring and research activities that can be carried out by community members.* **Action required:** GEM staff to draft new Science Plan sections with appropriate public and committee review. and oversee implementation through the RFP/project review process.

Strategies	Implementing Actions
II. C. Support for community-scientist partnerships and networks Community-based monitoring and research involves setting up partnerships within and among other communities and with researchers and forming networks engaged in similar activities. Collaboration at all stages of a project should be encouraged and supported. Although fieldwork is often the focus of collaborative efforts in research and monitoring, extending collaboration towards project design and towards analysis and interpretation will increase the ability of community members to contribute their knowledge and skills. Furthermore, the addition of new perspectives including familiarity with a different set of projects and data will broaden the set of factors considered when designing, conducting, and interpreting data. Scientists require guidance and support in terms of implementing projects collaboratively with communities.	*Encourage life-of-the-project collaboration* **Actions required:** see Implementing Actions for Facilitating Scientist-Community Partnerships in Section I.D and III.C. *Develop guidelines for research agreements between communities and researchers, covering topics such as use of data, payments for those involved, and confidentiality and limitations thereto.* **Actions required** by GEM Community Liaison
II. D. Availability of training to meet community needs Community members will require training in data collection methods for core monitoring activities on an on-going basis and may need training in basic and advanced methods of monitoring and research for specific projects, all of which should be regarded as appropriate project tasks. Local mentoring, in which community members can train others in their community or in other communities, can help spread the benefits of training courses and engage more people.	*Provide training opportunities, including basic programs as well as advanced ones on specific topics.* **Actions required:** Individual communities, community partners, or tribes to identify needs as a component of monitoring and research proposals, and to implement training. Appropriate training activities to be supported through RFP/project review process.

II. E. Facilitate the inclusion of traditional and local knowledge The contribution of traditional and local knowledge can make a major contribution to GEM. The information is often qualitative and may require special measures to limit access to sensitive information.	*Develop guidelines for research agreements and data management to address the particular needs of traditional and local knowledge research.* **Action required** by GEM Community Liaison and tribes.
II. F. Support Data Management for Community-based Monitoring and Research Once data are generated, they must be managed effectively, including data entry, quality control, management, archiving, and access. Conducting community-based monitoring and research with scientific rigor requires the development of data quality control procedures. The GLOBE program and several other citizen-based monitoring programs provide models for a variety of citizen data-collection activities relevant to GEM. The GEM data management system should provide for these functions in a user-friendly manner, for example through data form entry into databases and graphic interfaces that provide access to GIS (Geographic Information Systems) information using desktop and laptop computers.	*Develop data quality control procedures for core community-based core monitoring protocols.* Action to be taken by GEM staff or contractor. *Require the development and implementation of specific procedures, as appropriate for other community-based projects.* **Action to be taken by** project Principal Investigator. *Support GEM data management functions for community-based monitoring and research activities.* **Action to be taken by** GEM data management staff.

II. G. Support and Encourage Collaborative Analysis and Interpretation Once data are generated through monitoring and research, they must be analyzed and interpreted. Frequently, community involvement ends when locally produced data are entered into a central database, and further interpretation is left to professional researchers. Going further offers two distinct benefits: first, the greater intellectual engagement of community members will increase their interest and what they are able to contribute, and second, community members are better able to participate in management and stewardship and to see the connection between community-based activities and a healthy ecosystem. Collaboration at this level should be promoted in several ways: ▪ Opportunities for formal and information interactions Analysis and interpretation also take place across two or more projects, as investigators learn from one another and share their findings and questions. The process by which this happens is inexact—it may occur at formal workshops and conferences, it may happen through a chance encounter. ▪ WEB-accessible data analysis tools for archived data ▪ Data and information sharing beyond GEM GEM is only one of the efforts to gather information in the Gulf of Alaska. In addition to other scientific and natural resource agency programs, there are several community-based programs gathering information on climate, water quality, species sightings, and other topics will encourage community members and others to consider as many sources of data and information as possible when analyzing their own work and drawing conclusions about the state of the ecosystem and how it functions.	**Promote collaboration by:** ▪ *Providing opportunities for substantive interactions among citizens, scientists, and resource managers* ▪ *Encouraging and providing travel assistance for key community members engaged in community-based monitoring or research activities to make presentations or participate in focused workshops or annual meeting sessions* ▪ *Sharing GEM data with other local or regional GIS efforts and seeking and providing linkages from the GEM database to other GEM area environmental information databases, including databases of community-based monitoring programs.* **Actions required:** GEM staff (Community Liaison and data management staff) to implement.

Element III: Effective Sharing of GEM Data and Information

The broadest audience for community involvement includes people who want to be able to use data and information from GEM. GEM's ability to deliver timely, relevant, and comprehensible information is an essential part of fulfilling its mission, because only then can the application of that information occur so that GEM contributes to maintaining the health of the Gulf of Alaska ecosystem. Effective data and information sharing should be accomplished through several means described under Strategies below.

Strategies	**Implementing Actions**
III. A. Access to data Respondents to the regional capacity survey expressed strong interest in having access to GEM data. The data management procedures for research projects should include provisions for the appropriate sharing of data, e.g., through meta-data directories that allow interested persons to contact those who hold the actual data sets, and for the development and support for user-friendly interfaces to enter and access data. To the extent feasible, core monitoring activities should provide data in near-real time.	*Create a data management system capable of addressing community and general public needs to have access to data.* **Action required:** GEM Staff and Trustees to dedicate sufficient effort and funding to the creation and maintenance of the data management system.
III. B. Personnel responsible for generating and disseminating GEM information The volume of data that GEM will generate, together with the range of information needs among the region's communities as well as among researchers and managers, requires that the Trustee Council ensure that GEM has personnel not only to manage entry and access to a GEM database and linkages to other databases but also with expertise to manage the flow of information and to translate technical information into language and formats appropriate to diverse audiences within the GEM area and beyond.	*Continue to provide information/outreach through translation of technical information into language and formats appropriate to diverse audiences within the GEM area and beyond.* **Actions required**: Executive Director to recruit appropriate staff and provide direction.

III.C. Dissemination and sharing of clear, accessible, understandable information Several mechanisms can and should be used. A variety of distribution networks can operate to give the right products at the right time to those with different levels of interest. For example, regular email updates can be sent to those who wish to be engaged regularly and intensively, whereas annual reports can be sent to those who are interested in more general engagement. The annual meeting, in particular, can be a valuable opportunity for dissemination of information, provided that it is structured to ensure that some sessions are geared to general audiences seeking "take home" messages about GEM results**.** Interactive methods should also be used, including: ▪ Interactive WEB site features such as "Ask-a-Scientist" or WEB-based observer networks ▪ Interactive displays ▪ School curriculum and technology that provide opportunities for teachers and students to interact with GEM scientists.	*Employ methods to disseminate and share GEM information including, at a minimum:* ▪ *A list serve* ▪ *Publications* ▪ *WEB site with Interactive forums* ▪ *Continuation of annual meeting workshops for the public* ▪ *Workshops in Anchorage and other GEM area communities* ▪ *Presentations in GEM area communities by GEM scientists* ▪ *Development of educational materials for K-12 students as well as the general public.* **Actions required:** Community Liaison and information/outreach staff to implement appropriate and timely methods to disseminate information and share data. Communities and community partners to identify needs and participate in community-based efforts. Provide travel support for GEM scientist presentations in communities.

III. D. Information synthesis Information from individual projects is worthwhile, but GEM should also produce synthesis products, tying together findings from across the region and across various monitoring and research projects. Such products are essential to show how GEM operates as a cohesive program with a clear mission. The Web site can help share synthesized information. A regular "State of the Gulf" report can provide a comprehensive picture of what has been learned. Community science forums, community-based GEM outreach projects, and the continuation of the GEM annual workshop are other effective synthesis mechanisms.	*Synthesize information and disseminate using appropriate and timely methods.* **Actions required:** GEM information/outreach staff or contractor to implement.

Element IV: Application of GEM Information to Management and Stewardship

The mission of GEM to "sustain a healthy and biologically diverse ecosystem," requires management and stewardship of that ecosystem and its resources. The primary activities of GEM, however, are the generation of data and information. Applying our improved understanding of the ecosystem to management and stewardship will take a focused effort. Some processes, particularly government natural resource management and regulatory programs, will naturally look to GEM for information to help their efforts. Others, especially community-based efforts, may require more assistance in turning GEM information into effective stewardship actions.

Strategies	**Implementing Actions**
IV. A. Support for active and interactive information/education networks Promoting the application of GEM data and information to management and stewardship will require ongoing partnerships and feed-back loops to share "success stories" and "lessons learned". Applications should be promoted among a broad network that includes scientists, managers (including tribal councils and natural resource programs), educational institutions and organizations, and schools.	**Actions required:** See Implementing Actions for Disseminating Information in Section III.C.

IV. B. Support for Data and Information Beyond GEM	Incorporate, by links or other means, other databases into the GEM database. **Action to be taken** by GEM data management staff.
IV. C. Support for community-based applications to management and stewardship The application of GEM information to stewardship activities requires that there be community-based mechanisms to apply the GEM information to specific local stewardship activities. Examples include working groups focused on particular types of applications (e.g., commercial fisheries applications), tribal natural resource management or other community natural resource management programs that identify specific stewardship activities, and community-based and stakeholder groups actively involved in natural resource management planning, decision-making, and regulatory processes. The proposal and review process should be modified to emphasize the importance of applying GEM information.	Support community-based applications to management or stewardship. **Action required:** GEM staff and advisory committees to review the recommended changes provided by the Community Involvement Project (030575) Team and implement through RFP and annual workplan process.

Element V: A Strong Community Role in GEM Decision-making and Program Development

The preceding elements address how GEM can promote community involvement in GEM functions. Communities should also be involved in helping the design, evaluation, and evolution of GEM over time. Such involvement should not be limited to one or two means, but should open as many avenues as possible as described in the Strategies below.

Strategies	**Implementing Actions**
V. A. Participation in Advisory Committees The Public Advisory Committee (PAC) provides one formal mechanism for public input. Subcommittees of the Science and Technical Advisory Committee (STAC) also have community representatives.	*Provide continuing participation in the PAC, STAC, and its subcommittees by community members.* *Develop an annual feedback and evaluation process by community and community partners for the GEM program.* **Actions required:** GEM staff to implement with Trustee Council oversight.
V. B. Open, two-way communications In addition to the formal mechanisms above, open, two-way communication should be maintained throughout the year between communities, on the one hand, and GEM staff and the Trustee Council, on the other. Community concerns and priorities can be sent to GEM, for example through the web directory described earlier. Community workshops and consultations can help generate that information. GEM should also have a means of regular communication with communities on a variety of levels. Email and newsletters can help keep community members up to date on GEM developments. The participation of community members in the annual workshop and other GEM activities is a useful starting point for keeping people informed and engaged while also providing a means of soliciting feedback, but the annual workshop does not work well for all communities or individuals, so that it should not be relied upon as the sole mechanism.	*Implement appropriate and timely communication methods to seek input on program direction and development.* **Actions required:** GEM staff to implement with oversight by GEM Community Liaison.

Part II.

Report on Planning for the Community Involvement and Community-based Monitoring in the Gulf Ecosystem Monitoring Program

Report on Planning for Community Involvement and Community-based Monitoring in the Gulf Ecosystem Monitoring Program

Executive Summary

The Gulf Ecosystem Monitoring and Research (GEM) Program has been designed to provide a long-term foundation for supporting and facilitating important marine research and monitoring in the greater Gulf of Alaska ocean system. Community involvement is a key implementing strategy of the program that can greatly strengthen GEM's science and the application of that science to sound resource management and stewardship. A plan was developed as an outcome of EVOS-funded Project 030575 to develop a community involvement plan for GEM and a response to the challenge of meaningfully and effectively involving and collaborating with the many coastal communities in the GEM area to accomplish GEM program goals and objectives.

The plan was developed by a Project Team composed of representatives of the Center for Alaska Coastal Studies, the Chugach Regional Resources Commission, the Prince William Sound Science Center and social and marine science consultants. The recommended plan elements, strategies, and implementing actions are based on:

- a review of the context for a GEM community involvement plan in terms of the history of community involvement in EVOS restoration activities and the communities, tribes, and community organizations within the GEM area;
- an analysis of various approaches to community involvement in relation to issues relevant to the GEM program (Appendix 1);
- a survey of the regional capacity for community involvement in GEM involving through 164 potential community partners (Appendix 2); and
- a review of community-based monitoring efforts in the GEM geographic area and relevant models from other geographic areas (Appendices 3 and 4).

The recommended mission of GEM community involvement is to apply the knowledge and effort of the region's communities to the study of the Gulf ecosystem and to enable those communities to help apply the collective knowledge gained through GEM to sustaining the ecosystem and the human use of its resources. The goals that fit of this program should be:

1. Active, sustained participation by community members in GEM Program activities including contributions to all aspects of monitoring and research.
2. The education of community members and stakeholders about the dynamics of the Gulf ecosystem and the management of its natural resources.
3. The sharing of GEM and related data and information among community partners, K-12 students, scientists, natural resource managers, and the public in formats appropriate to their needs.
4. The use of local and traditional knowledge together with scientific knowledge to create a collective understanding of the Gulf ecosystem.
5. An increased capacity of communities and community members to apply their understanding of the Gulf ecosystem to stewardship of natural resources

The draft plan has been designed to be an integral part of GEM program and to provide communities with the opportunity for a full range of participation, from receiving information to carrying out GEM research and helping direct GEM's evolution over time.

The regional capacity survey documented the considerable interest in and capacity for community-based activities throughout the GEM region from a broad array of local and regional organizations, natural resource management agencies, and city and tribal governments.

The analysis of issues and recommended approaches to community involvement in GEM draws upon information about a number of community monitoring and research programs relevant to the GEM Program. A selected number of these have been compiled into case histories and into a searchable database available at http://gemcitizenb.akcoastalstudies.org.

Introduction

The Gulf Ecosystem Monitoring (GEM) Program provides a long-term foundation for supporting and facilitating important marine research and monitoring in the greater Gulf of Alaska ocean system. One of the many challenges in laying out the groundwork for conducting a truly long-term research and monitoring program is how to meaningfully and effectively involve and collaborate with the many coastal communities in the region.

The mission of the Gulf Ecosystem Monitoring Program (GEM) is:

> To sustain a healthy and biologically diverse marine ecosystem in the northern Gulf of Alaska and the human use of resources in that ecosystem through greater understanding of how its productivity is influenced by natural changes and human activities.

Fulfilling this mission requires many things, from monitoring and research to the application of acquired knowledge to truly sustain the ecosystem. Fulfilling the mission also requires the involvement and cooperation of many groups, from academic researchers to resource managers to those who use, and thus most directly influence and depend upon, the Gulf ecosystem. In reviewing the developing plans for GEM, a National Research Council committee identified community involvement as a priority, recommending that GEM "build meaningful community involvement at all stages of planning and implementation."

This report is a significant step in carrying out that recommendation. It is the outcome of GEM Project 030575 to develop a community involvement plan for GEM. The partners in the project are:

- The Center for Alaskan Coastal Studies, a community-based environmental education organization in Homer
- Prince William Sound Science Center, a research and community education organization located in Cordova with a significant history of EVOS-supported research, and
- The Chugach Regional Resource Commission, a tribal organization representing the seven tribes of the Chugach region, which has provided services to the EVOS Trustee Council since 1995 to facilitate the involvement of Native communities within the spill-affected area in EVOS activities.

Representatives of the Chugachmiut Native Corporation Environmental Program, and tribal governments of villages in both Prince William Sound and lower Cook Inlet were also invited to participate in the project. Two social scientists, Henry Huntington and Joseph Spaeder, were contracted to participate. Ted Cooney, a marine scientist, was also contracted to review and comment on draft products.

This report provides a context for a GEM community involvement plan with a description of communities, tribes, and organizations that are potential partners in the GEM project. It then provides a brief history of community involvement activities that have been supported by EVOS followed by a description of current community

involvement activities and the regional capacity for involvement based on a survey of 164 organizations within the GEM geographic area. An analysis of various approaches to community involvement in relation to issues relevant to the GEM program (Appendix 1), a more detailed report on the regional capacity survey methods and results (Appendix 2), case histories of a number of the programs or projects (Appendix 3) and a description of an online searchable database of relevant community-based monitoring programs and projects developed as a product of the project (Appendix 4) are appended. The analysis of issues drew upon the information compiled into the searchable database available at www.gemcitizendb.akcoastalstudies.org.

Until the survey was completed, it was unclear how communities, tribes, interest and stakeholder groups wished to be involved. The possibilities ranged from the desire for a "seat at the table" to a voice in the setting of priorities for GEM research and monitoring to ensure that specific community concerns were addressed to making use of information generated by GEM to becoming active participants in research and monitoring. The survey elicited strong interest from 89 different community entities in a spectrum of opportunities to become involved. The levels of interest in specific types of opportunities should inform and guide the evolution of the GEM community involvement program. One organizing principle of the plan would be to enable each community or stakeholder partner to choose its appropriate level of involvement and to make that involvement productive and worthwhile for both GEM and the partner.

The community involvement mission should be read broadly. In the context of a century-long monitoring program, the development and application of knowledge must take into account the need to inform and train those who will take part. In a program covering a vast stretch of coastline and a diverse set of communities, many different approaches will be needed to meet the particular needs, capacities, interests, and situations of the various community partners. These approaches may evolve over time, reflecting changes in GEM and in the communities and other partners. Whatever form the involvement of each partner takes, the collective community involvement component must be an integral part of GEM, and not merely a sideline or an afterthought. The success of involving communities will largely depend on the degree to which they are true partners in achieving GEM's mission.

With this in mind, the community involvement program has several specific goals to support its mission:

1. Active, sustained participation by community members in GEM Program activities including contributions to all aspects of monitoring and research.
2. The education of community members and stakeholders about the dynamics of the Gulf ecosystem and the management of its natural resources.
3. The sharing of GEM and related data and information among community partners, K-12 students, scientists, natural resource managers, and the public in formats appropriate to their needs.
4. The use of local and traditional knowledge together with scientific knowledge to create a collective understanding of the Gulf ecosystem.
5. An increased capacity of communities and community members to apply their understanding of the Gulf ecosystem to stewardship of natural resources.

The key elements of a plan and implementation steps needed to reach these goals are described in more detail later in this report. While this plan has been created specifically for the GEM program, the elements of the recommended plan are also appropriate for the development of effective community involvement programs involving these coastal communities or other regional or ecosystem-scale monitoring and research programs in other areas of Alaska. The searchable database of community-based research and monitoring programs and projects and case histories will serve as a resource for designing community involvement programs and projects and for networking to share information and approaches to citizen involvement in natural resource management and stewardship.

The Context for the Plan

Definitions and Starting Points

Communities within the Scope of the Plan

The GEM geographic area includes 23 coastal communities and a number of other inland communities within the geographic scope of GEM. Both the geographic communities of the GEM program region and more broadly the people who live and work in that region are considered communities for the purpose of this report and plan. Several groups that depend on or are focused on the health and productivity of the northern Gulf of Alaska ecosystem are considered identifiable communities: e.g., the fishing community, the Native/subsistence community, and the conservation/environmental interest community.

Community Involvement

The incorporation of community involvement is a major strategy identified for the development of the GEM program in the Final GEM Program Document (GPD 2003): "Communities and stakeholders must be involved at all levels of the program. The Trustee Council believes that encouraging local awareness and participation in research and monitoring enhances long-term stewardship of marine resources." The Trustee Council envisioned the following ways in which community members would be actively involved in and contributing to GEM:

- planning and developing the program
- guiding the goals and topics of research projects
- collecting data and participating in long-term monitoring efforts
- providing Traditional Ecological Knowledge
- interpreting results in a local context
- educating other community members about ongoing research

This broad commitment encompasses a potential "spectrum of opportunity" for development of the community involvement component of GEM. Other examples of expectations of local residents included in the GPD are that they will provide ecological knowledge that can be incorporated into established scientific models, be a source of research questions which help ensure research that is relevant to both ecological and community needs, and be involved in community-based monitoring efforts that can efficiently collect essential data and build local stewardship as well as long-term support for the GEM program.

Community involvement has taken a variety of forms during the EVOS restoration program, including a 20-person Public Advisory Committee, support for community facilitators, facilitation of methods to incorporate and support for the incorporation of Traditional Ecological Knowledge in a number of restoration projects, funding and grant administration for community-based subsistence projects, support for youth involvement in the science behind restoration efforts and local restoration projects, and a variety of other efforts to incorporate meaningful public participation and community involvement into the restoration program (e.g., hiring local residents on residual oil spill clean-up projects, waste management projects, fisheries enhancement projects, archeological

repositories, displays, and exhibits; training for volunteer collection of tissues from abnormal animals harvested for subsistence). Community involvement was the focus of one annual meeting in 1996 and support was provided for Youth/Elder workshops and community workshops to develop tribal natural resource management plans with the help of scientists and the sharing of information. Public information and outreach documents were sent to a mailing list of over 3,000 (GPD 2003).

Based on this background of past and potential community involvement activities in GEM, the Regional Capacity Survey developed by the Project Team and conducted as part of this project requested expressions of interest in the following activities:

10. Setting GEM program priorities
11. Identifying and incorporating specific community issues and concerns
12. Providing input to GEM advisory committees
13. Participating in annual meetings to hear about GEM program results
14. Organizing community forums about the GEM program
15. Receiving and disseminating GEM synthesized information
16. Providing educational programs based on GEM data and information
17. Being on the GEM program email/mailing list for announcements
18. Participating in community-based research or monitoring activities

An "other" category was also provided for response.

Local and Traditional Ecological Knowledge – knowledge derived by experience with the environment and possessed by reliable non-scientists. "Traditional" refers to knowledge that is inter-generational and within a context of aboriginal or indigenous peoples.

Citizen-based or Community-based Monitoring and Research - refers to activities that are a sub-set of the spectrum of opportunities for community involvement in GEM community. These activities are focused on the collection of data and direct participation in research and long-term monitoring efforts. To be meaningful in the GEM geographic and social context, they would also encompass the provision and incorporation of traditional and local knowledge.

Monitoring – as defined for the purposes of the GEM program, is the action of repeatedly collecting long-time series observations. Monitoring differs from research primarily in the length of time over which measurements are taken, and the nature of methods and devices employed. Monitoring employs methods and devices that are "tried and true" to help assure the quality of the data.

Research – is defined under GEM as collecting relatively short time series of new observations to evaluate a testable hypothesis relating to the conceptual foundation or a specific aspect of the monitoring program. Research may use experimental devices or novel methods to acquire data.

Data vs. Information – Data is transformed into information for user groups by using synthesis, modeling, data management, and information transfer.

The Communities and Their Role in the GEM Program

The residents of the communities in the area encompassed by the GEM Program are stakeholders in GEM for two major reasons: 1) they depend on the sustained productivity of the Gulf ecosystem for livelihoods, recreation, fish and wildlife harvests, and quality of life and 2) their activities and the activities taking place around their communities are a key part of the equation that results in change in the ecosystem.

The Final GEM Program Document (GPD 2003) recognized the crucial role of people as agents of change in the Gulf of Alaska ecosystems in the central hypothesis of the program and shaping the program mission. "The GEM mission of sustaining a healthy ecosystem and its focus on long-term monitoring have been shaped by the need for a long-term understanding of how human activity shapes the environment, and how human and non-human-caused environmental change can be distinguished" (GPD 2003). The GPD (2003) further noted that human impacts may, in fact, be increasing in importance as a driving force: "Trends since the 1989 Exxon Valdez oil spill suggest that the pace of change in human-caused effects may have accelerated. The spill itself changed attitudes toward acceptable risks of human-caused disruption, while economic trends have brought about more intense use of some resources and diminishing use of others."

Community residents often possess important and precise knowledge about specific areas and have the means and opportunity to gather information that would be too costly for scientists to travel over large geographic areas to collect. The understanding of Gulf ecosystem dynamics gained by their participation in the GEM Program could provide them choices about their role in managing its natural resources and causing impacts to the ecosystem.

The GEM geographic area encompasses 23 coastal communities. These communities range in size from several small villages with fewer than 100 year-round residents to Kodiak, with approximately 9,000 residents. Human activities in and around the inland communities of Tyonek and Soldotna can also affect the nearshore and marine environments in Cook Inlet through downstream watershed effects. The geographic proximity of the Anchorage/Mat-Su urban area also suggests that growth there will—as it has in the past—produce environmental impacts in the area directly affected by the oil spill.

The accessibility of communities within the GEM geographic area varies considerably. Only Valdez, Whittier, Seward, Soldotna, Kenai, and Homer are connected by road and have highway access to the state's main road system. Whittier and Seward have Alaska Railroad passenger and freight service. Cordova, Valdez, Whittier, Tatitlek, Chenega Bay, Seward, Homer, Seldovia, Kodiak, and Port Lions are served by the Alaska Marine Highway System as is Chignik on a seasonal basis. The remainder of the communities are accessible only by plane or boats other than a state ferry.

The following table summarizes information about the population size of each GEM area community, the form of local government, and the economic dependence on natural resource-based activities (Alaska DCED 2002).

Table 1. Communities within the GEM Geographic Area

Community	**Population (2001 U.S. Census)**	**Local Government**	**Major economic activities**
Cordova	2454	Home Rule City Eyak Tribal Council	Commercial Fishing Seafood Processing Tourism Government employment
Valdez	4336	Home Rule City	Oil Transportation Tourism & Recreation Cargo and Port Facilities Seafood Processing
Seward	3430 (greater Seward)	Home Rule City	Tourism & Recreation Commercial Fishing Transportation Center Prison and other government facilities
Whittier	182	2nd Class City	Transportation Visitor-related businesses
Chenega Bay Tatitlek Port Graham Nanwalek *(*four communities*)*	86 107 177 171	Tribal Council Tribal Council Tribal Council/Borough Tribal Council/Borough	Subsistence Fishing, Hunting, & Gathering Commercial Fishing, Logging Aquaculture Fish Processing
Seldovia/Seldovia Village	286 / 144	1rst Class City/Borough/ Tribal Council Borough	Commercial Fishing Seafood Processing Timber Tourism

Community	Population (2001 U.S. Census)	Local Government	Major economic activities
Homer/Kachemak City	3946 / 431	1st Class City Borough/2nd Class City Borough	Commercial Fishing Sport Fishing Tourism & Recreation Timber & Coal Transportation Transfer payments (retiree income)
Kenai	6942	Home Rule City Kenaitze Tribal Council Borough	Oil & Gas Sport Fishing Tourism & Recreation
Kodiak	8864 (includes Coast Guard base and road system)	Home Rule City Borough Tribal Council	Commercial & Subsistence Fishing Seafood Processing Coast Guard Base Recreation & Tourism
Port Lions	256	2nd Class City Tribal Council Borough	Commercial Fishing Seafood Processing Tourism
Ouzinkie	225	2nd Class City Native Village Inter-tribal Council Borough	Commercial Salmon Fishing Subsistence
Larsen Bay	115	2nd Class City Native Village Inter-tribal Council Borough	Commercial Fishing Seafood Processing Subsistence
Karluk	27	Native Village Inter-tribal Council Borough	Seafood Processing Subsistence Hunting & Fishing
Old Harbor	237	2nd Class City Native Village Inter-tribal Council Borough	Commercial Fishing Tourism Subsistence Hunting & Fishing
Akhiok	80	2nd Class City Native Village Inter-tribal Council Borough	Commercial Fishing Subsistence Hunting & Fishing

Community	Population (2001 U.S. Census)	Local Government	Major economic activities
Chignik	79	2nd Class City Tribal Council Borough	Regional salmon fishing center Fish processing Subsistence
Chignik Lagoon	103 +200 during fishing season	Tribal Council Borough	Regional salmon fishing center Fish processing Subsistence
Chignik Lake	145	Tribal Council Borough	Subsistence Commercial Fishing
Ivanof Bay	22	Tribal Council Borough	Subsistence Commercial Fishing
Perryville	107	Native Village Borough	Subsistence Commercial Fishing

The approximately 71,000 full-time community residents of the area affected by the spill (Prince William Sound, lower Cook Inlet, Kodiak Island, and the Alaska Peninsula) are not the only people who create pressure on the area through their use of natural resources and activities. Anchorage and Wasilla are major population centers whose residents benefit from and affect the natural resources of the GEM geographic area through marine and coastal recreation and commercial activities. The GPD (2003) noted

> "Two to three times that number use the area seasonally for work and recreation. The spill area population, combined with that of the nearby population centers of Anchorage and Wasilla, totals more than 60 percent of the state's 627,000 permanent residents. When the resident population is combined with the more than one million tourists who visit the state each year, it becomes clear that the natural resources of the GOA (Gulf of Alaska) cannot be immune to the pressures associated with human uses and activities."

The GEM area has a number of stakeholder communities that are identifiable, if not geographically centered. In addition to spill-affected communities, the Prince William Sound Regional Citizens' Advisory Council formed after the EVOS includes Alaska Natives, commercial fisherman, and aquaculture, tourism, recreational and environmental interest groups as stakeholders in the organization's mission of minimizing the environmental impacts of the trans-Alaska pipeline terminal and tanker fleet. The Cook Inlet Regional Citizen Advisory Council recognizes these same stakeholders in the environment and resources at risk from oil production and transportation in the Cook Inlet region.

Some of these stakeholder groups are well-organized at the local level and loosely

organized at the regional level so are often recognized as "communities."

- The commercial fishing community has been one of the most prominent throughout the EVOS spill and restoration program, beginning with the "mosquito fleet" that responded immediately to the spill to protect important areas and begin clean-up. They have remained involved, particularly in Prince William Sound, where they have recently received EVOS funding to form a Fisheries Research Applications and Planning Group to provide public forums for determining short-term and long-term fishery management issues and needs and a process to apply scientific information to fishery management.
- Aquaculture organizations are identifiable. All are locally-managed private non-profit entities that are closely tied with the small boat commercial fishing community.
- Also identifiable is a "conservation community" of environmental interest groups with membership or involvement by area residents based in the GEM area. These organizations support a range of environmental activities from education to "on–the-ground" projects to activism. Their geographic scope and support base ranges from the national (National Audubon Society, National Wildlife Foundation) to the local (Kachemak Bay Conservation Society, Eyak Preservation Council). Organizations based in spill-affected communities have been actively involved in EVOS restoration activities, including several that formed to watchdog issues related to oil and marine transportation safety, spill prevention, and response.
- Tourism and recreation stakeholders are less identifiable as an organized community, but are represented by organizations such as the Alaska Wilderness and Recreation Tourism Association, by local Convention and Visitors Bureaus and Chambers of Commerce, and by other recreational user groups.

Other businesses and industries that are directly or indirectly dependent on the productivity and natural resources of the GOA ecosystem are also stakeholders in GEM. They are not considered citizen or community stakeholders but may also have a role to play in partnering in GEM community-based monitoring and research, supporting education programs related to GEM, or in the use of GEM-derived information to reduce impacts on the environment.

Tribal Governments and their Role in the GEM Program

Twenty tribal governments are federally recognized in the GEM geographic area. Two tribes, Valdez Native Tribe and Qutekcak Native Tribe are pending federal recognition status. Chenega IRA Council, Native Village of Eyak, Nanwalek IRA Council, Port Graham Village Council and and Tatitlek IRA Council are located in the Chugach Region. Kenaitze Indian Tribe, Seldovia Village Tribe and Native Village of Tyonek are found in the Cook Inlet Region. The Kodiak tribes include Ahkiok Native Community, Native Village of Karluk, Native Village of Larsen Bay, Village of Old Harbor, Native Village of Ouzinkie, Native Village of Port Lions and Shoonaq' Tribe of Kodiak. The Tribes in the Bristol Bay Native Corporation are Native Village of Chignik

Bay, Native Village of Chignik Lagoon, Chignik Lake Village, Ivanof Bay Village Council and Native Village of Perryville.

Natives of Tyonek and the upper Cook Inlet region are Dena'ina Athabaskan. Natives of Seldovia are mixed Dena'ina Indian and Sugpiaq (also known as Alutiiq). Alutiiq people make up the bulk of the Native population found in the GEM area and are found from Prince William Sound to the Kenai Peninsula, the Alaska Peninsula, and Kodiak Island. The Alutiiq population in this region was about 3,000 people in 2,000. The changing names reflect their history. Before Western contact, people called themselves Sugpiat, "the real people." Russian fur traders introduced the name "Aleut" which was eventually adopted in Native communities. The Sugpiaq term for Aleut is "Alutiiq." All three names – Alutiiq, Aleut, and Sugpiaq – are used now.

The passage of the Alaska Native Claims Settlement Act in 1971 established regional corporations to manage community land and resources. The corporations in the GEM region are Chugach Alaska Corporation for Prince William Sound and the lower Kenai Peninsula; the Bristol Bay Native Corporation which works with four Alutiiq villages on the Alaska Peninsula, Koniag, Inc., for the Kodiak Island area; and the Cook Inlet Region Inc. for Cook Inlet, including Seldovia. Each of these geographical areas also has its own not-for-profit corporation that provides health, social, and political-advocacy services to the people. Those corporations are the Cook Inlet Tribal Council, the Kodiak Area Native Association; Chugachmiut, Inc; and the Bristol Bay Native Association. Further, Chugach Regional Resources Commission (CRRC) was created in 1984 by Tribes in the Chugach Region to collectively address natural resource issues. Since the Exxon Valdez oil-spill, CRRC has taken the lead in coordinating with all the Tribes in the oil-spill/GEM geographic area.

Tribal participation in the GEM program is compelling. All the Native communities have important subsistence components to the local economies and all were affected by the oil spill. Subsistence is an important natural resource component that was injured by the spill. In the year after the spill, subsistence harvests declined. A study conducted by the Alaska Department of Fish and Game (ADF&G) and CRRC 10 years after the spill found strong evidence of the continuing importance of subsistence harvests and uses of fish and wildlife resources in all eight study communities. Any program designed to assess and monitor the health of the Gulf of Alaska cannot ignore the human populations that depend on the resource.

Several Tribes within the GEM geographic area have been developing Tribal Natural Resource Management Programs with the goal of ensuring the health of subsistence resources and the responsible management of lands in their traditional use areas. As a first step, Tribes are writing Tribal Natural Resource Management Plans which form the basis for development of Resource Management Programs. The Plans outline overall interests and priorities of the communities, including economic development and traditional use area management. All tribal planning efforts will be helpful in planning for participation in GEM community-based monitoring programs.

Tribes are recognized as having a special legal relationship with the United States government. This legal relationship is most often called the government-to-government relationship. It is through this relationship that federal departments and agencies have a duty to consult with tribal governments. This policy has found its way into federal

statutes and case law and into Executive Orders.

Consultation includes that Tribes are (among other things): to receive timely notification of proposed Federal actions; to be informed of potential impact on Indian Tribes; to have the input and recommendations of Tribes on proposed action to be fully considered by those officials responsible for the final decision; and to be advised of rejection of tribal recommendations and basis for such rejections. Consultation does not mean merely the right of tribal officials, as members of the general public, to be consulted, or to provide comments, under the Administrative Procedures Act or other Federal law of general applicability.

In April 2001 Governor Tony Knowles and Alaska Tribal Leaders signed the Millennium Agreement that provides a framework for state agencies and tribes to work together on a government-to-government basis to improve the delivery of essential public services. Administrative Order No. 186 makes clear for all state and federal agencies, the courts, the Tribes and the public that the State recognizes and respects the governmental status of the federally recognized tribes with Alaska.

The *Exxon Valdez* Oil Spill Trustee Council was formed to oversee restoration of the injured ecosystem through the use of the $900 Million settlement. GEM is funded with $120 million endowment from the remaining Exxon Valdez oil spill settlement funds with an annual budget of approximately $5 million. The Trustee Council consists of three State of Alaska and three federal trustees. Although the Exxon Valdez Oil Spill Trustee Council is neither a State nor a Federal entity, the Trustees are state and federal heads of agencies bound to government-to-government principles specifically because of Executive Order No. 13175 and State Administrative Order No. 186. These principles should ensure that the Tribes are consulted regarding GEM actions in a manner, which may be separate from that of the general public. The development of a Memorandum of Agreement between CRRC and the Trustee Council, which incorporates government-to-government principles, is being explored. An MOA would provide for mutually agreed protocols for timely communication, coordination, and collaboration to determine the impact on traditional and cultural lifestyles and natural resources consistent with a government-to-government relationship.

A protocol was developed with the Trustee Council for including indigenous knowledge in the Exxon Valdez oil spill restoration process. This protocol formalized the relationship of Alaska Native communities with EVOS scientists.

Community Partnerships

Community-based organizations, state and federal natural resource agencies, university programs, and local and tribal governments are often the focal points for partnerships to develop, support, and sustain community involvement. A number of partnerships with a monitoring or natural resource management focus already exist within the GEM area and are described in the Case History section of this report (Appendix 3). Additional information on selected model programs is available through an online searchable database at www.gemcitizendb.akcoastalstudies.org (See Appendix 4).

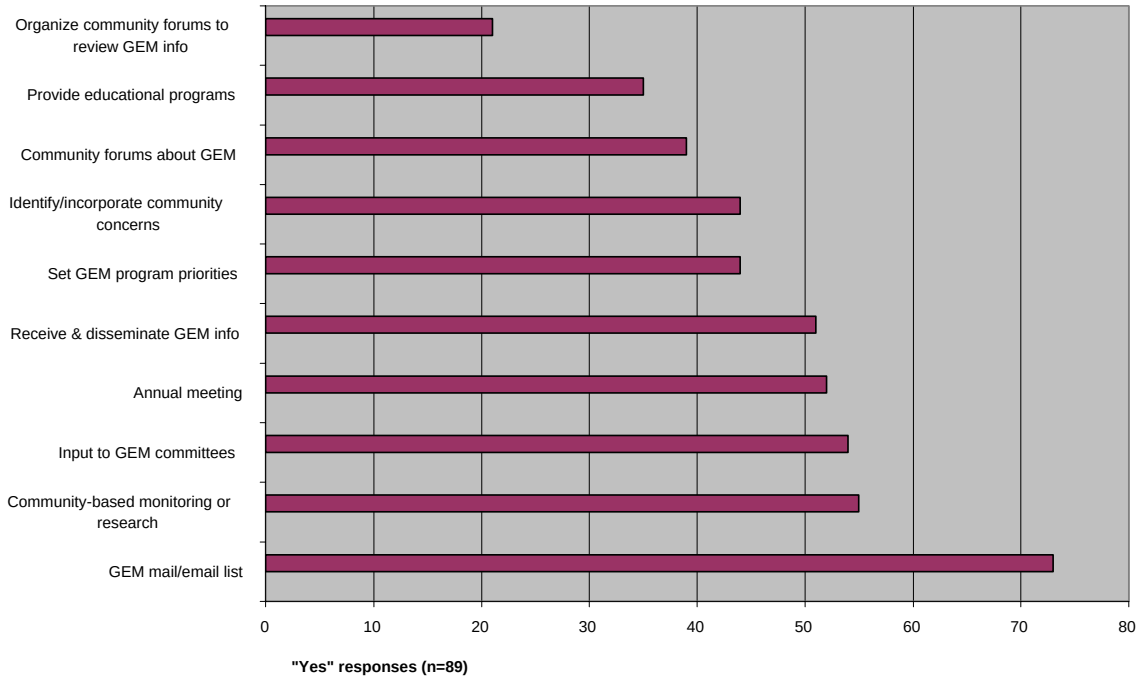
Regional Capacity for Community Involvement

A survey form was developed to assess the interest and capacity of 164 organizations within the GEM geographic region to participate in GEM community involvement and community-based monitoring and research activities. The survey form and organizations targeted for a mail/email survey is appended, with those identified as key respondents noted (See Addenda A, B, C, D, E, and F to Appendix 2). The survey form was also used to target tribal organizations and Tribal Councils (See Addendum B to Appendix 2) with email and mail surveys supplemented with telephone and in-person interviews. The 89 responses that were received are summarized in Appendix 2 and shown in detail for each survey question in Addendum E to the appendix. These results provide a resource for identifying potential GEM community partners and the partners that could potentially work together within specific communities.

Regional Capacity Survey Results

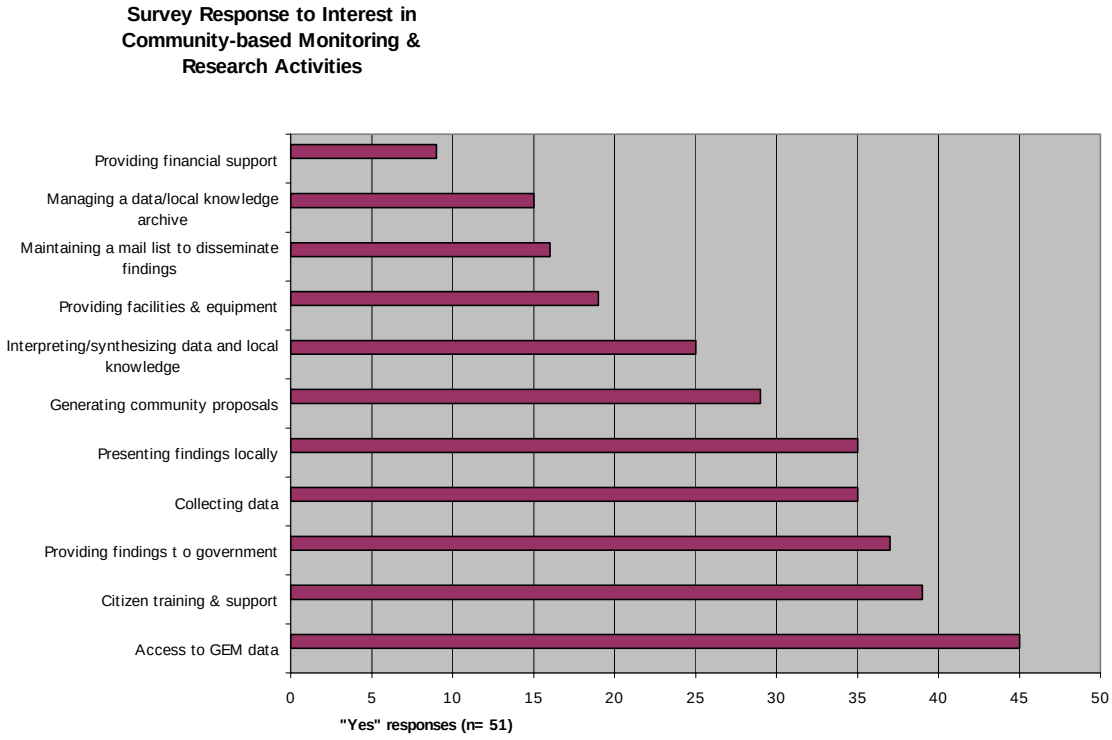
The online/mail survey of 164 potential GEM community partners (See Appendix 2 of this report for a detailed report on the survey) received 89 responses of interest in participating in ten types of community involvement activities.

Figure 1. Responses of Interest in Participation in GEM Community Involvement Activities
(n = 89)



The respondents who answered “yes” to interest in participating in community-based monitoring or research were asked a further question about interest in eleven options for participating in various aspects of monitoring or research. Fifty-one responses are summarized in the following chart.

Table 2. Survey Response to Interest in Participation in Community-based Monitoring and Research Activities (n = 51)



The survey asked about existing community-based research and monitoring which elicited information about 35 different programs within the GEM area. These programs monitor water quality (28), habitat quality (17), fish and wildlife populations (15), land use change/human impact (15), contaminants (13), weather/climate (10), or they involve habitat mapping (11). Watersheds are receiving the majority of effort (29 programs) followed by nearshore habitats (19 programs).

The responding organizations indicated considerable capacity in terms of paid staff (27) or a combination of paid staff and volunteers (49), active citizen volunteers (37 reported 1-25 volunteers, 9 reported 26-50, two reported 51-100, and four reported more than 100), and the involvement of K-12 students or other youth (50).

The survey provided information about perceived issues and concerns in the region that the respondents thought the GEM Program should address. Although the largest number of responses were grouped into general categories of “habitat”, “human impact”, “fisheries”, and “fish and wildlife populations”; the individual responses encompassed a wide variety of specific issues.

GEM Activities in FY03 and FY04

In addition to this planning project, a number of GEM projects funded in FY03 were either community involvement projects or have significant community involvement aspects:

EVOS/GEM Project Number	Project
030607	Geographic Information Systems (GIS) Map of Water Quality Monitoring Sites Across the Gulf of Alaska
030052	Tribal Natural Resource Stewardship and Meaningful Tribal Involvement in GEM
030210	Youth Area Watch – Chugach School District
030610	Youth Area Watch – Kodiak Archipelago
030636	Management Applications: Commercial Fishing
030647	Investigating the Role of Natural and Shoreline Harvest in Altering the Kenai Peninsula Rocky Intertidal
030666	Alaska Natural Geographic in Shore Areas: an Initial Field Project for the Census of Marine Life
030684	Toward Sustainable Management in the Kenai River Watershed: Linking Human & Resource Development with Nutrient and Energy Pathways

The FY04 GEM Invitation for Proposals included several types of community involvement projects, including "targeted workshops, database, maps, publications, and community science symposia", inclusion of resource dependent people and communities as groups for whom GEM data needs to be converted into useful information, community-based sampling strategies for marine-derived nutrients, and capitalizing on community assets such as scientists and interested lay people to assist with data acquisition in a "Voluntary Ship Observing" program. The majority of the proposals recommended for funding by the Executive Director were deferred by the Trustee Council pending completion of this project.

Acknowledgements

This project was supported by funding from the *Exxon Valdez* Oil Spill Trustee Council and the sincere interest on the behalf of EVOS Trustees and staff to ensure community involvement in the GEM program. Molly McCammon, Phil Mundy, and Sandra Schubert contributed their knowledge of the evolving GEM program and their own experience gained from working with communities and citizens throughout the spill area. The Planning Team members (Marilyn Sigman, Center for Alaskan Coastal Studies; Nancy Bird, Prince William Sound Science Center; Mimi Hogan, Paul McCollum, Chugach Regional Resource Council; Henry Huntington, Joe Spaeder, Ted Cooney, Christine Celentano, Chugachmiut, Inc.; Pat Norman, Port Graham Tribal Council; and Gary Kompkoff, Tatitlek Tribal Council) contributed their time and expertise to represent and address the interests and concerns of the diverse communities in the GEM geographic area. Bree Murphy, Center for Alaskan Coastal Studies, and Signe Baumann, Prince William Sound Science Center, conducted the online survey of regional capacity and the research to create the searchable database of community-based monitoring projects and programs. Lisa Ellington, Center for Alaskan Coastal Studies, provided administrative support. Tomasz Sulczynski, Subconscious Logic Consulting; developed the database structure and user interface for queries. Members of the EVOS/GEM Public Advisory Committee and Scientific-Technical Advisory Committee and EVOS staff provided invaluable reviews of draft products.

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Chapter 1. Vision, pp. 2-4, 10
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Chapter 5. Program Implementation, Administration, Public and Community Advice, Scientific Guidance, and Data Policies, pp.66-72
Chapter 7. Introduction to the Economics of Human Uses and Activities in the Northern Gulf of Alaska pp. 237-245
Appendix C. EVOS Tribal and Community Involvement.

_____. 2003b. Invitation for Proposals, Gulf of Alaska Ecosystem Monitoring and Research Program FY2004.

Appendix 1.

GEM Community Involvement: an analysis of issues and approaches

Strong expressions of interest and concern have been voiced about community involvement throughout the multi-year planning process for the GEM Program. A number of issues have emerged that a meaningful and effective program needs to address:

- How can the GEM program address issues of concern to communities that are also relevant to GEM's long-term monitoring focus?
- How can community members become involved in all aspects of GEM monitoring and research activities and how particularly can they become involved in collection and interpretation of scientific data and local and traditional knowledge?
- What role should education and capacity-building play in the GEM program to increase knowledge, skills, and understanding and to facilitate participation in GEM and natural resource stewardship?
- How can community members be involved in the development and future evolution of the GEM program?

The planning process involved three information-gathering activities: 1) a review of the GEM programmatic documents (the Final GEM Plan/framework document, Draft Science Plan, proposal review process and criteria), 2) a survey of capacity and interest in specific community involvement activities within the GEM geographic area sent to 164 potential partners that received 89 responses, and 3) a review of relevant citizen-based monitoring programs and projects as possible models for a GEM program (expansion of review completed by Shester 2001). The collected information provided the resources to develop recommended approaches, elements, and implementing actions of the GEM community involvement plan.

Several key concepts emerged from this review in terms of developing a program that would be meaningful to both community participants and to the GEM Program:

1. Community involvement should be integrated into all aspects of the GEM Program, not developed as a separate "track" of activities.
2. Community involvement should be promoted and supported over the entire life of the GEM program as a spectrum of opportunities appropriate to the diversity of communities in the GEM geographic area.
3. GEM community involvement should build upon existing community-based efforts and activities through partnerships.
4. GEM community involvement should be developed with both short and long-term objectives. Short-term objectives might relate to a specific monitoring or research activity that is relevant to a high-priority community issue, while long-term objectives should be related to involving community members in information synthesis, education, community capacity-building, and applications of GEM research and monitoring results in natural resource management and stewardship.

Integration of Community Involvement into All Aspects of the GEM Program

The GEM Program is unique in many ways. Its evolution from an oil spill restoration program into a long-term ecosystem-scale monitoring program is unique and dedicated funding to sustain a long-term ecosystem-scale monitoring program is also unique. No real models exist for community involvement in this type of program that the GEM program can adopt based on a proven track record of success. Certain aspects of community involvement are obvious and have already been employed during the EVOS restoration project such as the involvement of community and public members in advisory committees and community outreach and dissemination of information. The GEM mission statement identifies an expanded role for community involvement "to promote local stewardship by involving stakeholders and having them help plan, guide, and carry out parts of the GEM program." Thus, to address this mission, the GEM program should provide communities a strong role in advice and decision- making about priorities and direction of the GEM program itself and also provide opportunities for community members to participate in a variety of GEM activities including GEM monitoring and research activities. The GEM Program has adopted an implementation goal of "facilitating the application of GEM research and monitoring results to benefit conservation and management of marine resources." This applied aspect of community involvement will require education and capacity-building of community members. While neither is an explicit goal of the GEM program, both are a likely focus for strong partnerships with on-going community-based efforts and cross-cutting approaches to transform GEM information into increased public knowledge and understanding about the Gulf of Alaska ecosystem that will translate into informed management and stewardship.

The integration of community involvement into all aspects of the GEM Program should be explicit in program documents and decision-making processes. The Final GEM Plan includes three implementation goals that are directly related to community involvement:

- Involve other government agencies, non- governmental organizations, stakeholders, policy makers and the general public in a collaborative process to achieve the mission and goals of GEM
- Increase community involvement and local and traditional knowledge in order to enhance long-term stewardship of living marine resources
- Facilitate application of GEM research and monitoring results to benefit conservation and management of marine resources

In addition, partnerships with existing community-based monitoring programs could address a fourth implementation goal of "leveraging funds to augment ongoing monitoring work funded by other entities."

The Trustee Council has made a commitment to traditional knowledge and community involvement and has adopted program strategies to incorporate them, recognizing that "encouraging local awareness and participation in research and monitoring enhances long-term stewardship of living marine resources".

The specific role for communities and citizens in the collection of scientific data is less clear in the Working Draft Science Plan (May 1, 2003). The plan identifies specific

data needs and the need for the development of innovative scientific approaches based on a scientific "gap analysis." But neither the Science Plan nor the Request for Proposal/proposal review process provide clear and understandable direction or opportunities for communities or community-based organizations to develop short-term or long-term data collection efforts that can reasonably be carried out by the community members. Proposals that respond to current guidelines for Requests for Proposals are required to address community involvement aspects of proposed projects, however no weight is accorded the inclusion of these aspects nor is the absence of community involvement judged negatively in situations where the involvement is appropriate and desirable. Direction and support has not been provided in a systematic way to scientists or communities to work collaboratively to develop proposals. The current review criteria do not aid reviewers in determining the potential effectiveness of what is proposed and to date, few GEM peer reviewers have had the expertise to evaluate community involvement aspects of GEM proposals.

Programmatic guidance has not been developed for use of the proposal/proposal review process to encourage other types of community involvement activities such as dissemination of GEM information or education and capacity building activities to provide requisite skills to participate in GEM and/or to apply the GEM results to natural resource management or stewardship.

Conclusions

1. The GEM Science Plan should be revised to include a clear and specific process to develop GEM monitoring and research activities that can be carried out by community members.

2. The Request for Proposal/proposal review process should be revised:
   a. To require community involvement in planning, implementation, and/or dissemination of results where appropriate

   b. To provide reviewers with criteria to evaluate the appropriateness and effectiveness of proposed community involvement

   c. To encourage community- generated proposals and collaborative proposals from scientist-community partnerships and multi-partner community-generatedproposals for community-based monitoring and research and other types of community involvement activities.

3. One approach would be to organize a Community/Tribal GEM Review Panel with representation by community-based organizations, scientists, and Tribal natural resource personnel or community members with particular knowledge in a specialized area. This Review Panel would review Tribal/Community Projects and make recommendations to the STAC. The proposals would be recommended for funding based upon the following criteria:
   a. Scientific merit
   b. How it fits within the GEM plan;
   c. How it fits into the long range goals of a community or local natural resource management or stewardship programs

d. If appropriate, how it will integrate local or Traditional Ecological Knowledge into its objective

e. How it will facilitate meaningful involvement by the community members

f. How the results will benefit the resources or people affected by the project

g. Matching funding availability

4. More GEM peer reviewers with expertise in community involvement should be recruited and employed in proposal reviews.

Spectrum of Opportunities Appropriate to the Diverse Nature of Communities within the GEM Area

The responses to the regional capacity survey clearly indicated substantial interest in participating in GEM in diverse ways. The following components of community involvement must be developed to fit the identified interests and needs of the diverse GEM area communities.

Outreach and Dissemination of Information

To reach out to communities and disseminate information to the public, GEM needs to take substantive and active steps. In this context, "information" refers neither to data sets nor to brief summaries of findings, but to the vast body of interpreted data that can be made available in various ways to all of GEM's constituents. It is important to emphasize the role that public information can have for everyone involved in GEM. The public may not have ready access to the details of GEM's findings in any other way. Managers and researchers may not have time to follow each other's work in detail, particularly across different disciplines. An effective public information process can allow everyone an excellent entry point into GEM, leading the way to different levels of detail and sophistication depending on the particular needs of the individual.

Information can only be transformed into knowledge and understanding when a specific message is matched with an appropriate means of delivery to a specific audience. Scientific information often requires translation from precise, technical language into terms that can be understood by a lay audience. This translation requires specific communication skills that ensure that the translation occurs without loss of accuracy. Skills in making scientific information relevant and interesting to broad audiences are equally important to effective outreach.

Examples of approaches:

- Community, scientists, and natural resource manager participants in the *Arctic Borderlands Ecological Knowledge Co-operative project* identified a mutual need to find information on research and monitoring in the Northern Yukon, Alaska and Northwest Territories. This is accomplished through a Database of Information Sources and through synthesis and research notes and reports on the Co-op web site (www.taiga.net/coop/reference).

- University Cooperative Extension programs provide a successful "technical assistance" education model for outreach and dissemination of information. The *Sea Grant (*www.uaf.edu/seagrant/) and associated *Marine Extension Program* programs, in particular, disseminate information about coastal resources from a variety of sources to a diversity of audiences including recreational users, sport and commercial fishers, researchers, and K-12 educators. Local marine extension agents can respond to the specific information needs of individuals and user groups in the community, while benefiting from being connected with a statewide and national network of other marine educators, university scientists, and extensive resources on coastal topics.

- The international *SeaWeb* program (www.seaweb.org/) and its programs, *The Ocean Project* (www.theoceanproject.org/) and *COMPASS* (http://www.compassonline.org/) provide models for effectively disseminating information through a network of educational institutions and for facilitating collaborations among scientists and journalists, respectively.

- A public education-oriented WEB site is a successful outreach tool of many large-scale scientific research programs. The WEB site can provide relatively low-cost on-going education opportunities with 24-hour access as individual interest dictates. The educational value can be enhanced by interactive features such as opportunities to report and learn about unusual events or sightings throughout the ecosystem and to receive feed-back about the significance of the observations from an expert. Another enhancement would be an Ask-a-Scientist network with scientists willing to answer emailed questions in specific topic areas with a reasonable turn-around time and a searchable archive of questions previously asked and answered. The MadSci Network (http://www.madsci.org) based out of Washington University Medical School provides a model for the operation of this type of WEB site. Links to other WEB sites with a similar feature for specific species groups or topics could also be provided.

Conclusions

1. The respondents to the regional capacity survey and other community members and representatives of stakeholder and interest groups that have been involved in the GEM planning process can form the nucleus of a GEM Community Network.
2. Creating a GEM system for dissemination of information to the Network cannot be left to chance. There are a number of mechanisms for disseminating information, some passive and some interactive. To start with, GEM should employ as many means as it can. These can be refined and streamlined as GEM learns what is most effective. The basis for such a system is staff time dedicated specifically to public information and developing and maintaining partnerships with community-based organizations with interests in assisting with dissemination of GEM information. (Fifty-seven percent of the organizations responding to the project survey indicated their interest in receiving and disseminating GEM information.)
3. The EVOS staff person (or persons) can create a number of information products, such as:

- a web site "portal" to GEM-generated information
- regular newsletters
- annual reports
- plain- language summaries of research projects
- educational materials
- annual meeting sessions geared to presenting GEM results to the public (58% of survey respondents expressed interest in participating)
- presentations to the public, to user groups, to communities, etc.

4. The EVOS staff person (or persons) can also facilitate interactive exchange of information through:
    - mail/email list (82% of survey respondents expressed interest in participating)
    - an interactive "Ask a GEM Scientist"/unusual observations web page
    - selected speaker's bureau of GEM researchers and community participants that can be provided with travel support to respond to community requests for presentations or forums
    - organizing and facilitating interactive community workshops involving scientists, resource managers, and community members

5. Establishing and committing the necessary resources to a strong effort in public information will produce huge dividends for GEM, especially if it can show that GEM is not merely the province of scientists and managers, but is a valuable program benefiting many people directly as well as indirectly. Such an approach is not meant to weaken the scientific basis for GEM, but to increase its visibility and the degree to which the public appreciates why it is important and how it can be put to effective use to achieve the mission of GEM.

Community Involvement in Advice and Decision-making

Throughout the development of the GEM Program, community members and stakeholder representatives have repeatedly expressed interest in participating in setting GEM priorities, identifying the priority community issues and concerns for consideration in the GEM planning process, and in providing input to GEM advisory and decision-making committees. Survey results confirmed these interests – 61% of the 89 respondents expressed interest in providing input to GEM committees and 49% expressed interest in participating in setting GEM priorities. The same percentage (49%) expressed interest in identifying community issues and concerns and incorporating them into GEM.

Identifying community issues and concerns for incorporation into GEM

The major GEM goals of *detecting* environmental change in the marine ecosystem, *understanding* the causes of change, and *predicting* the status and trends of natural resources are of vital concern to the resource-dependent communities in the GEM area. Communities and resource user groups are often pressured, however, by short-term, "smaller picture" or shorter timeframe concerns about changes in local resources and thus, have different priorities than those arrived at solely from a "big picture" perspective

of the entire long-term GEM program. The challenge for meaningful community involvement in GEM will be to create forums and a process for the allocation of program resources that can address issues that motivate community members to participate in GEM within the context of the long-term regional monitoring and research program.

The importance of grass-roots organizations and consensus planning should not be overlooked in preparing communities to interact efficiently with GEM. A chorus of many different voices advocating a variety of needs and concerns will be difficult to accommodate. However, a few skillfully prepared arguments built around well-defined resource utilization and management themes are much more likely to be seriously entertained. Examples of potential themes might include public-based shore-side surveillance programs, resource augmentation (private salmon and shellfish hatcheries), and cooperative work with state and federal agencies on selected key species.

GEM is an ecosystem-scale project with potential linkages to global scale oceanic and atmospheric monitoring and research. While community representatives can be involved in GEM program planning and review committees, direct participation by larger numbers of community members throughout the GEM geographic area will need to happen in or near the communities. This reality raises practical concerns about the coordination of community- level efforts to ensure that meaningful contributions are made to the overall program and that community members understand the significance of their contributions and thus find their involvement to be meaningful.

The Regional Capacity Assessment conducted as a component of this project included a question about the priority issues of community-based and regional organizations and government agencies. The question was open-ended ("top three priority issues") and elicited a wide variety of responses that were categorized generally. The largest number f responses (more than 20 each) were categorized as a "habitat" or "human impact" concern/issue followed by nineteen and eighteen responses categorized as "fisheries" or "fish and wildlife populations" concern/issue, respectively. The survey did not, however, result in the identification of specific high priority issues on a regional basis.

Past efforts funded by EVOS has resulted in progress in identifying local issues and developing GEM projects that address these issues:

- The Trustee Council has funded efforts by the Chugach Regional Resources Commission to develop natural resource management plans in several Native villages, which tribal representatives believe are a necessary step before incorporating tribal concerns into the GEM program. Three of the communities have followed the development of plans by participating in the development of competitive research and monitoring proposals to implement the plans.
    - *Tribal Natural Resource Management Plans* developed by the Villages of Port Graham and Nanwalek identified black chitons (bidarkis) as an important resource. Port Graham identified traditional harvests and population surveys and assessments as their highest priority issue and black chitons among the highest priority for research and monitoring in their plan. An on-going collaboration between community members in both communities and resulted in a successful FY03 EVOS proposal to investigate the relative roles of natural and shoreline harvest in altering rocky intertidal communities (Ruesink 2002). STAC and EVOS staff recommendations to fund the project cited the focus on involvement by

local communities in obtaining quantifiable research results, the contribution of information on how to study the effects of subsistence harvests in nearshore environments, development of comparative data on human and natural influences on species distribution, and the importance of the black chiton as a subsistence resource.

- The *Tribal Natural Resource Management Plan* developed by the Village of Tatitlek identified herring as a priority natural resource species needing follow up information and research. The Tatitlek Tribal Council subsequently organized a Community *WisdomKeeper meeting* with the assistance of CRRC and the EVOS Trustee Council that culminated in collaborations between participating scientists and community members to develop research and monitoring project proposals. Potential collaborative projects in water monitoring and beach surveys and monitoring were identified along with follow-up actions for community questions and concerns about herring, harbor seal, and sea otters (Huntington 2003). An informal herring project team was formed to synthesize available information on Prince William Sound herring stocks and plan a follow- up workshop to provide both scientific and tribal perspectives on major herring issues (Hogan 2003).

- The Trustee Council has also funded work by the *Prince William Sound Fisheries Research Applications Research Group (PWSFRAG).* One of the primary objectives of this stakeholder group is to provide EVOS with criteria and guidelines for making and keeping information gathered by GEM relevant to fisheries management and shore-based communities. Beginning in 2002, the group conducted a series of public workshops in Cordova involving members of the fishing community and scientists from the Prince William Sound Science Center, as well as scientists from various institutions within and outside of Alaska. This group developed a statement of short-term and long-term fisheries management issues and needs and an objective of determining the information resources that would contribute to resolving issues and needs.

An example of an approach in another program is:

- The *Arctic Borderlands Ecological Co-op* Program in northeastern Alaska and northwestern Canada began with community involvement in the identification of three major issues (i.e., climate change, contaminants, impact of development) of concern to communities and natural resource managers. They then identified 75 indicators related to these issues. Specific projects are identified and reviewed at annual gatherings. The Old Crow Plant Monitoring Project was the Co-op's first long-term monitoring project. A loche (burbot) liver project is underway to follow up on concerns about the quality of loche. Other projects will proceed when partnerships and funding have been established.

Participating in advisory bodies and program decision- making

As presently envisioned, GEM will be a long-term marine environmental monitoring and research program somewhat analogous to the National Weather Service (NWS). However, instead of focusing exclusively on meteorology, GEM will attempt near real-time characterizations of ocean climate, including the physical state (temperature, salinity and current patterns), air-sea interactions, production at lower trophic levels (plankton and benthos), and the status of resources of high value. This information has great potential importance for stakeholders of the Gulf's vast marine resources, and is expected to inform much more environmentally astute programs of resource utilization and management in the future. To fully capture the opportunities afforded by GEM, the stakeholders of these resources must be afforded membership on GEM scientific and technical committees crafting plans for the various habitat research and monitoring programs. This representation will assure that academic and agency planners on these committees are also aware of community needs and expectations. Community members currently serve on the Public Advisory Committee (PAC), Scientific Technical Advisory Committee (STAC) and the Habitat Subcommittees that advise the STAC. These "seats" should be maintained with rotation of membership to ensure that all communities within the GEM geographic area are represented.

Conclusions

1. Additional community work is needed to identify issue of concern in a manner that can be readily meshed with work to date on GEM priorities. The GEM program should provide opportunities for forums related to identification of relevant community issues within the context of overall GEM program planning and evaluation.

2. Review criteria for proposals for community- generated projects should recognize and give weight to proposals that address community issues as evidenced by community planning processes or forums or multi-partner proposals that address issues of mutual concern over a broad geographic area.

3. Participation in the PAC, STAC, Habitat Subcommittees, and other advisory groups to the GEM Program by members of communities within the GEM area should continue and be supported.

Participating in Community-based Monitoring and Research

Community-based monitoring and research is a part of the spectrum of opportunity and one that has tremendous potential for involving large numbers of community members and motivating them to build their understanding of Gulf ecosystem dynamics and apply their knowledge and understanding in stewardship. Thirty- five organizations responded to the survey that they are presently engaged in environmental monitoring within the GEM area. Fifty- five organizations (62% of survey respondents) expressed interest in participating in GEM monitoring and research. Some significant issues require careful planning to ensure this type of effort is meaningful to both citizen participants and

to the GEM program.

Meaningful monitoring and research that is planned and/or carried out by community members requires that connections and partnerships be forged between the communities and scientists at the earliest stage of planning specific activities, that data collection occurs in a scientifically- valid manner, that local efforts are tied into the ecosystem-scale effort, that data and local and traditional information is managed and made accessible in appropriate ways, and that opportunities are provided for collaborative interpretations and integration of traditional and local knowledge with scientific data.

Connecting scientists and communities

Community/scientist partnerships can be mutually beneficial. They can provide a bridge between Western ecosystem science and indigenous/local knowledge systems, contribute to capacity-building in communities by expanding the ability of community members to participate in the monitoring and research of local ecosystems, provide a cost-effective means to collect locally-relevant environmental data that benefits both the community and the researcher, and increase public support and "buy in" for local monitoring projects and ecosystem-related issues which in turn can increase funding and the sustainability and duration of projects.

In general, no formal mechanisms exist to connect scientists and communities in the GEM area. Barriers to making connections exist for both scientists and community members. Scientists may be unaware that potential projects will affect nearby communities or are of interest to them. Information about individual community expectations and appropriate mechanisms to notify and involve communities in project planning is not widely available. Community members, on the other hand, have difficulty identifying and contacting scientific experts who can address a community issue through research or monitoring. Both scientists and community members face the barrier of the cost of travel between the population centers where most researchers reside and work and the far- flung communities and field sites for data collection.

A number of successful collaborative GEM projects have been planned collaboratively, such as onse focused on black chiton/bidarki ecology (GEM Project G-030561) and forage fish stomach contents (GEM Project G-030647) involving subsistence users as a result of individual researcher or community initiative or informal connections that occurred at EVOS meetings.

Examples of more structured approaches to connecting scientists and communities include:

- The EVOS-sponsored *WisdomKeeper Series* is a tool designed to facilitate the combination of Western science and traditional knowledge in the development of community-based monitoring projects. A facilitated meeting among community members and scientists took place in Tatitlek in November, 2002.

- The *Arctic Borderlands Ecological Knowledge Co-op* convenes community members, scientists, and natural resource managers annually to identify and review projects.

- Other organizations and initiatives have been explicitly designed to create durable partnerships between researchers and communities/local residents. Examples

include the U.S. Fish and Wildlife Service Subsistence Division Alaska Federal Fisheries Monitoring Program, the Porcupine Caribou/Community Resilience Study, and the Northern Ecological Monitoring and Assessment Network for Northern Canada.

- The *Yukon North Slope Research Guide* is a resource document for both researchers and communities, to clarify expectations and develop common understandings. Topics covered include:
  - How to involve communities in research and monitoring;
  - How to consult with the communities;
  - How to access traditional and local knowledge for research and monitoring;
  - How to communicate information to the communities;
  - How to conduct research in an ethical way;
  - Where to find funding;
  - What support services are available for research; and
  - What permits, licenses, and review processes apply. (www.taiga.net/wmac/researchplan)

Ensuring the validity of scientific data

Concern about the quality and reliability of citizen- generated data is a key concern among scientists. The myriad of programs that engage citizens in data collection approach this concern in a number of ways that range from an investment in training and support of a small number of monitors who employ relatively simple, rigorous data collection protocols with margins of error that can be calculated fairly accurately (e.g., physical and chemical parameters of water quality monitoring) to a smaller investment in training and support for large numbers of monitors who collect measurements "campaign-style" over a relatively short period of time (e.g., ground-truthing hundreds of cover type pixels in a satellite image; counting all of the killer whales observed by large numbers of recreational boaters in a geographic area, the Audubon Christmas Bird Count). The objectives of these programs vary accordingly, from consistent measurements sufficient to document baseline conditions or trends to the detection of "red flag warnings" about possible population declines or change in habitat quantity or quality that can only be confirmed by more intensive studies.

The "middle ground" for GEM citizen-generated data would revolve around sets of core standardized protocols for monitoring in one or more of the GEM habitats. The concept that has emerged from a series of workshops about the design of GEM nearshore monitoring is a proposal for a program of intensive monitoring at a small number of sites representative of the GEM area supplemented by citizen monitoring at "extensive" sites. Citizen- generated data at extensive sites would be a sub-set of measurements at intensive sites and conform to the rigor of the full suite of core monitoring activities and also complement and extend the long-term datasets developed at the intensive sites to detect change at the ecosystem scale. Site selection for extensive site could also address data collection to provide information about more localized impacts and nearshore habitat change relevant at the scale of local issues.

Standardized data collection protocols are used in a number of citizen monitoring

programs. Programs that involve students or other citizens in data collection using protocols that have been standardized on a regional, statewide, or provincial basis include the *EVOS forage fish/predatory fish stomach sampling projec*t, the *EVOS harbor seal tissue biosampling projec*t, the water quality monitoring protocols of the *Citizen Environmental Monitoring Program (CEMP) Partnership for the Cook Inlet Watershed (*www.inletkeeper.org/monitoring.htm) community survey projects of the *Arctic Borderlands Ecological Knowledge Co-o*p, and waterbird survey techniques of the *British Columbia Waterbird Survey* (www.bsc-eoc.org/regional/bccwsprotocol.html).

- The NOAA *Mussel Watch (*www.vertigo.hsrl.rutgers.edu/NST.html) program to monitor contaminant levels in mussel tissues provides a model for local citizen-based data collection using standardized nationwide data collection protocols. Citizen monitoring programs with standardized global data collection protocols include the *Census of Marine Life Projec*t (GEM Project G-03066) *Project GLOBE* (www.globe.gov), the *Audubon Christmas Bird Coun*t (www.audubon.org/bird/cbc/), and the *Ocean Conservancy International Beach Clean-up and Debris Monitoring Program* (www.coastalcleanup.org).

Linking local scale efforts to ecosystem scale

Key elements to link citizen-based monitoring and research efforts at the local scale to ecosystem and global-scale efforts are paid program coordinators, standardized data collection protocols and training for citizen-based monitoring or research, centralized database management (See the Data Management section of this report for further discussion), and feed-back mechanisms to ensure that participants in local efforts are linked into the broader network of the overall program.

Examples of approaches by other programs:

- The *Arctic Borderlands Ecological Knowledge Co-op* program monitors 75 indicators. Data sets, with explanations, are in place for approximately 40 indicators. The status of these indicators is updated, as data become available, on the Knowledge Co-op web site (www.taiga.net/coop/indics/).

- The *CEMP Partnership for the Cook Inlet Watershed* shares their data among the partners and through linkages with the statewide CIIMMS database and the national EPA STORET database. Coordination among the partners occurs through frequent electronic communication, an annual meeting, and periodic trainings in the data collection protocols, development of Data Quality/Data Control procedures, and data entry.

- The *Global Learning and Observations to Benefit the Environment (GLOBE)* program provides a global-scale model relevant to GEM for coordinating a collaborative and well- integrated effort of scientists, educators, and students to collect and interpret scientifically- valid observations over a broad geographic area that could be extended to adult citizen monitors. A scientific focus on climate change, a small number of key questions, standardized protocols, and a well-

supported WEB site where data can be entered and archived data retrieved and analyzed with online tools are key mechanisms for linking the local efforts.

Managing scientific data

A central issue for GEM is the question of data management. Tremendous quantities of data will be collected through monitoring and research. To have value, these data must follow quality assurance/quality control procedures before entry into a database, and then must be made accessible to the research community and the public so that they can be used. Even more challenging is the problem of managing information (i.e., data that have been interpreted to some degree). To provide for the needs of researchers, who are trained in the methods of data collection and are familiar with using data sets, these challenges are not trivial and can be highly technical. For community members and area residents, there are additional challenges in making *data collection practical* and *data access comprehensibl*e. For the purposes of the Community Involvement Plan, this section will focus on these two points.

There are two basic approaches to making data collection practical. One is to restrict citizen data collection to parameters and methods that are simple and frequent. Keeping them simple means that no specialized training is required, so that turnover among those collecting the data is not a big problem. Taking frequent measurements reduces the significance of any one data point, so that the effects of random errors will be minimized. The other approach is to invest in training for data collectors, and to provide sufficient incentives to minimize turnover. (Considerable regional capacity exists for providing training and support for citizen data collection – 77% of the organizations responding to the survey expressed interest in providing training and support of citizens, including K-12 students, in the collection of data and local knowledge.)

The two approaches can, of course, be combined in various ways. Within a program such as GEM, both can be used on different projects or for different parameters. However the data collection program is set up, it will require careful planning for data entry to make the process simple while reducing the likelihood of errors.

With regard to *data access and/or opportunities for independent or collaborative analysi*s, a similar interest and spectrum exists. Eighty-eight percent of the organizations responding to the survey wanted access to data generated by GEM scientists and community-based research and monitoring. One can provide simple materials that are readily comprehensible without much background or training, or one can develop more sophisticated interfaces with the available databases, which may require training for the users. Both can be done at the same time, by providing basic information alongside interfaces for more sophisticated and interactive analysis. The creation and management of the overall data system must take into account the various uses to which it will be put, so that different interactive programs can be created to allow users to explore and analyze the data.

To the extent that GEM can disseminate its findings to the public, area residents should increase their understanding of the functioning of the Gulf of Alaska ecosystem and its needs in terms of natural resource management. This approach, however, is a passive one, relying on a general spread of knowledge flowing from the GEM office. A more active way of increasing understanding and sharing knowledge is to involve users and area residents more directly, particularly in terms of contributing information in

addition to receiving it. Data collection is one facet of this active approach, but the ability of users to analyze data and share their own findings leads to the sharing of information (i.e., interpreted data). Forums for sharing such information will be important, including online forums as well as workshops and other in-person events. In addition to the opportunity to learn by doing, training programs can speed up the process and give it greater focus.

Providing opportunities for presenting community- generated data and results or encouraging local presentations is another means to make data more accessible. Seventy-three percent of the organizations surveyed responded that they are interested in providing their organization's findings to state and/or local governments, while 69% are interested in presenting specifically at local meetings.

Examples of approaches:

- Data can be provided in real- time from sensors or "near real- time" for data requiring processing. The *Rutgers Coastal Ocean Observing Lab* is an example of a research program with a sophisticated array of sensors that provides information about currents and weather patterns over the Web to thousands of members of the public (http://www.marine.rutgers.edu/mrs/). In Alaska, data is processed from NASA SeaWiFFS satellites and can be made available in the form of color imagery by the University of Alaska Institute of Marine Science within days of data transmission and capture.

- Cook Inlet Keeper provides monitors with datasheets and training in data collection for physical and chemical water quality parameters, but centralizes data entry into the CEMP computer database and performs data quality checks. The UAA Environmental Natural Resources Institute, on the other hand, provides data sheets for biological monitoring and monitors enter data into the computer database individually.

- The EVOS *Youth Area Watch* program (www.chugachschools.com/youth_area_watch/, www.kodiak.k12.ak.us/edgrants/keenloc.html) includes varying levels of analysis for students, who are also responsible for gathering data for different purposes. In this program, students are given intensive training for the different projects in which they are involved.

- The *Bidarki/Black Chiton* project shares information informally at community potlucks and gatherings.

- The *Shorekeepers & Reefkeepers* program in Canada (www.keeperweb.org) offers citizens the opportunity to get involved in data analysis if they so desire, though government scientists typically do most of the analyses.

- The *Chesapeake Bay Citizen Alliance* has online software that allows the public to plot statistics and time series graphs to search for trends.

- As described above, the *GLOBE* program provides a rigorous protocol for gathering and entering data, which students can then analyze via a website.

- The *WSU/Island Beach Watchers* program (www.beachwatchers.wsu.edu/) has one volunteer whose focus is on data interpretation and synthesis.

Managing local and traditional information

Communities within the Gulf of Alaska have a direct interest in the activities and decisions concerning the fish and wildlife resources on which they depend for their livelihoods and subsistence. Traditional knowledge provided by Tribal members and local knowledge provided by long-term resource users and observers of the environment can provide important insights into changes in the health of marine resources and guide the direction of research and monitoring.

The collection of local and traditional information raises issues in addition to those related to validity that are associated with scientific data. Local and traditional knowledge can include sensitive information such as the location of harvest areas, harvest levels, or archaeological sites so whether or not information can and will be kept confidential is a source of concern to those providing the information. In some cases, the information is regarded as an intellectual property that requires specific permission for each type of use and which may require financial compensation. Because the collection of this type of information often requires a level of trust, one-on-one contact between the informant and the person requesting the information is often the most appropriate way to collect it. Some information may only be entrusted to someone from the same culture or stakeholder group.

One approach to making local and traditional knowledge available is through mapping efforts. Community level maps can be a powerful tool to communicate local values and traditional knowledge. Maps can become a powerful medium for bringing traditional knowledge into planning and the database. The mapping process and mapped knowledge can be accomplished with confidentiality maintained for the tradition al knowledge that is often very sensitive data. Community level mapping can be used to capture and communicate traditional ecological knowledge. With the right level of trust and understanding, these maps can be used to bridge traditional and scientific knowledge. GIS is increasingly a tool used for this type of integration of different types of knowledge tied into a common landscape.

Examples of approaches:

- The *Aboriginal Mapping Network* maintains a web site (www.nativemaps.org) with a focus on issues related to mapping traditional ecological knowledge.

- The *Alaska Department of Fish and Game* (ADFG) collects information on subsistence uses of harbor seals in cooperation with the Alaska Native Harbor Seal Commission (ANHSC), tribal governments, and organizations representing marine mammal hunters, including the Aleut Marine Mammal Commission. Information is collected principally by local researchers in each community conducting household interviews, working with a network of local and regional researchers organized by the ADFG Division of Subsistence. Participation in harvest surveys is voluntary and individual and household- level data are

confidential. Established guidelines require approval of ongoing research by tribal governments annually. Preliminary results are sent to communities for review and comment before final reports are published. Reports include sections on selected topics such as traditional uses of harbor seals, hunting methods, and traditional knowledge in addition to harvest data. A transfer of responsibility to hire local researchers from ADFG to the ANHSC is being phased-in over several years. (Wolfe et. al., 2002).

- The *Association of Canadian Universities for Northern Studies* (ACUN 1998) has developed principles for researchers:
  - Abide by local laws, regulations or protocols in place
  - Appropriate community consultation
  - Respect for language, traditions, and standards of the community
  - Incorporation of relevant traditional knowledge into all stages of research
  - Enhance local benefits that could result from research.
  - Identify sponsors, purposes of research, sources of financial support, and investigators responsible for the research.
  - A community or an individual has the right to withdraw from the research at any point.
  - On-going explanations of research objectives, methods, findings and their interpretation should be made available to the community.
  - Subject to confidentiality, descriptions of the data should be left on file in the communities from which it was gathered, along with descriptions of the methods used and the place of data storage. Local data storage is encouraged.
  - Research summaries and research reports made available to the communities.
  - Publications should give appropriate credit to everyone who contributes to the research.

- The UAF *GLOBE/Native Ways of Knowing* project (http://www.uaf.edu/olcg/native/index.html) provides an intensive three-week summer training program for teachers and community educator teams. The teams jointly develop activities to collect scientific data using GLOBE data collection protocols and to involve elders and other experienced observers of the local environment to collect and integrate traditional ecological knowledge with Western science.

- Interactive web sites can be used to capture and share observations that are less sensitive and may be of interest to citizens, researchers, or natural resource managers. EVOS maintained a hotline to report abnormalities of harvested species immediately after the spill when concern over oil impacts to subsistence foods was high. Other 800 numbers or web sites are employed to record seasonal or unusual sightings (rare bird alert lines or web sites such as the Kachemak Bay bird sighting line [235-PEEP]), warm-water species (e.g., sea turtles) during El Nino events, changes in abundance or distribution [e.g., jellyfish - DockWatch

(www.dockwatch.disl.org/)] ,as well as episodic events such as usual plankton blooms or the occurrence of paralytic shellfish poisoning. The value of an interactive WEB site to record and archive these observations would be enhanced by the participation of scientists as well as Native elders and other long-term residents of the area to put the significance of the observations into a perspective over a larger spatial or temporal scale.

Conclusions

1. Facilitating connections between and among scientists, community members, resource managers, and resource users in the GEM area will require support and planning.
    a. The EVOS Community Involvement staff person should maintain databases of community interests and priorities and scientific expertise in specific topics and facilitate collaborative planning.
    b. Scientist/community partnerships should be encouraged and rewarded through exploratory grants to plan collaborative projects and a pre-proposal process that would surface common interests and potential partnerships.
    c. EVOS should support well-designed community forums and meetings to plan research projects and monitoring activities that provide opportunities for community involvement, to share scientific and local information, and to develop and evaluate applications of information to natural resource management. These forums should occur in conjunction with EVOS annual meetings and as EVOS-sponsored meetings and workshops in the communities.
    d. EVOS-sponsored community forums should be designed to provide a productive and meaningful dialogue among resource users, community residents, managers, and scientists using the WisdomKeeper model: 1) clear focus with a defined topic; 2) preparation in order to give the participants time to think over the topics to be discussed; 3) diverse and knowledgeable participants selected for their expertise and commitment to the objectives of the meeting; and 4) adequate support and follow-up to complete the goals of the meeting.

2. A guide similar to the Yukon Guide for Researchers should be developed for GEM to provide guidance for researchers to be observed when carrying out or sponsoring research in the Gulf Ecosystem. Guidelines to consider that are similar to “Principles for the Conduct of Research in the Arctic” developed by the Social Science Task Force of the U.S. Interagency Arctic Research Policy Committee (1995):
    - Inform the community of planned research on or near lands, waters or traditional use areas used by tribes or community members.
    - Identify investigators, purposes, goals and time-frame of the project, and foreseeable results of the research.
    - Consult with and, where applicable, include communities in project planning and implementation.

- Explain results in non-technical terms, using forums such as community meetings, school programs, and displays or partner with a community-based educational organization or institution.
- Provide copies of reports, data and other relevant materials to the local community.
- Where appropriate incorporate local and traditional knowledge and experience.

3. The GEM Program should support the development of standardized core GEM citizen data collection protocols in nearshore and watershed habitats as a cost-effective approach that could be sustained by community-based organizations through periodic training and recruitment of citizen volunteers. The CEMP for CIK and the UAF GLOBE Program provide models and potential partners for other organizations and agencies with an interest in GEM watershed and nearshore monitoring to develop an ecosystem-scale citizen monitoring program.

4. The GEM data management system should be designed to meet community needs as well as the requirements of researchers. Data entry should be simple and smooth, especially through uploading spreadsheets and other data forms so that data can be entered once and then transferred electronically, reducing the chances of entry errors. Data access should provide not only access to raw data, but online software to allow data queries and analysis through user-friendly programs with universal access.

5. GEM should provide staff to manage the database and provide help to users, including preparing some analyses for distribution over the web to stimulate greater attention to and use of the database.

6. Data entry formats should be made consistent, and data sets identified easily so that data from different projects can be compared easily to identify correlations. This can be done through clear and comprehensive indexing as well as associating data sets with a list of key words to allow simple searches.

Partnerships

Partnerships with tribal and local governments, existing community-based organizations, environmental education institutions, and university and agency programs will be at the heart of an effective and sustained GEM community involvement program. The Regional Capacity Survey provides a snapshot of the potential partners and their current level of interest in a variety of GEM activities. Partnerships will leverage GEM financial resources and connect GEM-generated data and information with other efforts to understand the Gulf ecosystem and sustain its health and productivity.

Short-term and Long-term Objectives for Community Involvement

If community priority issues and concerns can be identified and addressed through GEM monitoring and research, short term objectives for community involvement can be reached through successful planning, development, and implementation of community-based projects or through projects designed and implemented collaboratively by communities and scientists. Other short-term objectives relate to the participation of communities and community organizations in other types of community involvement projects such as the dissemination of information through community presentations, forums, displays, and educational media or programs.

Longer-term objectives relate to education, capacity-building, and the applications of GEM information to community- level natural resource management and stewardship. The Trustee Council did not identify education or capacity-building as major goals of the GEM program. Both will be required, however, to ensure that coastal community members, stakeholders, and the general public are included in meeting the major GEM goals of informing, creating a shared understanding about the causes of change in the ecosystem, and providing the basis for appropriate responses to changes in natural resources. The Council recognized that the GEM program alone could not meet its major goals. For that reason, they adopted implementation goals to: 1) involve non-government organizations, stakeholders, and the public in a collaborative process; 2) increase community involvement and local and traditional knowledge in order to enhance long-term stewardship of living marine resources, and 3) facilitate application of GEM research and monitoring results to benefit conservation and management of marine resources.

The motivation to become and stay involved in GEM requires a basic “big picture” understanding of program goals and the conceptual foundation of Gulf ecosystem components and dynamics. Approaching the ecosystem with a commitment to use both best science and local knowledge will require that scientists and non-scientists become and stay engaged in a mutual education and capacity-building process as they learn how best to share their important questions, knowledge, and understandings and to apply the results to management and stewardship. Community involvement efforts that are planned to provide effective education and community capacity-building will be needed to ensure that people make sense of information, transform it into personal knowledge and understanding, and apply it in resource management decisions and personal decision-making about the use and conservation of resources.

Education

In the context of the implementation goals, perhaps the best reason that education is integral to success is that the desire to educate people about the productivity and health of the ecosystem and how best to use and manage natural resources is likely a, if not the, prime motivation for people and organizations to become and stay involved, to partner, and to collaborate to achieve the mission and goals of GEM. Education is a key purpose, for citizen monitoring – a national survey of citizen monitoring programs included the result that 84% of the organizations involved in monitoring listed education the primary use of their data and data use for education by local, state, and federal governments,

community organizations, and university scientists (Ely and Hamingson 1998). The responses to the Regional Capacity survey documents the importance of education as a key strategy for community-based organizations addressing community issues. Thirty-five organizations responded that they wanted to provide educational programs based on GEM data and information.

The GEM framework document states that "GEM must provide information that enables resource-dependent people such as subsistence users, recreation users, commercial fishers to better understand and cope with changes in marine resources." But more than a one-way delivery of information will be needed to enable understanding and appropriate coping behaviors. Education is needed as a proactive and planned process to target and engage specific audiences in a structured way to ensure that they gain specific knowledge, understandings, or skills. This type of learning can occur in a variety of settings - the classroom with its more "captive audience" of K-12 and college students, in "non- formal" educational settings such as museums and outdoor education sites for all ages, in community education settings such as workshops, forums, and one-on-one interactions, and over the Worldwide Web.

Examples of approaches:

- *K-12/Youth Education Programs* reach an important target audience for community involvement and education programs. Of the 75 organizations who responded to a survey question regarding youth involvement in their community involvement programs, 50 (76%) responded that that they did have school classes (K-12) or youth involved in their programs. These programs range from those directed at K-12 students and their teachers, youth in non- formal education settings, and youth in interaction with their community.

- The EVOS-sponsored *Youth Area Watch* program facilitates partnerships between students and scientists conducting EVOS research and restoration projects. The Chugach and Kodiak School District partners integrate YAW activities and extended learning into the school curriculum. YAW has provided opportunities for students to observe or assist with field data collection with a variety of projects (harbor seal biosampling, seabird monitoring, collection of oceanographic data on cruises, and analyzing chemicals found in intertidal mussels) and supported student restoration and community education projects.

- The *Global Learning and Observations to Benefit the Earth* (GLOBE) program provides a model for developing a network of scientists and K-12 teachers and their students to collaborate and collect real environmental data relevant to studying global environmental change.

- A number of community-based institutions have on-going school group and youth education programs with a focus on the marine and coastal habitats in the Gulf of Alaska and on stewardship (The Center for Alaskan Coastal Studies *Alaska Coastal Ecology* and *Kachemak Bay Onboard Oceanography* programs, Prince William Sound Science Center/Chugach National Forest *Science of the Sound* program, SeaLife Center programs, outreach programs by these institutions to

classrooms throughout the GEM area). Additional educational facilities and programs are being developed in Seward (National Park Service *Ocean Alaska Science and Learning Center*) and in Homer (*Alaska Islands and Ocean Visitor Center*).

- *Summer camps* with emphasis on science, natural resource issues, and natural resource careers provide extended learning for students with the highest interest in these areas are provided by the Prince William Sound Science Center on the Copper River Delta, the U.S. Fish and Wildlife Service in Kodiak communities. A *Spirit Camp* is also provided by the Chugach Heritage Foundation at Nuchek (Hinchinbrook Island).The U.S. Fish and Wildlife Service sponsors a number of other summer camps throughout Alaska, usually in communities in or near National Wildlife Refuges, that integrate science content and traditional ecological knowledge in areas where communities in or near National Wildlife Refuges are predominantly Native. The *Yukon Flats NWR Earthquest program*, open to youth in rural villages throughout Alaska, is a two-year program that extends the summer camp learning experience with on-the-job natural resource management training through paid federal agency internships.

- The EVOS-sponsored *Tatitlek Wisdomkeepers workshop* in November, 2002, included a school project that engaged students in learning social science interview survey and interview techniques, developing survey questions, interviewing adults and elders in the community about changes they had observed in the marine environment, and presenting their results in a workshop involving community members and scientists. A similar survey activity has been developed by the *UAF GLOBE program "Native Ways of Knowing" projec*t. Students interview community members, including elders, to collect information about observations of climate change.

- The *UAF Cooperative Extension Service 4-H Fisheries, Natural Resource and Youth Development Program* combines teacher and community educator training with a unique classroom instruction program, afterschool 4-H activities, and final paid job and intern opportunities in natural resource management. The program is an excellent model for rural education and capacity-building within rural communities around natural resource issues and stewardship activities. (www.uaf.edu/coop-ext)

Education and Training as part of Community-based Monitoring and Research

A number of community-based research and monitoring programs targeted primarily at adults include a strong focus on education through extended training programs that provide skills training to collect and handle data and often go well beyond this objective.

Examples of nearshore monitoring programs include:

- The *Shorekeepers & Reefkeepers Program* provides a multi-day training course for students and adults to learn to identify local flora and fauna in order to collect

accurate data. School groups participate in Junior Shorekeepers. (www.keeperweb.org)

- The *WSU/Island County Beach Watchers Program* provides 100 hours of extensive training about local area ecology in the form of field trips and guest lectures by experts to volunteer monitors. Citizen volunteers are also trained to participate in an interpretive/education program for beach users. The program sponsors an annual daylong "Sound Waters" workshop with several different sessions about environmental issue. (www.beachwatchers.wsu.edu/)

- The *People for Puget Sound* Rapid Shoreline Inventory program provides a three-session training program, with one session devoted to broad ecological concepts. The organization has a strong focus on education in addition to the shoreline inventory program. Other activities include regular Beachwalks, student education programs (involving thousands of "Kids for Puget Sound"), an environmental education listserve, and numerous workshops and events. (www.pugetsound.org)

Conclusions

Realizing the potential for GEM to motivate educated community involvement will require attention to encouraging and supporting effective education efforts. This could occur in a number of ways:

1. Inclusion of the following types of education and training projects in the RFP/project review project with opportunities for proposals for:
   a. continuation of Youth Area Watch and other school-based and youth programs that provide opportunities for youth to interact with GEM scientists and/or to participate in GEM research and monitoring activities.
   b. Partnerships that include educators, community-based educational organizations or educational institutions to develop educational products (e.g., presentation of the project and project results using a variety of media, displays, community computer stations for access to GEM information, curriculum development, WEB sites, traveling educational kits).
   c. GEM-specific programs and educational products that can be delivered at educational facilities and used for sustained GEM program outreach
   d. Projects that integrate GEM-generated scientific data with traditional and local knowledge.
   e. Programs and materials to train community members to collect GEM data, to enter and access GEM data, and to increase understanding about the Gulf ecosystem and the overall GEM program.

2. Identifying potential environmental education partners and educator networks (see case histories section of report) and including them in the GEM Community Network.

3. Providing financial support for teacher and student involvement in GEM annual meetings and community forums or science conferences and planning sessions

in appropriate formats for these audiences.

4. Providing an annual session for new or prospective scientist project leaders on the topic of effective public outreach and education during the EVOS annual meeting. A possible format could include “do’s and don’ts” and “success stories” presented from the viewpoints of scientists and community members.

Capacity-building

Capacity-building is an important aspect of community involvement, particularly in the many small, predominantly Native communities in the GEM geographic area. Tribal and other coastal people living in the Chugach Region and EVOS area, have first-hand knowledge of the marine, nearshore, and intertidal areas that they depend on for subsistence lifestyles as well as cultural, spiritual and economic needs. The many small, predominantly Native villages in the GEM geographic area want to be actively involved in the GEM program, particularly in monitoring and research projects. In larger communities within the GEM area, environmental and other community-based organizations often serve as the nexus between local concerns and participation in management and stewardship activities. Small, tribal communities do not have these types of organizations, the Tribal Council and committees provide a variety of services. Villages have a strong tradition of sharing, but the concept of volunteerism that is often strong in larger communities is not traditional to Native villages. Also in the villages there are usually few people trained in the sciences.

The tribes would like to develop their technical management capabilities, capacity, and infrastructure to manage the natural resources upon which they depend, and to conduct culturally appropriate science-based projects based upon the damage that was done to their traditional use areas and spiritually based traditional lifestyles.

For these reasons GEM may choose to provide formal training for village residents interested in working on GEM projects and eventually proposing and running GEM projects. Training would also enable rural residents to better understand the objectives of GEM research and could encourage them to continue their education so they could assume increasingly responsible positions.

Technical capacity building would include training and education, program development, or any type of project idea that would further develop the ability of the community to participate in scientific research and monitoring projects through the GEM program either through collaborative partnerships or direct technical assistance from a professional biologist. To address this need for technical capacity building for the tribes, CRRC has shifted its EVOS-supported community coordination program to the broader goal of integration of Tribal Natural Resource Programs with the GEM program. The long-term goal of this CRRC project is to promote local stewardship by building the capabilities of spill area communities, primarily Alaska Native villages and Tribes, through planning and training. The first step in capacity building will be to design a curriculum which will provide training to include such topics as GIS, marine and terrestrial ecology, biology, data collection and management, research and monitoring methodologies and equipment use and other subjects critical to professional

responsibilities and interests.

In larger communities, considerable capacity already exists as the results of the regional capacity survey demonstrate. If GEM directs capacity-building efforts are directed at these interested community-based organizations, members of these communities could have considerable opportunities to participate in the GEM program in a variety of ways such as being trained as citizen monitors or receiving GEM information from the programs of local educational institutions. Community-based organizations and educational institutions are potential GEM partners both as local catalysts for participation in GEM and as the agents for seeking ways to apply GEM results to influence human impacts on coastal habitats on the local scale.

Capacity-building is a long-term process. Effort will be needed during early stages of the GEM program to provide opportunities for participation and training that may result in relatively small contributions to the program as the "first steps" towards a larger role and larger contributions in the future. Efforts to provide training in data collection and data entry protocols to volunteer or tribal professional monitors and researchers will need to be sustained over the life of the project. Technical support for community mapping and the development of GIS is especially important to improving access to public information resources and training and education in mapping and GIS for environmental analysis would facilitate the inclusion of local and traditional knowledge into maps and GIS databases.

Capacity-building will require additional financial resources for tribal and community-based organizations. But the tribes, community-based organizations, stakeholder groups, and agencies are also potential financial partners because they can collectively solicit and receive funds from diverse sources such as state and federal agencies, private foundations, corporations, and individual donors. They can often leverage these funds through matching (especially nonfederal) contributions.

Conclusions

1. Small, Native villages in the GEM area require an investment in capacity-building to realize their potential as participants in the program. Continued EVOS funding to promote Tribal natural resource programs, to support efforts to identify priority issues and participate in monitoring and research opportunities, and to foster communication regarding traditional knowledge and GEM activities would help meet the GEM goal of incorporating traditional knowledge and community involvement. Financial support for development of a training curriculum would further develop Tribal technical capacity to conduct research and monitoring projects under the GEM program so that throughout the life of GEM, Tribes can be true stewards of their traditional use areas.

2. Larger communities in the GEM area have considerable capacity to participate through community-based organizations, stakeholder groups, and university and agency programs. The GEM program should provide opportunities for existing organizations and programs to gear their efforts towards GEM activities and priorities through incentives and leverage funding through matching grants.

3. The review process for monitoring and research project proposals needs to take into account that, particularly in the beginnings of such a community involvement program, the capability of communities to develop proposals that will rigorously address the major "gaps" in scientific knowledge and understanding that will be the focus of the Science Plan will likely be low. The development of standardized citizen monitoring protocols, user- friendly data entry and access, support for training in data collection and data entry protocols, and information and outreach products to potential partners will greatly increase the "fit" of community-based monitoring programs with the overall GEM Program over time.

Applications of GEM Information

The success of the GEM program will be not only in its ability to measure, understand, and predict environmental change, but also in its ability to inform human activities to sustain the health of the Gulf ecosystem and the communities that depend on it. This long-term mission requires the application of GEM data and information. Some applications of GEM data may be immediate, such as the use of real-time data on weather conditions and currents to make recreational or commercial boating decisions. Others may accrue after significant amounts of data are processed and compiled into a more user-friendly format such as a composite color image or GIS data layer. Others may happen in the context of management of a harvested species where information on population trends and changing environmental conditions are synthesized in complex models to predict the effects of alternative harvest management scenarios. GEM data and information may be used to predict the potential fate and effects of a future oil spill and assist in readiness for a rapid clean-up response, to determine key habitat areas and thus, regional conservation priorities; or to track the pattern of climate change over the next several decades in the North Pacific Ocean and to bring information about the implications of such changes to bear on human actions.

Examples of potential community- level applications:

- The EVOS-sponsored *PWSFRAG* has already been described. The group has identified information needs for management of the Prince William Sound herring population and fishery in the context of an adaptive management approach. The Village of Tatitlek and Tribal Council has also developed a focus on the herring resource through a *Wisdomkeepers* workshop and has developed project proposals to collect data relevant to stock status and population ecology.

- *ShoreZone mapping*, a method that combines standardized biophysical mapping and classifications on georeferenced shoreline segments has been completed for a large portion of the GEM area as well as for the entire shoreline of Washington and British Columbia. In Washington and B.C., the mapping and associated data has provided the means for natural resource managers to assess the relative abundance and distribution of specific nearshore habitats (e.g., eelgrass beds, kelp

beds) on a broad scale. It has also been applied in oil spill response preparedness and coastal zone planning. In addition, the availability of the mapping to the public has resulted in a variety of innovative applications by local governments and community-based stewardship groups. (http://www.coastalandoceans.com, http://imf.cortex.net/mapping/demos/cori.launch.html).

- *People for Puget Sound*, a community-based group, developed a Rapid Shoreline Inventory Protocol that provides finer-scale citizen-collected data to resource managers nested within a coarser-scale Shorezone mapping and classification system. The organization works closely with resource managers to target priority areas for data collection and to select goals for use of the data such as identification of areas for protection and/or restoration or baselines against future resource damages. Likely areas for intertidal forage fish spawning and other important resources that cannot be observed with aerial mapping are also targeted for the Rapid Shoreline Inventory. The organization works with upland land owners to educate them about potential impacts of shoreline development.

- Another community-based organization, Friends of the San Juans, has developed local maps of key resources and shoreline characteristics that are accessible over a WEB site (http: www.sanjuans.org/shorezone.htm).

- These applications are particularly relevant to GEM based on the recommendations that resulted from an EVOS-sponsored Shoreline Mapping Workshop in March, 2003, that EVOS seek partners to complete a ShoreZone mapping and classification of the GEM area using protocols consistent with those used in Washington and British Columbia and integrate environmental sensitivity mapping for oil spill response. GEM and CIRCAC have already funded ShoreZone mapping for a large part of the GEM area; a major portion of Prince William Sound has been mapped by Alyeska Pipeline Company using mapping protocols that can be likely be converted to the ShoreZone Mapping classification methods and the Oil Spill Research Institute has funded environmental sensitivity index maps for the entire Alaska coastline. Finer-scale mapping could be used to select "extensive" nearshore monitoring sites for community-based monitoring with an emphasis on quantifying human impacts such as shoreline modifications or identification of "hot spots" for nearshore biodiversity (www.pugetsound.org).

- The *Alaska Observation Network (AOS)* is under development by a Steering Group coordinated by the UAF School of Fisheries and Ocean Science Sea-Air-Land Monitoring and Observation Network (SALMON) Program and the North Pacific Research Board. Other states have developed ocean observing systems that provides weather and current information to thousands of people over the WEB with numerous applications to other types of oceanographic research and marine commerce, recreation, and safety.

Conclusions

1. The GEM program has recognized that facilitating the application of the results of GEM research and monitoring will benefit conservation and management of marine resources. The application of the data one of the primary implementation goals of the program. Successful local-scale applications of GEM results should be a primary long-term objective of community involvement in GEM.

2. Effective applications will require a feed-back mechanism to the GEM program so that the results of the applications can inform the monitoring and research process.

3. Periodic information synthesis can contribute to applications through descriptions of "lessons learned" in terms of applications to resource management and stewardship, and "stories" that bring together scientific evidence from disparate disciplines to bear on questions of interest and concern to stakeholders and the public. This might be partially accomplished through public symposia and technical sessions at annual meetings.

4. The application of GEM information can be encouraged and supported in a variety of ways:
    a. Support for "applications" workgroups with community, stakeholder, scientist, and resource manager members, such as the one that has been organized for fisheries applications in Prince William Sound
    b. Charging the PAC and Habitat committees with identifying (whenever possible) and signaling opportunities for resource and stewardship applications of GEM information.
    c. Developing and supporting an interactive WEB site or WEB site feature to allow residents and researchers in the GEM area to share and archive observations and to identify the types of observations that can contribute to detection of significant environmental change.
    d. Project review criteria addressing the identification of potential management applications (when appropriate) of the results of project studies, and the provision of suggestions for implementing these applications.
    e. Requiring project annual and final reports to address the application of project results in a section specified for that purpose.
    f. An annual report to bring information about applications to the attention of the Trustee Council and to the public.
    g. Periodic assessments of the application of GEM information by the Trustee Council member natural resource agencies.
    h. Highlighting management and stewardship applications of GEM information on the EVOS WEB site.

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Aboriginal Mapping Network www.nativemaps.org

Alaska Killer Whale Count www.alaskakillerwhales.org

Alaska Sea Grant www.uaf.edu/seagrant/

Arctic Borderlands Ecological Knowledge Cooperative Project. www.taiga.net/co-op

Audubon Christmas Bird Count www.audubon.org/bird/cbc/

B.C. Coastal Waterbirds Survey www.bsc-eoc.org/regional/bccwsprotocol.html

Citizens Environmental Monitoring Program www.inletkeeper.org/monitoring.htm

COMPASS http://www.compassonline.org/

Cornell Laboratory of Ornithology Citizen Science Programs http://birds.cornell.edu/

DockWatch www.dockwatch.disl.org/

Friends of the San Juans http://www.sanjuans.org/shorezone.htm

Mad Scientist Network http://www.madsci.org

Mussel Watch www.vertigo.hsrl.rutgers.edu/NST.html

Ocean Conservancy Marine International Coastal Cleanup www.coastalcleanup.org

People for Puget Sound www.pugetsound.org

Project GLOBE www.globe.gov

SeaWeb www.seaweb.org/

Shorekeepers and Reefkeepers www.keeperweb.org

ShoreZone Mapping http://www.coastalandoceans.com
http://imf.cortex.net/mapping/demos/cori.launch.html

The Ocean Project www.theoceanproject.org

University of Alaska Cooperative Extension – 4H Fisheries and Youth Development Program www.uaf.edu/coop-ext

University of Alaska Fairbanks GLOBE/global change
http://www.uaf.edu/olcg/globalchange/index.html
Native Ways of Knowing Project
http://www.uaf.edu/olcg/native/index.html

Washington State University/Island Beach Watchers www.beachwatchers.wsu.edu/

Youth Area Watch www.chugachschools.com/youth_area_watch/
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Appendix 2

GEM Community Involvement Plan
Regional Capacity Survey

The GEM Regional Capacity Survey for Community Involvement was carried out to support development of a GEM Community Involvement Plan (EVOS Project 030575) by the Center for Alaskan Coastal Studies, the Chugach Regional Resources Council, and the Prince William Sound Science Center.

Objectives

The objectives of the GEM Community Involvement Survey were to:

1) assess the regional capacity for community involvement in GEM Program activities.
2) identify potential community partners for the GEM program, assess their interest in participating in a spectrum of potential GEM community involvement opportunities and specifically, their interest in and capacity for participation in community-based monitoring and research.
3) identify important community issues and concerns that could be addressed by GEM monitoring and research.

Methods

The survey occurred in December 2002 and January and February, 2003 and was conducted by staff members of Center for Alaskan Coastal Studies (CACS), Prince William Sound Science Center (PWSSC), and Chugach Regional Research Commission (CRRC) under the guidance of the GEM Community Involvement Plan Project Team.[1] The Project Team developed a target list of 164 potential GEM organizational partners within the geographic scope of the GEM area. Organizations that were targeted included:

- Environmental interest organizations in local communities
- Regional or national environmental interest organizations with a focus on GEM region
- Organizations with educational facilities that focus on Gulf of Alaska
- Tribal governments and organizations
- City and Borough governments
- Commercial fishing and aquaculture organizations
- Research organizations with community involvement projects or programs
- Natural resource or land-managing agencies with community involvement projects or programs
- University programs with a focus on community involvement

[1] Project Team members: Marilyn Sigman, CACS; Nancy Bird, PWSSC; Mimi Hogan, Paul McCollum, CRRC; Henry Huntington, Joseph Spaeder, Christine Celentano, Pat Norman, Gary Kompkoff

The compiled list was divided into four categories based on the survey methods to be used and the amount of follow-up that was planned after an initial request for response. The four categories were: Key Respondents, Tribal Respondents, Agency Respondents, and General Respondents. The Key Respondent list (Addendum A) was selected by the Project Team based on their knowledge of the current programs and/or partnerships and relevance to the GEM Program. CRRC Project Team members were responsible for the selection of the organizations for the Tribal Respondent list (Addendum B). The Agency Respondent list (Addendum C) was composed of agencies with community involvement programs. Organizations on the General Respondent list (Addendum D) were a mix of various organizations ranging from city/borough governments to commercial fishing and aquaculture organizations.

The survey project staff developed the survey questions (Addendum E) under the guidance and review of the Project Team.

The survey was conducted primarily as an online survey but was supplemented by faxed or mailed surveys when email addresses could not be obtained or the respondent identified "hard copy" surveys as the preferred method. The most common reason for this request was expressed discomfort with being unable to view the entire survey or look ahead for related questions. CRRC staff determined the appropriate survey method for the Tribal list, supplementing online surveys with faxed or mailed "hard copy" surveys and one-on-one interviews to improve the response rate.

Development and reporting from the online survey was contracted to the Survey-Monkey, a computer services company, after their services had been used successfully by Kachemak Bay Research Reserve staff to conduct a statewide inventory of organizations concerned with coastal management issues. The Survey Monkey method employed tools that controlled the survey flow with custom skip logic based on responses to specific questions.

The online survey required selecting contact persons in each organization and obtaining email addresses. A personalized email (Addendum F) was sent to the contact person in each targeted organization describing the GEM Program briefly (with a link to the EVOS WEB site to obtain further information), the purpose of the survey, the overall GEM Community Involvement Plan Project, and the project partners. The letter then urged the recipient to take the survey via a web link.

The survey was managed through the SurveyMonkey website. The results of surveys that were not completed online were entered into the online database by project staff. A Microsoft Excel database of survey results was created by the online survey service with files that could be easily downloaded for further analysis.

Survey Effort

Two reminder email messages were sent to Agency and General respondents if no response occurred following an initial email. The web link to the online survey was included in the email message. CACS and PWSSC project staff followed-up with additional email and phone messages to the key respondents to encourage completion of survey. CRRC staff made follow-up phone calls to tribal respondents who had not responded to email or "hard copy" surveys and assisted respondents with filling out surveys through interviews.

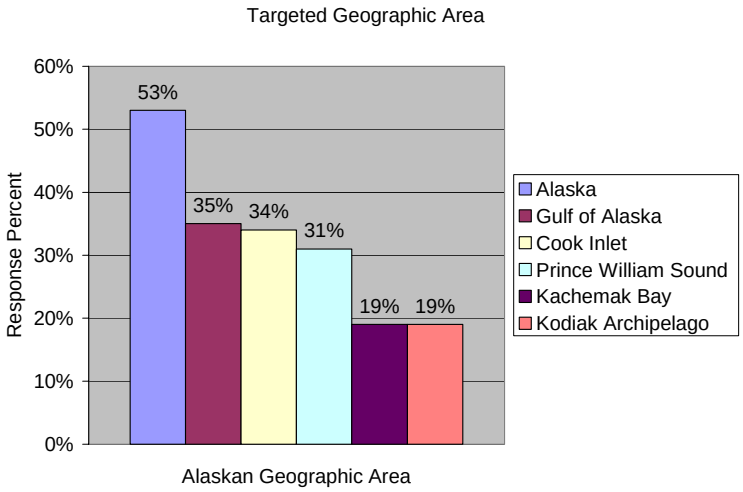
Results

Responses were received from 95 of the 164 target organizations. Six of the respondents identified themselves but either did not fill out the survey or responded that they did not wish to participate in the survey. Response rates of the remaining 89 organizations, by respondent category, were 82% of the key respondents (44 of 54), 41% for tribal respondents (8 of 15), 39% for general respondents (27 of 64) and 45% for agency respondents (14 of 29). Three key respondents who did not reply to the survey had previously expressed interest in involvement with the GEM program during an interview conducted by EVOS staff (Shester 2002).

Geographic versus Community Focus

In response to questions #2-4 concerning the organization's geographic or community area of interest, most respondents chose geographic area (75%) for question #2 and many indicated more than one geographic area in response to question #3. Of the 68 respondents that chose geographic area, over half (53%) indicated a statewide interest, while the remainder provided a similar number of responses to the three geographic categories of Gulf of Alaska (35%), Cook Inlet (34%), and Prince William Sound (31%) (See Figure 1). Twenty-one responded that their focus was on specific communities.

Figure 1. Targeted Geographic Areas of the GEM region.



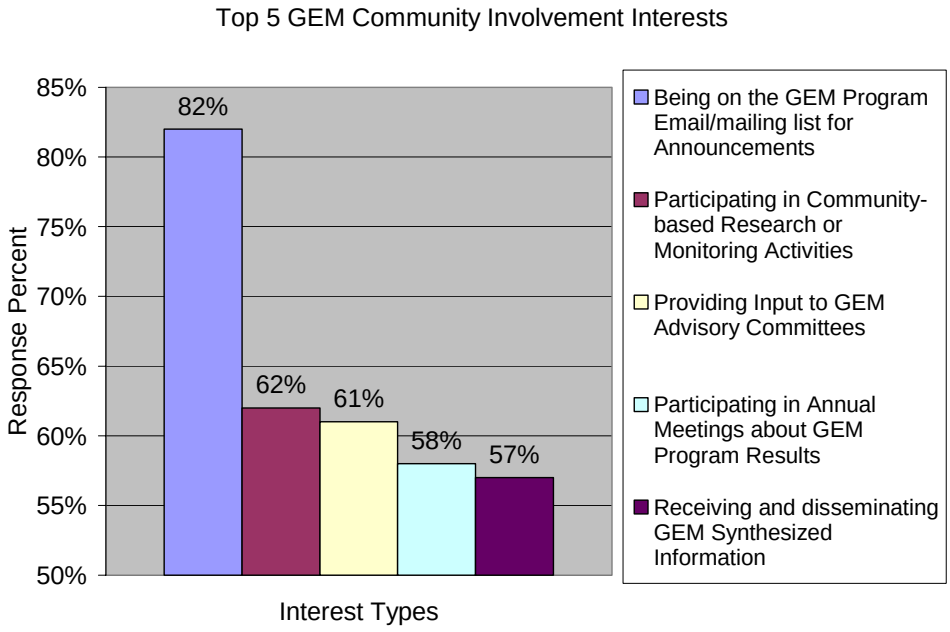
Interests in a Spectrum of GEM Community Involvement Activities

Interest in becoming involved with the GEM Program was assessed through question #5. Respondents were asked to choose among ten different involvement categories. Survey respondents could select one or more of the ten different categories. Only three of the 95 respondents indicated no interest in participating in the GEM program. All other respondents checked at least one category and a number checked as many as six.

Throughout the survey process, the online responses indicated a markedly high interest (85-90%) in the category "*Being on a GEM Program Email/mailing List for Announcements of Meetings and Availability of Publication.*" The final positive response rate was 82%. The second highest category for community involvement interest, at 62%, was "*Participating in Community-based Research or Monitoring Activities"*. Other

community involvement types that more than 50% of the respondents indicated interest in included: "*Providing Input to GEM Advisory Committees"* (61%), "*Participating in Annual Meetings to Learn about the GEM Results"* (58%), and "*Receiving and Disseminating GEM Synthesized Information"* (57%) (See Figure 2). Close to half of the respondents, 49%, responded with interest in both "*Setting GEM Program Priorities* and *Identifying and Incorporating Specific Community Issues and Concerns."* All categories received expressions of interest with no category receiving fewer than 21 positive responses.

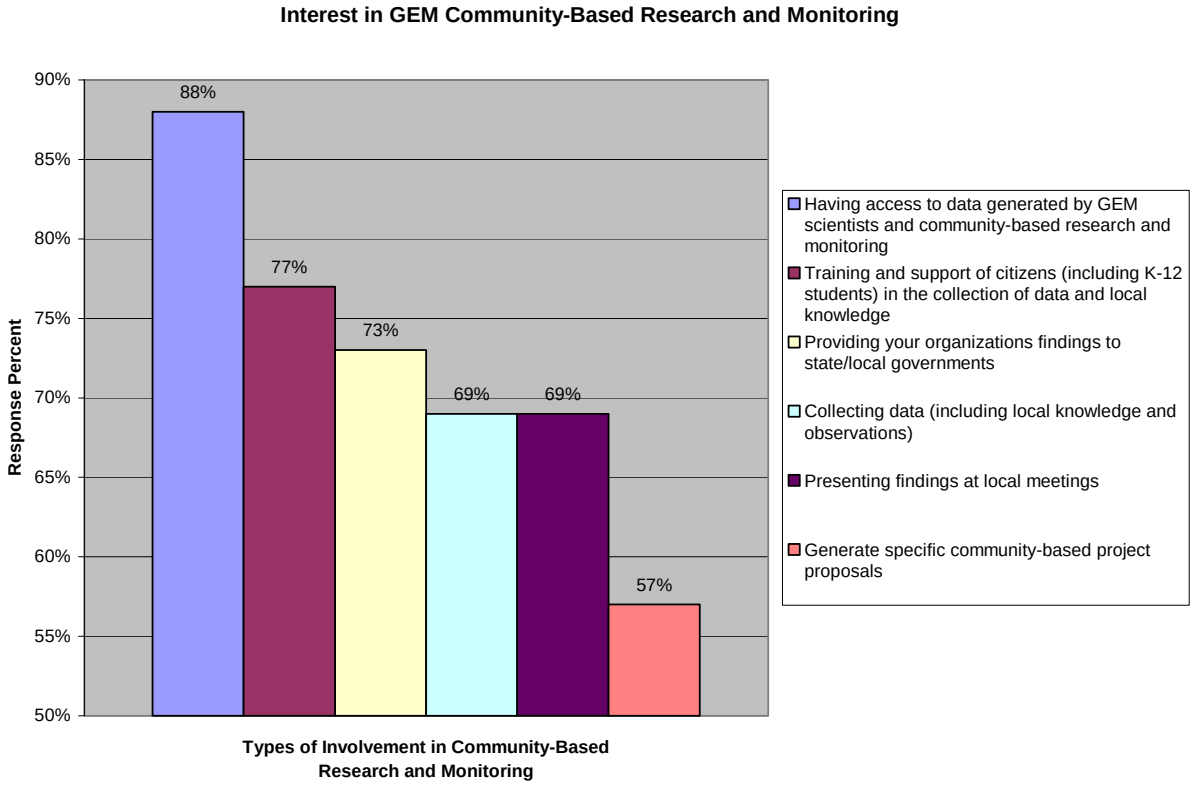
Figure 2. General Interest in Community Involvement in the GEM Program selected by over 50% of the respondents.



<u>Interests in GEM Community-based Research and Monitoring Activities</u>

The 55 organizations that responded that they were interested in *Participating in Community-based Research or Monitoring Activities* were asked an additional question with 11 options for how they would like their organization to be involved in these activities (See Appendix E for full question and complete responses). The highest response rate, 88%, was to "*Having access to data generated by GEM scientists and community-based research and monitoring*". Many responding organizations (77%) expressed interest in providing "*Training and support of citizens (including K-12 students) in the collection of data and local knowledge*". Many of the organizations also responded with interest in opportunities to present their findings. Seventy-three percent of the organizations responded that they are interested in providing their organization's findings to state and/or local governments, while 69% are interested in presenting specifically at local meetings. The same percentage of respondents (69%) were interested in collecting data as those responding with interest in presenting at local meetings (See Figure 3).

Figure 3. Respondent Rate for Interest in Involvement in Community-Based Research and Monitoring selected by over 50% of the Respondents asked this question.



Priority Needs and/or Issues of Concern Related to GEM Monitoring and Research

The survey also attempted to survey attitudes about important needs and/or issues related to environmental monitoring and research that could be addressed by the GEM Program. An open-ended question (#7) was included that asked respondents to identify their organizations' top three priority needs and/or issues of concern. The open-ended questions were binned into general categories outlined in Table 1. In Table 1, the general categories have been bolded along with the total number of times it has been selected. Beneath the totals are sub-categories and their total number of selections, which were then summed in the category total.

The survey respondents described diverse needs and/or issues of concern. The largest number of responses (more than 20 each) were binned into the "habitat concern/issue" and "human impact concern/issue" categories. Nineteen and eighteen responses were binned into the "fisheries" and "fish and wildlife populations" categories, respectively. Due to the subjective nature of the binning process and the broad nature of the categories relative to the variety of responses, however, the original responses better reflect the array of concerns and issues considered important by the survey respondents.

Table 1. Priority Needs and/or Issues of Concern for Environmental Monitoring and Research which Survey Respondents think the GEM Program should address.

Issue/Need	Number of times Selected
Habitat Concern/Issue	**28**
Nearshore	*11*
Watershed	*10*
Offshore/ACC	*4*
Habitat Prioritization/Fragmentation	*3*
Human Impact Concern/Issue	**21**
Fisheries Concern/Issue	**19**
General	*11*
Salmon	*8*
Fish and Wildlife Populations Issue	**18**
General	*11*
Birds	*4*
Marine Mammals	*3*
Education	**13**
Outreach	*3*
Training	*5*
Youth Involvement	*5*
Contaminants	**12**
General	*8*
Oil-related	*4*
Data Management/Database	**12**
General	*9*
TEK/LEK	*2*
Monitoring	**12**
General	*7*
Citizen-Based	*5*
Climate/Weather	**10**
Water Quality	**9**
Food Webs	**8**
Funding	**5**
Habitat Mapping	**5**

A follow-up open-ended question (#8) asked how needs and issues were determined. Sixty-four of the 95 survey respondents answered this question. Responses were also binned. The majority of organizational respondents said that the needs or issues they stated related directly to their mission statement, requests from Board of Directors, or organizational priorities (38%). The next highest response, at 23%, was “from experience”. Some respondents stated that the specific needs they identified were a perceived gap in the work of their organizations or in the community (17%). A near equal number of respondents (16%) said that they determined the needs through discussions, meetings or scoping sessions. Only two of the 64 organizations said that they had determined these needs or issues of concern through a survey.

Involvement of volunteers and youth

Questions #8-10 requested information on participation by volunteers, paid staff, and youth. The majority of responding organizations (49 of 82, or 60%) had a combination of paid staff and volunteers, but 6 (7%) were volunteer organizations. Of 52 organizations with citizen volunteers, 37 (71%) chose the category 1-25 as the number of active volunteers, 9 (17%) chose the category 26-50, and 6 (6%) indicated more than 50. Of the 75 organizations who responded to the question regarding youth involvement in their community involvement programs (#11), 50 (76%) responded that that they did have school classes (K-12) or youth involved in their programs.

Existing Community-based Research and Monitoring Programs

Of the 95 respondents, 78 responded to question #13 that asked whether or not their organization has an existing community-based research and monitoring program. Thirty-eight organizations (49%), replied positively (see Table 1). The responses from the cities of Homer, Soldotna, and Whittier, however, overlapped other responses by mentioning programs within their city limits that had also completed the survey. Therefore, the total number of existing community-based research and monitoring programs in the GEM region identified by survey respondents is 35.

Table 2. Profile of the 37 organizations, within the GEM region, with existing community-based research or monitoring programs.

Organization	Region/Community	Habitat	Monitoring Type
ADEC	Cook Inlet	Watershed	Water Quality
ADEC-Division of Environmental Health	Alaska	Watershed	Water Quality, Contaminants
ADEC-Rural Issues	Alaska	Watershed	Water Quality, Land Use/Human Impact, Contaminants, Habitat Quality
Alaska Marine Conservation Council	Alaska	Nearshore, Offshore	Habitat Mapping
Anchorage Waterways Council	Municipality of Anchorage	Watershed	Water Quality
Audubon Alaska	Alaska	Watershed, Nearshore	Fish and Wildlife Population
BLM Campbell Creek Science Center	Alaska	Watershed	Weather, Water Quality, Land Use/Human Impact, Habitat Quality, Habitat Mapping, Butterfly Surveys, Plant, Lichen, Insect, and Fungi Inventories

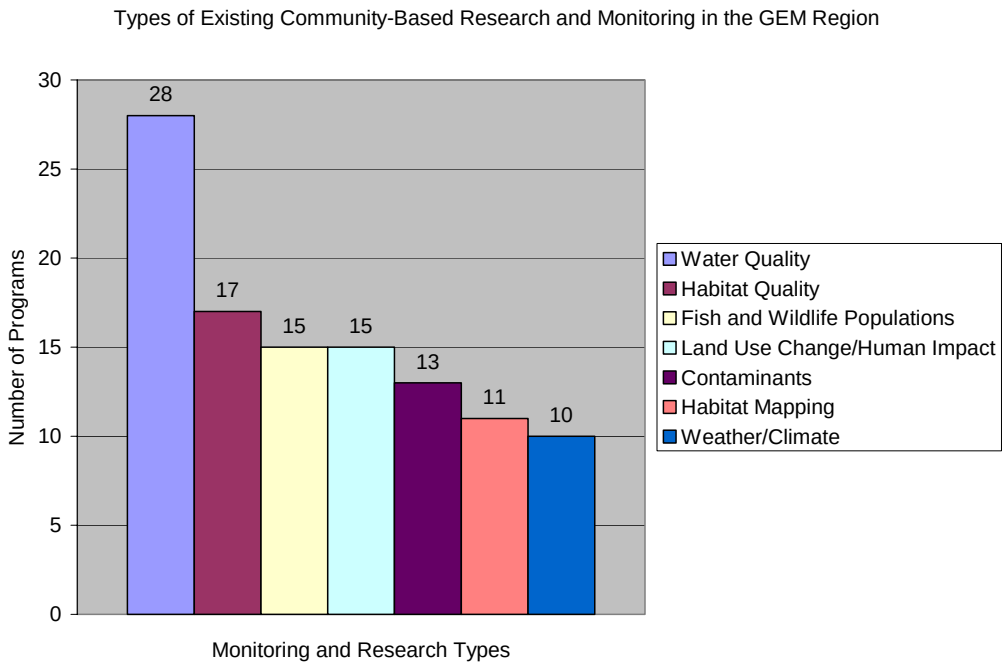
Organization	Region/Community	Habitat	Monitoring Type
Center for Alaskan Coastal Studies	Kachemak Bay	Watershed, Nearshore	Fish and Wildlife Population, Weather, Water Quality, Land Use/Human Impact
Chenega IRA Council	Prince William Sound	Watershed, Nearshore	Water Quality, Contaminants
Chugach School District	Cook Inlet, Prince William Sound	Nearshore	Weather, Water Quality
City of Homer (Through Cook Inlet Keeper, Kachemak Bay Research Reserve, and USGS)	City of Homer	Watershed, Nearshore, Alaska Coastal Current, Offshore	Fish and Wildlife Populations, Weather, Water Quality, Land Use Change/Human Impact, Contaminants, Habitat Quality, Habitat Mapping
City of Kodiak	City of Kodiak	Watershed, Nearshore	Water Quality, Wastewater Plant Monitoring
City of Soldotna (Through Kenai Watershed Forum)	City of Soldotna	Watershed	Water Quality
City of Whittier/ Port & Harbor Commission	Gulf of Alaska, Prince William Sound, Alaska	Nearshore	Fish and Wildlife Population, Weather, Water Quality, Land Use Change/Human Impact, Habitat Mapping, Habitat Quality, Impacts of E.V.O.S
Community Rivers Planning Coalition	Cook Inlet	Watershed	Water Quality, Land Use Change/Human Impact
Cook Inlet Keeper	Cook Inlet, Kachemak Bay	Watershed, Nearshore	Water Quality, Land Use Change/Human Impact, Habitat Quality
Copper River Watershed	No Response	Watershed	Water Quality, Land Use Change/Human Impact, Habitat Quality
Ecotrust	Alaska	Watershed, Nearshore, Alaska Coastal Current, Offshore	Fish and Wildlife Populations, Land Use Change/Human Impact, Habitat Quality, Habitat Mapping
Eyak Preservation Council	Gulf of Alaska, Prince William Sound	Watershed	Fish and Wildlife Populations, Water Quality, Land Use Change/Human Impact, Habitat Quality, Contaminants

Organization	Region/Community	Habitat	Monitoring Type
Kachemak Bay Conservation Society	Kachemak Bay	Watershed	Fish and Wildlife Populations, Land Use Change/Human Impact, Habitat Quality
Kenai Watershed Forum	Cook Inlet	Watershed	Water Quality, Contaminants, Habitat Quality, Stream Geomorphology
Kodiak Brown Bear Trust	Kodiak Archipelago	Watershed	Fish and Wildlife Populations, Land Use Change/Human Impact, Habitat Mapping, Habitat Quality
Native Village of Eyak	Gulf of Alaska, Prince William Sound	Watershed, Nearshore	Fish and Wildlife Populations, Water Quality, Land Use Change/Human Impact, Contaminants
Native Village of Tatitlek	Prince William Sound	No Response	Habitat Mapping
Oil Spill Recovery Institute	Alaska	Nearshore, Alaska Coastal Current	Fish and Wildlife Populations, Weather, Habitat Mapping,
Port Graham Traditional Council	Cook Inlet	Watershed	Weather, Water Quality, Land Use Change/Human Impact
Prince William Sound Science Center	Gulf of Alaska, Prince William Sound	Nearshore, Alaska Coastal Current, Offshore	Fish and Wildlife Populations, Habitat Quality, Physical Oceanography, Food Webs
PWSRCAC	Gulf of Alaska, Kachemak Bay, Kodiak Archipelago, Prince William Sound	Nearshore, Alaska Coastal Current	Water Quality, Contaminants
RuralCAP	Alaska	Watershed	Recycling
SALMON Project	Alaska	Nearshore, Alaska Coastal Current, Offshore	Weather, Ocean Water Quality, Ocean Currents and Optical Qualities
The Nature Conservancy	Alaska	Watershed	Fish and Wildlife Populations, Water Quality, Habitat Quality, Habitat Mapping

Organization	Region/Community	Habitat	Monitoring Type
U.S. Fish and Wildlife Service	Cook Inlet, Gulf of Alaska, Kachemak Bay, Kodiak Archipelago, Prince William Sound	Watershed	Fish and Wildlife Populations, Water Quality, Land Use Change/Human Impact
UAF-Environmental and Natural Resources Institute	Alaska	Watershed Nearshore	Water Quality, Habitat Quality, Stream Macroinvertebrates
UAF-GLOBE Partnership	Alaska	Watershed, Nearshore	Weather, Water Quality, Contaminants, Soils, Plant Phenology, Land Cover/Biology
USDA-Forest Service	Cook Inlet, Prince William Sound	Watershed	Habitat Quality
Valdez Native Tribe	Prince William Sound	Nearshore	Fish and Wildlife Populations, Water Quality, Contaminants, Habitat Quality, Habitat Mapping
Wasilla Soil and Water Conservation District	Wasilla, Big Lake, Willow	Watershed	Water Quality

Water Quality monitoring was the most frequent type of community-based monitoring or research program identified (28 of 35 programs, or 72%) The next most common type of monitoring was Habitat Quality (17 of 35 programs) (see Figure 4 for the other types of existing monitoring and research programs).

Figure 4. Monitoring and Research Types in the GEM Region that involve community members.



The organizations that responded that they have a community involvement program related to research and monitoring were asked a follow-up question (#14) about the which of the four GEM habitat types habitats they monitored. Watersheds were by far the most common habitat response (76% of responses), followed by the nearshore (50%).

Question #15 asked how organizations involved community members in their monitoring and research programs. Responses generally fell into 5 categories. The most common was data collection (40%), followed by education (20%). Interestingly, 12% said meetings and another 12% specified receiving input from community members, which occasionally included input like local and traditional knowledge. Only 8% of the organizations stated that they involved community through publications.

Conclusions

1. The online survey method supplemented with other methods to follow up on key and tribal respondents proved a cost-effective survey method for a diverse audience. The one feature of the survey method that proved to be a barrier for some people was the fact that they had to answer each question sequentially and could not read through the entire survey before completing it or look ahead for related questions.

2. The survey results demonstrate the substantial current and potential capacity in the region for community involvement in the GEM Program. A significant number of organizations expressed interest in participating in the GEM Program in a variety of ways. When presented with a spectrum of opportunities ranging from relatively passive involvement, such as being on the GEM Program mailing/email list for announcements, to active involvement, such as participating in community-based

research and monitoring, 89 survey respondents selected at least one, and many selected six ways they would like their organization to participate in GEM community involvement activities.

3. Fifty-five organizations stated an interest in participating in community-based research and monitoring. Thirty-five programs currently exist in the GEM region which could provide potential partnerships and relevant data-sharing. The higher number of organizations interested in participating in research and monitoring, coupled with responses from 12 organizations that "monitoring" was a need they believed should be addressed by GEM, demonstrates the large potential for these types of community-involvement programs as part of GEM.

4. The results of the survey provide a framework for development of an interested GEM network based on a foundation of existing programs and partnerships. In addition, the survey results provide the GEM Program with information on interests, needs and issues of concern during the process of creating and implementing a community involvement plan.

5. The survey identified habitat and "habitat" and "human impact" as broad common concerns of a number of respondents but did not serve to identify more specific common issues of concern throughout the region. More work is needed to identify the priority issues of individual communities, local and tribal governments, and organizations.

References

Shester, G. 2001. Report on information needs and collaboration opportunities between GEM and Alaska marine conservation organizations. Report to Exxon Valdez Oil Spill Trustee Council. November 28, 2001. 9 pp. Mimeo and WEB-published on EVOS Web site.

Addendum A: Key Respondents Mailing List

Key Respondents Mailing List				
Organization Name	**First Name**	**Last Name**	**Title**	**Survey Response**
AK Center for the Environment	Randy	Virgin	Executive Director	None
AK Community Action on Toxics	Pamela	Miller	Executive Director	None
AK Inst. For Sustainable Recreation and Tourism	Deb	Ajango	Executive Director	Yes
AK Marine Conservation Council	Dorothy	Childers	Executive Director	Yes
AK Oceans Network	Shelly	Johnson	Program Assistant	Yes
AK Rainforest Campaign	Brian	McNitt	Conservation Director	None
AK Sealife Center	Amy	Haddow	Education Director	Yes
AK Youth for Environmental Action	Polly	Carr	Coordinator	Yes
Alaskans Listening to Alaskans about Subsistence	Cynthia	Monroe	Director	None
Anchorage Waterways Council	Emily	Creely	Monitoring Program Director	Yes
Audubon Alaska	Stan	Senner	Executive Director	Yes
Bird Treatment and Learning Center				Yes
Campbell Creek Science Center (BML)	Luise	Woelfin	Environmental Education Coordinator	Yes
Campbell Creek Science Center (BML)	Mark	Denecke	Adult Education Specialist	Incomplete Survey
Center for Alaskan Coastal Studies	Marilyn	Sigman	Executive Director	Yes
Center for Biological Diversity	Corrie	Bosman	Alaska Program Coordinator	Yes
Center for Science in Public Participation	Amy	Crook	Alaska Program Coordinator	Yes
Coastal Coalition	Rick	Steiner	Director	Not Interested
Community Rivers Planning Coalition	Lindsay	Winkler	Watershed Coordinator	Yes
Conservation GIS Support Center	Mike	Beltz	Board President	Yes
Cook Inlet Keeper	Bob	Shavelson	Executive Director	Yes
Cook Inlet Regional Citizens Advisory Council	Susan	Saupe	Director of Science and Research	Yes
Copper River Watershed Project	Kristen	Smith	Executive Director	Yes
Eastern Kenai Peninsula Environmental Action Association	Doug	Lowthian	President	Yes
Eyak Preservation Council	Lauren	Padawer	Program and Development Director	Yes
Imaginarium	Chris	Cable	Executive Director	None
Kachemak Bay Conservation Society	Willy	Dunne	Board Member	Yes
Kachemak Bay Research Reserve	Glenn	Seaman	Reserve Manager	Yes
Kenai River Sportsfishing Association	Brett	Huber	Executive Director	Yes
Kenai Watershed Forum	Robert	Ruffner	Executive Director	Yes
Kenai Watershed Forum	Ole	Anderson	Project Coordinator	Yes
Kodiak Audubon Society	Stacy	Studebaker	President	Yes

Key Respondents Mailing List				
Organization Name	**First Name**	**Last Name**	**Title**	**Survey Response**
Mat-Su Resource Conservation and Development, Inc	Rhoda	Portis	Coordinator	None
National Wildlife Federation	Patrick	Lavin	PWS Project Manager	Yes
Ocean Alaska Science and Learning Center	Peter	Armato	Director	Yes
Ocean Conservancy	Kris	Balliet	Director	None
Oceana	Jim	Ayers	Director North Pacific Office	None
Oil Spill Recovery Institute	Nancy	Bird	Acting Director	Yes
Pratt Museum/Homer Society of Natural History	Gale	Parsons	Director of Education and Exhibits	Yes
Prince William Sound RCAC	John	Devens	Executive Director	Yes
Prince William Sound Science Center	Nancy	Bird	Acting President	Yes
PWS Fisheries Application and Planning	Elizabeth	Senear	Tech Staff	Yes
SALMON/CAOS	Phil	Marshal	Education/Outreach Coordinator	Yes
SOS Response Team	Karl	Pulliam	Coordinator	Yes
The Nature Conservancy	David	Banks	Alaska State Director	Yes
UAA AK Natural Heritage Program	Keith	Boggs	Director	Yes
UAA ENRI	Dan	Bogan	Bioassessment Project	Yes
UAF GLOBE Program	Elena	Sparrowe	AK Global Change Education Coordinator	Yes
UAF Marine Advisory	Paula	Cullenberg	Coastal Community Development Specialist	Yes
UAF Marine Advisory Program	Kate	Wynne	Marine Mammals-Kodiak	None
UAF Marine Advisory Program	Terry	Johnson	Marine Extension Agent	Yes
UAF-AK Cooperative Extension Service	Meg	Burgett	4-H Fisheries & Natural Resources Program Assistant	Yes
USDA Seward Ranger District	Karen	Kromrey	Forester-Stream Watch Program	Yes
Wasilla SWCD	Glenda	Smith	Watershed Project Coordinator	Yes
Youth Area Watch	Shoo	Salasky	Coordinator	Yes
Youth Area Watch	Vicki	Vanik	Coordinator	None

Addendum B: Tribal Respondents Mailing List

Tribal Mailing List				
Organization Name	**First Name**	**Last Name**	**Title**	**Survey Response**
Alaska Native Science Commission				None
Chenega IRA Council	Larry	Evanoff	President	Yes
Chickaloon Village	Jennifer	McGill	Environmental Specialist	Incomplete Survey
Chignik Lake Village Council				None
Native American Fish and Wildlife Society				None
Native Village of Chignik				None
Native Village of Chignik Lagoon				None
Native Village of Chignik Lake				None
Native Village of Eyak	Kate	Williams	Environmental Program Director	Yes
Native Village of Nanwalek				None
Native Village of Ouzinkie				None
Native Village of Seldovia				None
Native Village of Tatitlek	Gary	Kompkoff	President	Yes
Port Graham Traditional Council	Patrick	Norman	Chief	Yes
Qutekcak Native Tribe	Arne	Hatch	Vice President	Yes
RuralCAP	Ellen	Kazary	Environmental Program Director	Yes
Valdez Native Tribe	Charlie	Hughey	Natural Resources Manager	Yes

Addendum C: Agency Respondents Mailing List

Agency Mailing List

Organization Name	First Name	Last Name	Title	Survey Response
ADF&G-Alaska Water Watch	Jon	Lyman	Aquatic Education Coordinator	Yes
ADF&G-Cordova Area Office	Steve	Moffot	Area Research Biologist	None
ADF&G-Division of Wildlife Conservation	Gail	Blundell	Principal Investigator Harbor Seal Res. Program	None
ADF&G-Division of Wildlife Conservation	Michele	Sydeman	Assistant Director	None
ADF&G-Division of Wildlife Conservation	Lilly	Goodman	Wildlife Education Specialist	Yes
AK Dept of Natural Resources	Carol	Fries	Natural Resources Manager	None
ADEC-Rural Issues	Bill	Stokes	Rural Issues Specialist	Yes
ADEC-Division of Environmental Health	Kristin	Ryan	Acting Director	Yes
ADEC	Timothy	Stevens	Environmental Specialist	Yes
AK Maritime National Wildlife Refuge	Greg	Siekaniec	Refuge Manager	Yes
AK Soil And Water Conservation District	Omar	Stratman	President	None
Alaska Peninsula/Becharof National Wildlife Refuge	Susan	Savage	Refuge Manager	None
Bureau of Land Management	Tom	Allen	State Director	None
EPA	Phil	North	Watershed Coordinator	None
Homer Soil and Water Conservation District	Al	Poindexter	Education Coordinator	None
U.S. Fish and Wildlife Service	Gary	Sonnevil	Project Leader	Yes
Kenai Fjords National Park	Anne	Castellina	Director	Yes
Kenai National Wildlife Refuge	John	Morton	Supervisory Biologist	Yes
Kodiak National Wildlife Refuge	Tracy	Fischbach	Wildlife Biologist	Yes
National Marine Fisheries Service	Steve	Pennoyer	Director	None
National Park Service	Rob	Arnberger	Regional Director	None
National Parks Conservation Association	Joan	Frankevich	Acting Regional Director	Not Interested
NOAA Alaska Region	John	Whitney	Scientific Coordinator	None
SW AK Network-National Park Service	Alan	Bennett	Monitoring Coordinator	Yes
U.S. Fish and Wildlife Service	Micheal	Roy	Coastal Program Coordinator	Yes
US Geological Survey	Gordon	Nelson	Branch Chief	None
USDA Natural Resource Conservation Service	Mark	Weatherstone	Coordinator	None
USFS Cordova Ranger District	Becky	Norse	District Ranger	None
USFS Glacier Ranger District	Jim	Fincher	District Ranger	Yes

Addendum D: General Mailing List

General Mailing List				
Organization Name	**First Name**	**Last Name**	**Title**	**Survey Response**
AK Crab Coalition	Arni	Thomson	Executive Director	None
AK Draggers Association/Pelagic Resources Inc	Jay	Stinson	President	Yes
AK Health Project	Daniel	Middaugh	Executive Director	None
AK Longline Fishermen Ass'n	Linda	Behnke	Executive Director	None
AK Natural Resource & Outdoor Education Ass	Eric	Wade	Executive Director	None
AK Pacific University	Gregory	Brown	Environmental Science Dept. Chair	None
AK Public Interest Research Group	Steve	Cleary	Development Director	None
AK Shellfish Growers Ass	Rodger	Painter	Vice President	Yes
AK Trollers Association	Dale	Kelley	Executive Director	None
AK Waveriders	Mike	Macy		None
Alaska Wilderness League	Cindy	Shogan	Executive Director	None
Alaskan Oceans Seas and Fisheries Research Fnd	Dan	Ogg	Executive Director	Yes
American Fisheries Society-Alaska Chapter	Carol	Woody	President	None
Chignik Regional Aquaculture Association	Charles	McCallum	Executive Director	Yes
Chignik Seiner's Association	Chuck	McCallum	Executive Director	None
City of Cordova	Ed	Zeine	Acting City Manager	None
City of Homer	Ron	Drathman	City Manager	Yes
City of Kenai	Linda	Snow	City Manager	None
City of Kodiak	Linda	Reed	City Manager	Yes
City of Seldovia	Innica	Buchman	City Clerk	Incomplete Survey
City of Seward	W.C.	Casey	P/W Director	Yes
City of Soldotna	Thomas	Boedeker	City Manager	Yes
City of Valdez	David	Dengel	City Manager	Yes
City of Wasilla			City Manager	None
City of Whittier/Port & Harbor Commission	Dean	Rand	Representative	Yes
Concerned Area "M" Fishermen	Steve	Brown	President	Not Interested
Cook Inlet Aquaculture Ass	Gary	Fandrei	Executive Director	Yes
Cooperative Extension Service Anchorage Office	Dan	Lung	Watershed Coordinator	None
Cordova District Fisherman United	Sue	Aspelund	Executive Director	None
Defenders of Wildlife	Karen	Deatherage	Alaska Program Associate	Yes
Ducks Unlimited	James	Hagee	District Chairman	None
Ducks Unlimited	Rosemary	Craig	District Chairman	None
Ducks Unlimited	Ron	Goecke	District Chairman	None
Ducks Unlimited	John	Nealon	District Chairman	None
Ecotrust	David	Pray	GIS Analyst	Yes

General Mailing List				
Organization Name	**First Name**	**Last Name**	**Title**	**Survey Response**
Fisheries Conservation Action Group	Linda	Kozak	Chair	None
Friends of McNeil River	Mike	Adams		None
Kenai Peninsula Fishermen Ass'n	Paul	Shadura	Vice President	None
Kenai River Center	John	Mohorcich	Coordinator	None
Kenai River King Salmon Fund	Paul	Dale	President	None
Kodiak Brown Bear Trust	Dave	Cline	Chairman	Yes
Kodiak Island Borough	Pat	Carlson	Manager	Yes
Kodiak Seiners Association	Kelley	Schactler	Administrative Mgr.	None
Marine Exchange of Alaska	Paul	Webb	Operations Manager	Yes
Mat-Su School District	Terry	Slaven	Teacher	Yes
Municipality of Anchorage	Greg	Moyer	Municipal Clerk	None
North Gulf Oceanic Society	Craig	Matkin	Director	Yes
North Pacific Fishery Management Council	Clarence	Pautzke	Executive Director	None
Pew Oceans Commission	Christophe	Tulou	Executive Director	None
Prince William Sound Aquaculture Corporation	Dave	Reggiani	General Manager	None
Prince William Sound Audubon Society	Milo	Burcham		None
Sierra Club-Alaska Chapter	Pamela	Brodie	Vice Chair	Yes
Society for Conservation GIS	Mike	Beltz	Board President	Yes
The Alaska Oceanographic Society	Micheal	Brittain		None
The Wilderness Society	Eleanor	Huffines	Alaska Regional Director	None
Trout Unlimited	Jan	Konigsberg	Alaska Director	Yes
UAF Fishery Industrial Technology Center	Scott	Smiley	Director	Yes
UAF Geophysical Institute	Syun-Ichi	Akasofu	Director	None
UAF Water and Environmental Research Center	Douglas	Kane	Director	None
United Cook Inlet Driftnetters Ass'n	Roland	Maw	Executive Directors	Yes
United Salmon Association	Marcia	Lynn	Administrative	Yes
Valdez Fisheries Development Association	Jason	Wells	Project Manager	None
Western Gulf of Alaska Fishermen	Joe	Childers	Director	Yes
Kodiak Regional Aquaculture Ass	Oliver	Holm	UFA Representative	None

Addendum E: Survey Questions and Responses

Gulf of Alaska Ecosystem Monitoring and Research (GEM)
Community Involvement Survey

1. Tell us about you

	Response	Response Percent	Total
Your Name/Position	**100%**	**92**	
Organization	**100%**	**92**	
Title	**100%**	**92**	
	Total Respondents	**92**	
	(skipped this question)	0	

2. Does your organization's interest encompass all communities in a geographic area or specific community/communities?

	Response	Response Percent	Total
Geographic Area	**75%**	**69**	
Community or communities	25%	23	
	Total Respondents	**92**	
	(skipped this question)	0	

3. Which geographic area do you target?

	Response Percent	Response Total
Alaska	**52.9%**	**36**
Cook Inlet	33.8%	23
Gulf of Alaska	35.3%	24
Kachemak Bay	19.1%	13
Kodiak Archipelago	19.1%	13
Prince William Sound	30.9%	21
	Total Respondents	**68**
	(skipped this question)	24

4. Which community or communities does your organization target?

Total Respondents	**21**
(skipped this question)	71

GEM Community Involvement

5. Please indicate your interest in participating in the following GEM community involvement activities. *Please check all that apply.*

		Response Percent	Response Total
	Setting GEM program priorities	49.4%	44
	Identifying and incorporating specific community issues and concerns	49.4%	44
	Providing input to GEM advisory committees	60.7%	54
	Participating in annual meetings to hear about GEM program results	58.4%	52
	Organizing community forums to review GEM information or results	23.6%	21
	Participating in community forums about the GEM program	43.8%	39
	Receiving and disseminating GEM synthesized information	57.3%	51
	Providing educational programs based on GEM data and information	39.3%	35
	Being on the GEM program email/mailing list for announcements	**82%**	**73**
	Participating in community-based research or monitoring activities	61.8%	55
	Other (please specify):	23.6%	21
		Total Respondents	**89**
		(skipped this question)	3

6. If your organization has indicated an interest in participating with GEM in community-based research or monitoring, how would your organization like to be involved? *Please check all that apply.*

		Response Percent	Response Total
	Generate specific community-based project proposals	56.9%	29
	Collecting data (including local knowledge and observations)	68.6%	35
	Training and support of citizens (including K-12 students) in the collection of data and local knowledge	76.5%	39
	Managing a data/local information archive	29.4%	15

	Having access to data generated by GEM scientists and community-based research and monitoring	**88.2%**	**45**
	Interpreting and synthesizing data (including local knowledge and observations)	49%	25
	Providing your organizations findings to state/local governments	72.5%	37
	Presenting findings at local meetings	68.6%	35
	Providing and managing facilities and/or equipment in support of citizen research and monitoring	37.3%	19
	Providing financial support for citizen monitoring and research projects	17.6%	9
	Maintaining a mailing list to disseminate findings	31.4%	16
	Other (please specify):	9.8%	5

Total Respondents **51**
(skipped this question) 41

Issues of Concern for Community-Based Monitoring

7. What are the top three priority needs and/or issues of your organization, in regards to environmental monitoring or research, which you think should be addressed by the GEM program?

Percent	**Total**	**Response**	**Response**
1.		**100%**	**68**
2.		92.6%	63
3.		73.5%	50
	Total Respondents		**68**
	(skipped this question)		24

8. How did you determine these needs and issues?

Total Respondents **64**
(skipped this question) 28

Your Community Involvement Program

9. Are you completely a volunteer organization or do you have paid staff? *Please circle one.*

	Response Percent	**Response Total**
Volunteer	7.3%	6
Paid	32.9%	27
Combination	**59.8%**	**49**
Total Respondents		**82**

(skipped this question) 10

10. How many active citizen volunteers, do you have?

	Response Percent	Response Total
1-25	**71.2%**	**37**
26-50	17.3%	9
51-100	3.8%	2
101+	7.7%	4
Total Respondents		**52**
(skipped this question)		40

11. Are school classes (K-12) and youth engaged in your community involvement program?

	Response Percent	Response Total
Yes	**66.7%**	**50**
No	33.3%	25
Total Respondents		**75**
(skipped this question)		17

12. What are the other organizations that you partner with for your community involvement program?

Total Respondents *63*

(skipped this question) 29

Community-Based Research and Monitoring Program

13. Do you have an existing community-based research or monitoring program?

	Response Percent	Response Total
Yes	48.7%	38
No	**51.3%**	**40**
Total Respondents		**78**
(skipped this question)		14

14. What do your current research or monitoring programs measure?
Please check all that apply.

		Response Percent	Response Total
	Fish and Wildlife Populations	38.5%	15
	Weather	25.6%	10
	Water Quality	**71.8%**	**28**
	Land Use Change/Human Impact	38.5%	15
	Contaminants	33.3%	13
	Habitat Quality	43.6%	17
	Habitat Mapping	28.2%	11

	Other (please specify)	30.8%	12

Total Respondents **39**

(skipped this question) 53

15. Of the four habitats that GEM addresses, in which of the habitats do you conduct research or monitoring? *Please check all that apply.*

		Response Percent	**Response Total**
	Watersheds	**76.3%**	**29**
	Nearshore	50%	19
	Alaska Coastal Currents	18.4%	7
	Offshore	15.8%	6

Total Respondents 38

(skipped this question) 54

16. How do you involve the citizens in your research or monitoring?

Total Respondents 34

(skipped this question) 58

17. When you designed your community-based monitoring program did you use an existing model? If so, which one?

Total Respondents 26

(skipped this question) 66

Addendum F: Email Message Sent to Respondents

Hello ,

My name is Bree Murphy from the Center for Alaskan Coastal Studies. I am contacting you on behalf of the Gulf of Alaska Ecosystem Monitoring (GEM) Community Involvement Program.

GEM is a unique, long-term monitoring program supported by an endowment of *Exxon Valdez* Oil Spill (EVOS) settlement funds. Planning is underway to develop a program that will incorporate public involvement, interagency cooperation and collaboration, and accessible, informative data and information on the Gulf of Alaska ecosystem.

We are conducting a survey to evaluate: 1) the interest in specific types of community involvement and 2) the current and potential regional capacity for participation in community-based research and monitoring.

At the suggestion of Marilyn Sigman, Executive Director with the Center for Alaskan Coastal Studies, your organization has been listed as a potential partner in this program, because your community is within the GEM area or because your regional, statewide, or national scope encompasses the GEM area.

Please take a few minutes to complete the linked survey, before January 17th 2003, so that we can assess your organization's interest in participating in the GEM community involvement program, http://www.surveymonkey.com/s.asp?u=99938152148. If you would like to learn more about GEM, please browse the website at http://www.oilspill.state.ak.us/gem/.

If you cannot or wish not to participate in our online survey, I can send you the survey as a hard copy in the mail, or FAX it to you. If you would like the survey in an alternative form, please reply by indicating which version you would like and sending pertinent mailing information. Feel free to contact me for any questions about the GEM community involvement program or our survey.

Thank you for your participation.

Bree Murphy

Appendix 3.

Case Histories

Community Involvement Projects and Programs within the GEM Area

Tribal Natural Resource Stewardship and Meaningful Tribal Involvement in GEM

From 1995-2001, the EVOS Trustee Council provided funds to the Chugach Regional Resources Commission (CRRC) to hire a facilitator in each of ten spill area communities as well as a region-wide community involvement coordinator. Facilitators were employees of tribal governments in Chenega Bay, Tatitlek, Valdez, Cordova, Port Graham, Nanwalek, Seldovia, Ouzinkie, Seward, and Chignik Lake. The facilitators provided the results of oil spill restoration projects to the communities; facilitated communications between local communities and the Trustee Council; promoted community-based projects and involvement throughout the life of the restoration effort; served as a primary contact for EVOS in the community; and provided tribal input into the development of GEM. In 2002, the project shifted its focus to the integration of Tribal Natural Resource Management Programs within GEM. CRRC worked with five communities (Tatitlek, Eyak, Port Graham, Nanwalek, and Chenega Bay) to complete Tribal Natural Resource Management Plans. These plans were designed to help in identifying priority regional and community-specific research and monitoring activities, especially those related to GEM. The Tatitlek Natural Resource Management Plan was finalized and other community plans were in draft stages in 2003.

Community Wisdomkeeper meetings

The *Community Wisdomkeeper Series* is an EVOS-funded project implemented by the Chugach Regional Resources Commission (CRRC). The series is a tool designed by CRRC to facilitate the combination of Western science and traditional knowledge in the development of community-based monitoring projects. The objective is a two-way communication project; to keep communities informed about GEM activities and to inform GEM scientists and managers of local needs and traditional knowledge.

The first workshop, held in Tatitlek in November, 2002, provided a cross-cultural dialogue among resource users, community residents, managers, and scientists on the topic “what constitutes a healthy marine environment?” Teachers and school children played a key role in the community in preparing for the meeting (described under the Education section).

A second workshop will take place in Port Graham in September, 2003. The theme will be on "Traditional Management, Current Management and Environmental Change" with a species focus on: Dungeness crab, katy chiton/bidarki, cockles, and halibut.

Prince William Sound Fisheries Research Applications and Planning Group

The EVOS-funded *Prince William Sound Fisheries Research Applications and Planning group (PWSFRAP)* began in 2002 with a primary focus on determining how information gathered by GEM can be made and kept relevant to fisheries management and shore-based communities. They have identified the need for an adaptive management feed-back process whereby the planning group of resource users and managers work together to apply the information in specific fisheries management decisions, review the results of the application, and identify additional information needs if necessary.

Citizen Environmental Monitoring Program for the Cook Inlet Watershed

The *Citizen Environmental Monitoring Program (CEMP) Partnership for the Cook Inlet Watershed* encompasses water quality monitoring by eight partner organizations [Cook Inlet Keeper (CIK), Homer Soil and Water Conservation District, Anchorage Waterways Council, Kenai Watershed Forum, Upper Susitna Soil and Water Conservation District, Wasilla Soil and Water Conservation District, Mat-Su Borough Planning Department, University of Alaska Anchorage Environment and Natural Resource Institute (ENRI)]. CIK has taken the lead in developing a database, standardized physical and chemical data collection and Quality Assurance/Quality Control protocols that have been approved by EPA, and data entry procedures. ENRI has taken the lead in development of standardized biological monitoring protocols based on macroinvertebrate sampling

An annual partner meeting is held in conjunction with the Alaska Forum for the Environment to coordinate efforts and share information and lessons learned. CIKand ENRI also provides periodic trainings in data collection protocols, data quality control/quality assurance procedures, and database procedures.

One of the major sources of funding to community-based groups and local governments for monitoring efforts is the Alaska Clean Water Action grant program administered by the Alaska Department of Environmental Conservation. The purpose of the grants are “to clean up polluted waters or to protect waters that are at risk from pollution or loss of fish habitat” and a 40% match is required. In 2002, 30% of the nearly $1 million awarded went to monitoring projects in the Cook Inlet Watershed In 2003, the bulk of funding was awarded for monitoring related to restoration projects outside the Cook Inlet Watershed.

Kachemak Bay CoastWalk

The Center for Alaskan Coastal Studies (CACS), a community-based organization in Homer, has organized an annual volunteer survey of the Kachemak Bay shoreline for 19 years. Volunteers walk, boat, or use ATVs to collect information about birds, mammals, marine invertebrates, and human uses of specific shoreline segments. The survey is also coordinated with a beach clean-up and quantitative descriptions of types of marine debris and litter using data forms developed by the Ocean Conservancy. CACS has compiled the data in an Access database and is working to develop a user-friendly database for access and more intensive data collection protocols.

Youth Area Watch

The *Youth Area Watch* program has been sponsored and supported by EVOS since 1995 through the Chugach School District (CSD) and Kodiak Island Borough School District. The program has supported school district coordinators who facilitate partnerships between students and scientists conducting EVOS research and restoration projects and integrate YAW activities and extended learning into the school curriculum. YAW has provides opportunities for students to observe or assist with field data collection and supported student restoration and community education projects. As of 2002, 168 students had participated in the Prince William Sound and Kodiak programs, participating in projects as harbor seal biosampling, seabird monitoring, collection of oceanographic data on cruises, and analyzing chemicals found in intertidal mussels. During the 2002/2003 school year, partnership financial support was provided to the CSD through the UAF SALMON Project, including teacher training in physical oceanography concepts and current Gulf of Alaska oceanography research techniques and findings. CSD supported YAW school programs in Whittier, Chenega Bay, and Tatitlek and also in the Kenai Peninsula School District (Nanwalek, Port Graham) and Cordova and Valdez School Districts.

Science of the Sound

Science of the Sound is a science and environmental education program developed and implemented since 1992 by the Prince William Sound Science Center and the Cordova Ranger District of the U.S. Forest Service. Its goals are to provoke inquiry into the natural world, to increase science and ecological literacy, and to foster responsibility for the sound use of our natural resources. This program uses hands-on learning and outdoor education to inspire personal connections to the natural world and responsible decision making to sustain it.

Premised on the need to partner and effectively use all resources available in small, remote communities, *Science of the Sound* involves educators and scientists from the Prince William Sound Science Center, the United States Forest Service/Cordova Ranger District, the Cordova and Chugach School Districts, the Alaska Department of Fish and Game and the Prince William Sound Community College. In addition to the four core programs, examples of community involvement projects accomplished under the auspices of *Science of the Sound* include an Alaska Water Watch program on Eyak Lake in the mid-1990s and participation in a shoreline debris monitoring program since 2000.

Four core programs make up *Science of the Sound:*
The *Discovery Room* is a monthly science and environmental education program for elementary students in Cordova. *Outreach Discovery* takes a modified version of the Discovery Room program to the more isolated villages of Chenega Bay and Tatitlek in Prince William Sound. The latter two programs operate during the school year. *From the Forest to the Sea* summer camp offers field-based residential ecology programs for 7-16 year olds. *Community Education Programs* consist of field trips, lectures, and citizen science projects for adults and families in the region. These activities are generally scheduled during the school year.

GEM-area coastal and marine education facilities

The GEM geographic area has a number of coastal science education facilities and environmental educator networks that could provide the basis of a network for dissemination of GEM information and hubs for community-based monitoring:

Education Facilities:

Anchorage: Imaginarium Science Center, BLM Campbell Creek Science Center, University of Alaska Anchorage, Alaska Pacific University, Portage Glacier Visitor Center, Potter Marsh/Coastal Refuge

Kenai: Kenai River Center, Volcano Learning Center (in planning)

Soldotna: Challenger Space Learning Center (remote sensing)

Homer: Pratt Museum, Center for Alaskan Coastal Studies Wynn Nature Center and Peterson Bay Field Station, Kachemak Bay Research Reserve/Alaska Maritime National Wildlife Refuge Islands and Ocean Visitor Center

Cordova: Prince William Sound Science Center

Seward: Alaska SeaLife Center, National Park Service Ocean Alaska Science and Learning Center (in planning), UAF Marine Lab

Kodiak: NOAA/NMFS/AFSC/NMML Building, Kodiak National Wildlife Refuge Visitor Center, Alaska State Parks offices

Traveling Programs: Alaska Marine Highway System: U.S. Forest Service and U.S. Fish and Wildlife Service interpretation programs, Kenai Fjords National Park Service interpretation programs onboard Resurrection Bay tour ships, Center for Alaskan Coastal Studies Traveling Alaska Coastal Ecology Program

Educator Networks

Alaska Natural Resources and Outdoor Education Association

Southcentral Environmental Education Alliance

Kachemak Bay Environmental Education Alliance

Northwest Association of Marine Educators

Model Community Involvement Programs outside GEM Area or of Broader Scope

Arctic Borderlands Ecological Knowledge Cooperative

The *Arctic Borderlands Ecological Knowledge Co-op* convenes community members, scientists, and natural resource managers. The group has identified three key regional issues in northwestern Canada and northeastern Alaska and 75 indicators of environmental change that are monitored collaboratively. Projects are identified and reviewed at the annual gatherings. The Old Crow Plant Monitoring Project was the Co-op's first long-term monitoring project. A loche (burbot) liver project is underway to follow up on concerns about the quality of loche. Other projects will proceed when partnerships and funding have been established.

Intertidal/Nearshore Inventory and Monitoring

People for Puget Sound/Rapid Shoreline Inventory ShoreZone Mapping

People for Puget Sound is a staffed community-based group in Seattle, Washington. The organization designed and implemented a *Rapid Shoreline Inventory Protocol* to collect accurate, comprehensive data on contiguous sections of Puget Sound shoreline and to present the results in a timely fashion. The design process ensured that the scale of data collection and "on the ground" nature of observations would complement rather than duplicates existing data sets at a larger scale, that the data sets would be ones for which volunteers have proven to be successful in absorbing the requisite data and in implementing the collection of accurate data, and that the data would have direct applicability for making resource management decisions. The organization presents a variety of possible scenarios for data collection to resource managers from data collected solely by staff to data collected by newly trained volunteers, but in all scenarios, the staff assumes responsibility for training (if necessary), quality control, and data processing/ analysis/reporting. Shoreline areas are inventoried only once; the program is not designed to monitor change over time.

The inventory nests within the *Shorezone* mapping and classification system that has been completed for the Washington coastline. Shorezone mapping entails standardized biophysical mapping and classifications. It has been completed for the entire shoreline of Washington and British Columbia and for the lower Cook Inlet and outer Kenai Peninsula portion of the GEM area. Kachemak Bay has already been mapped at a finer scale by the Kachemak Bay Research Reserve in a manner that will nest within the Shorezone mapping and provide a basis for selecting representative monitoring sites to detect changes in nearshore biological communities.

People for Puget Sound maintain a GIS system and generates maps of eelgrass coverage, algae coverage, invasive species presence/absence, shoreline structure presence/absence, outfall presence/absence, and potential surf smelt and /or sand lance spawning areas. The maps are presented on a web site (www.pugetsound.org) and datasets are available on CD-ROM. Summary reports of findings and recommendations

are also provided to resource managers.

Beach Watchers

The Beach Watchers program combines watershed and intertidal monitoring Standardized protocols s have been developed for both types of monitoring. The program is supported by partners Washington State University (WSU) and Island County, Washington. A volunteer training program is administered and by Island County's WSU Cooperative Extension Education Center. Volunteers attend over 100 hours of classroom and field training in water quality-related subjects. Standardized protocols for beach monitoring include those for site selection, developing a physical beach profile along a permanent profile line, conducting quadrat surveys of species density at three tidal levels along permanent transects, and compiling a list of species observed. A core of "expert" volunteers accompany less experienced teams to assist with species identification. Watershed monitoring protocols include those for site selection, and collection of physical data (channel width and depth and flow rate); volunteers interested in water quality monitoring are provided with references such as the protocols developed for Project GREEN (Global Rivers Environmental Education Network) and the Adopt-a-Stream Foundation. and encouraged to develop their own volunteer monitoring programs

Twenty-six beaches were monitored in 2001. The Program compiles the intertidal data annually and sends a statewide summary to all participants. Based on the data, beaches are classified using a marine and habitat estuarine habitat classification system for Washington State. The database is digitized and local volunteer groups can obtain copies of their historical data. A web site provides updates, downloadable protocols, results, and a photo i.d. guide to commonly-observed marine invertebrates.

In addition to volunteer freshwater and beach monitoring and bioassessment, activities by Beach Watcher volunteers include interpretive programs in state parks, on state ferries, and at a lighthouse interpretive center; community presentations and seminars, developing and distributing educational materials and publications, environmental exhibits, displays, and events.

Shorekeepers

Shorekeepers is supported by Fisheries and Oceans Canada with the objective of involving citizens in the detection of gradual changes to habitats and local biodiversity through the collection of detailed data annually at the same intertidal site(s) for 3 or more years. The *Shorekeepers' Guide* presents a rigorous and standardized intertidal surveying methodology starting from selecting a study area through each type of measurement to entering the field data into the database, and finally, reporting results. The Guide also includes a training curriculum for instructors train volunteer monitors. Training consists of a courses in identification of local species, intertidal ecology, and habitat mapping.. The Guide can be downloaded from the WEB site (http://www.keepersweb.org) . Pictures of habitat types and common marine invertebrates are available on the web site and a page with photographs of common sea weeds is under construction.

Other Efforts

A number of volunteer monitoring efforts are organized to survey beached bird surveys, such as the *Coastal Observation and Seabird Survey Team* or *COASST* in the Seattle area, *Beach COMBERS* in Monterey Bay National Marine Sanctuary, and the *Beach Watch* program in the San Francisco Bay Area. The survey data provide information on the causes of mortality in marine birds and baseline data for determination of oil spill impacts. Beach COMBERS and other programs also count and identify dead marine mammals. These counts have provided “red flag” information about changes in the marine environment that were determined to result in high mortality in murres from the impacts of fishing methods and in sea lions from toxic blooms.

Volunteer efforts have also been organized for divers to survey reef fish communities (*REEF* and *Sea Stewards* in the Florida Keys) and octopus and octopus dens (Seattle Aquarium’s annual *Puget Sound Giant Octopus Survey*). Reefkeepers is a component of *Shorekeepers and Reefkeepers*, a program of Fisheries and Oceans Canada, in collaboration with the Royal British Columbia Museum and PADI Project AWARE. They have developed the "Reefkeepers' Guide For Monitoring Subtidal Habitats of Canada's Pacific Waters" a protocol for non-professionals, certified and experienced in scuba diving, to survey and monitor subtidal habitats. The objective is the collection of detailed data at regular frequent intervals at the same site for 5 or more years. The Reefkeepers’database is programmed as a Microsoft Access application for use by volunteers to enter and archive and to generate customized reports.

The Project DockWatch web site provides protocols for observing and identifying jellyfish from docks and contributing to a database that can provide real-time advisories about concentrations of sea nettles or other jellyfish harmful to swimmers on East Coast beaches.

Water Quality Monitoring/Boassessment

Alaska Region, Native American Fish and Wildlife Society Water Quality Aquatic Environment

The organization hosts summer monitoring workshops that emphasize rapid bioassessment, fisheries habitat assessment, and water quality testing for 10 parameters drawing on instructors from MAP and ENRI. A cooperative agreement between NAFWS and EPA provides Tribes with equipment and training to conduct water monitoring in an environmental planning context, to interpret water quality testing results, and to help Tribes analyze past research. Intermediate training will provide further technical training and assistance to Tribes to set up their own monitoring programs. Funding is provided by EPA.

Bird Counts and Surveys

Audubon Christmas Bird Count

The Audubon Christmas Bird Count has been operating for more than 100 years. The National Audubon Society (NAS) sets the data collection protocols in the form of the annual count period and the size of the count area. Volunteers organize locally to select the location of the count area and select a day within the count period to perform an intensive 24-hour bird count and to collect additional bird observations during the count period. Local volunteers compile the data from each count area and provide to NAS who publish the count results and maintain the historical database which is available online and easily queried.

The amount of effort each year in any one count area can be highly variable in terms of the number of observers, area covered, and means of transportation, which in Alaska can include boats, skis, and snowshoes in addition to walking or driving. The data have been used, however, to provide evidence in long-term population trends such as the declines in populations of neotropical migrants and Marbled Murrelets offshore of Washington, Oregon, and northern California.

British Columbia Waterbird Survey

The British Columbia Coastal Waterbird Survey is a program supported by a Canadian non-profit organization, Bird Studies Canada. Standardized protocols have been developed for a network of volunteers, regional organizers, naturalist groups, government agencies, and non-government organizations to monitor coastal waterbirds. The survey objectives for B.C. waterbird populations are to: 1) assess annual changes and long-term trends in population size and distribution, 2) collect data that contribute to population estimates ,and 3) advance the understanding of ecology and effects of human activity. Observers survey coastal sites once a month with an emphasis from September to April. All species of coastal waterbirds are counted including loons, grebes, cormorants, herons, swans, geese, ducks, shorebirds, gulls, terns, auks as well as raptors that use coastal areas. The organization provides information about the skills and equipment required for surveys, but does not provide training or a means to validate observer skills in bird identification. Criteria for suitable survey sites, timing of the surveys relative to tides, and definitions of habitats (inland, nearshore, off-shore) are also provided. All program information is available online, including survey results.

Cornell Lab of Ornithology Citizen Science Programs

Cornell Lab of Ornithology supports a number of citizen-science projects: Project FeederWatch, Cornell Nest Box Network, Project Pigeon Watch, House Finch Disease Survey, and Birds in Forested Landscapes. The projects involve volunteer birders, students, and professional biologists in data collection using protocols developed by Cornell ornithologists. The Lab compiles and analyzes the data and shares its findings with the volunteer observers and the scientific community. Participants receive instructions, reference materials, data forms, and with some projects, tapes or CDs of bird calls. The results are disseminated in the form of a newsletter which all citizen scientists

receive free of charge for one year. Some programs have an annual fee for participation; others are grant-funded and free to participants.

School-based and Youth Monitoring Programs

GLOBE

UAF/NSF GLOBE/Native Ways of Knowing Project

The Global Learning and Observations to Benefit the Earth (GLOBE) program is an international network of scientists and K-12 teachers and their students that collaborate to collect real environmental data relevant to studying global environmental change. Observations of atmosphere/weather, phenology, hydrology/water quality, vegetation, and soils are collected from sites all over the world. Each protocol and associated teaching activities are developed by a scientist and educator as co-Principal Investigators. Both protocol and associated teaching activity development and program support are funded by the National Science Foundation and NASA. Training and individual site support is provided by partner organizations such as the University of Alaska Fairbanks Global Change Program in Alaska and the Kachemak Bay Research Reserve and Center for Alaskan Coastal Studies in Kachemak Bay. KBRR and CACS are partners in training and support for the GLOBE program in Kachemak Bay, including coastal intertidal monitoring protocols that are were piloted in Kachemak Bay in fall, 2002.

The UAF GLOBE Program received a multi-year National Science Foundation grant to develop a "Native Ways of Knowing" program to combine and integrate traditional methods of observing natural phenomena with the Western science approach of the GLOBE protocols. An intensive three-week summer training program for teachers and community educator teams is the centerpiece of the program. Instruction is provided by scientists, university educators, and elders. Teachers are trained in inquiry-based science teaching strategies, GLOBE data collection protocols, and strategies to integrate traditional knowledge with Western science to investigate topics of interest to their communities. They also receive on-going support in implementation of the program.

UAF Cooperative Extension 4-H, Fisheries, and Youth Development Program

The program was developed in response to serious salmon population declines in the Yukon River drainage but has subsequently expanded to involve 1600 youth in more than 60 communities throughout Alaska. The program focuses on fisheries biology and management with the following elements:

- classroom instruction in the science of fisheries biology, management and aquaculture technology through the use of in-classroom salmon-egg incubators
- Computer technology to network students throughout the state over the World Wide Web
- The involvement of Native elders providing traditional knowledge about salmon fishing to students and 4-H club members

- After-school 4-H club projects with hands-on experiential learning in fisheries management and salmon restoration projects
- Annual regional trainings for teachers and community members as 4-H Club leaders
- On-going support and teaching resources from UAF Cooperative Extension
- Paid summer job and internship opportunities with natural resource management agencies and university scientists

A program-wide Extension 4-H Fisheries and Natural Resource Specialist provides direction and program planning, instructs the annual teacher in-service and 4-H leader training, produces a quarterly newsletter featuring educational opportunities, new curricula and environmental science events and activities; and serves as a liaison between village programs and organizations contributing to the program.

The program is currently funded by the USDA with numerous cooperators including Native organizations, university departments, state agencies, the U.S. fish and Wildlife Service, and school districts. The Chugach, Cordova, and Kenai Peninsula School Districts are cooperators within the GEM area.

U.S. Fish and Wildlife Service Summer Camps:

Pribilof Islands Stewardship Camps, Spirit of Becharof Lake Camp, , Bristol Bay salmon camp, Nushagak Peninsula Caribou & Yup'ik Culture Camp, Cape Peirce Marine Mammal & Yup'ik Culture Camp, Yukon Flats NWR Earthquest Program, Tetlin Refuge)

The U.S. Fish and Wildlife Service science/natural resource career summer camps throughout Alaska generally targeted at ages 14-18. Camp sessions last from 4-10 days and provide opportunities for kids to have hands-on research experiences with agency biologists and learn about management issues and activities. The camps have a focus on the integration of science content and practical experience with traditional ecological knowledge in areas where communities in or National Wildlife Refuges are predominantly Native. Participation in the programs is competitive with expenses usually paid by contributions and in-kind services from Native corporations, state and federal agencies, school districts, and non-governmental organizations.

Information and Outreach

Alaska Sea Grant /Marine Extension Program

Alaska Sea Grant is a NOAA-funded program of the School of Fisheries and Ocean Sciences at UAF and part of a national network of Sea Grant programs in all the coastal and Great Lakes states.

Alaska Sea Grant:

1) funds marine research to scientific researchers and students,
2) provides advisory services to fishermen, boat operators, tour guides, the seafood industry, and all other users of Alaska's water; and
3) distributes and produces information about Alaska's seas and coasts for the general public, K-12 educators, fishermen, and others.

Sea Grant employs scientists, marine advisory agents, and resource specialists.

The *Sea Grant Marine Extension Program* provides "technical assistance and information to individuals and businesses that enjoy and depend on Alaska's seas and coasts." The program has statewide specialists in seafood quality, technology, and marketing; marine mammals, aquaculture, conservation, coastal community development, and instructional media. Projects are on-going in all of these areas as well as in the areas of education and marine recreation.

Within the GEM area, MAP agents are stationed in Homer (seasonally) and Kodiak; a position in Cordova is currently vacant awaiting sufficient funding. Kodiak agent KateWynn's project "Sightings and Samples: a Community-based Research Effort" will involve a community of resource users in the collection of sightings data and samples needed to assess the distribution and diet of Steller sea lion predators and competitors in the Gulf of Alaska. Wynne will promote and facilitate reporting of whale sightings by pilots and mariners and collection of biological samples from commercial fishers fill data gaps and refine the "best available data" on Steller sea lion ecology.

SeaWeb

SeaWeb provides a monthly Ocean Update Newsletter summarizing recent news, views and events concerning marine and coastal environments and wildlife to an electronic susbscriber network. SeaWeb supports a team of scientists, the SeaWeb Spokesteam, to meet with journalists around the country to discuss a variety of problems facing the ocean. Current spokesteam members include Dr. Sylvia A. Earle -- former Chief Scientist at the National Oceanic and Atmospheric Administration, Dr. Jane Lubchenco from Oregon State University, and Dr. Carl Safina -- Director of the National Audubon Society's Living Oceans Program The organization produces, and makes available on their WEB site, reports on topics such as aquatic fish farming, marine protected areas, consumer seafood choices in relation to sustainable fishing, the state of the world's ocean (causes of ocean change, signs of trouble, difficulties in addressing the problems, and future directions), listings of pertinent articles from some of the published

literature on ocean resources, an on-going briefing book to provide scientifically based background information that may facilitate the communication of marine environment news , and a selection of articles about ocean issues written by the members of the SeaWeb staff and the SeaWeb science spokesteam.

The Ocean Project

The Ocean Project is a SeaWeb program and is an international network of aquariums, zoos, museums, and nature and environmental education centers and assists them in establishing themselves as sources of conservation education "about the significance of the oceans and the role each person plays in conserving our ocean planet for the future" for visitors and the communities in which they are located. The primary objectives of the project are to connect partners and visitors with conservation action and to improve partners' effectiveness at communicating for conservation.

The project is allied with SeaWeb,
With a Steering Committee that includes a representative of SeaWeb and a number of staff members from the largest aquariums in the U.S. and Canada. Institutions become partners at various levels ($500 and $1,000) depending on the number of visitors they receive and other institutions become sustaining members at a $5,000 level. The partners receive aquatic and ocean conservation news and information updates, information on communication strategies, case studies, resources, programs, CD-ROMs, and ideas for using information effectively. Staff training workshops and reference manuals are provided to sustaining members.

TOP is funded by private foundations. The primary source of support for five years was the David and Lucile Packard Foundation, but this funding was not renewed in 2003. The Steering Committee is now seeking contributions from its partner organizations to match a challenge grant from another private foundation.

COMPASS

SeaWeb is a partner in *COMPASS (Communication Partnership for Science and the Sea)* to share emerging science via symposia, publishing, networking and media outreach. The goal is to build capacity within the marine conservation community for new thinking and strategic action around critical issues, and to communicate new science to media, policymakers and the public. COMPASS achieves its mission by stimulating inter-disciplinary, conservation-oriented research and action by marine scientists; by catalyzing communication among marine scientists, policymakers, nongovernmental organizations, the media and the concerned public; and by translating scientific concepts and information into accessible and policy-relevant forms. The other three partners in COMPASS are a Board of Scientific Directors, the Monterey Bay Aquarium, and Island Press.

Appendix 4.

GEM CITIZEN SCIENCE DATABASE
http:www.gemcitizendb.akcoastalstudies.org

A searchable database of community-based monitoring projects and programs was developed to provide background and models for this element of the GEM Community Involvement Plan. The database is also intended as a resource for organizations and citizens interested in developing GEM citizen science proposals or programs supported in other ways. As noted in the database entries, a number of organizations have developed standardized protocols for data collection in watershed and nearshore environments. These may serve as models for the development of standardized GEM protocols for citizen-based monitoring.

Criteria and Process for Inclusion in the Database

The GEM Community Involvement Plan Project Team compiled a list of candidate programs and projects for inclusion in the database. The initial list included all on-going community-based research and monitoring projects within the GEM geographic area and projects outside the GEM geographic area that had one or more elements that made them a potential model for the GEM program. The model elements considered were: 1) data management systems, 2) how access was provided to data and synthesized information, 3) the process by which local efforts were tied into and combined in larger-scale efforts (e.g., ecosystem-scale), 4) the integration of different types of data (e.g., GIS, traditional or local knowledge), 5) community/scientist/scientific community partnerships, and 6) the longevity of the program and of citizen participation. Project staff obtained information about candidate site and evaluated them against the model element criteria to assist the Project Team in selecting 16 programs for more detailed research and data entry. An additional 21 programs were included in the database with a minimum of contact information. Addendum A to this appendix lists the programs included in the database.

Data entry included the parameters shown in Addendum B to this appendix along with the list of choices for each parameters. The parameters were based on those included in a survey done by EPA for a National Volunteer Monitoring Directory and additional parameters relevant to GEM including the model element criteria listed above, the habitat component (e.g., nearshore, watershed) monitored, and the issue(s) of concern.

Format of the Database and User Interface

An ACCESS database was developed that could be queried online. Users can search for programs satisfying up to three criteria (e.g., geographic area, habitat focus, and availability of standardized data collection protocols) and select up to three choices for each criterion for the search (e.g., among watershed, nearshore, offshore, Alaska Coastal Current or similar geographic feature as choices under “Habitat”.

Appendix 4.
Addendum A.

GEM Citizen Science Database

Programs Included in Database

Tier I - Detailed Information

CEMP Partnership for the Cook Inlet Watershed*	Cook Inlet Keeper
Community-based Forage Fish Sampling*	U.S. Fish and Wildlife Service
Harbor Seal Biosampling*	Harbor Seal Commission
GLOBE/Native Ways of Knowing	UAF Global Change Program
4-H Fisheries, Natural Resources, & Youth Development Program	UAF Cooperative Extension Service
Youth Area Watch*	Chugach School District
Arctic Borderlands Ecological Knowledge Co-op	
B.C. Coastal Waterbird Survey	Bird Studies Canada
Beachkeepers	Washington State University/ Island County
Christmas Bird Count	National Audubon Society
Coastal Ocean Observation Lab Room	Rutgers, State University of New Jersey
Kachemak Bay Coastwalk	Center for Alaskan Coastal Studies
Mussel Watch Program	NOAA
Rapid Shoreline Inventory/ShoreZone mapping	People for Puget Sound
Rutgers Ocean Observing System	Rutgers University
Shorekeepers & Reefkeepers	Fisheries and Oceans Canada

Tier II - Basic Information

Alaska Killer Whale Count	University of British Columbia
Alaska Marine Mammal Stranding Network	National Marine Fisheries Service, NOAA
Baywatchers	Coalition for Buzzards Bay, MA
Beach COMBERS	Monterey Bay National Marine Sanctuary
Coastal Observation and Seabird Survey Team	Friends of Casco Bay, Maine
Dock Watch	Dauphin Island Sea Lab
Estuary-Net Program	North Carolina National Estuarine Research Reserve
Forage Fish Distribution Study/TEK	University of Alaska Fairbanks
Intertidal Quadrat Studies	Georgia Strait Alliance
Lake Michigan Monitoring Coordinating Council	

* Projects receiving EVOS or EVOS/GEM funding

Tier II - Basic Information

Nature Mapping Program	University of Washington
Nature Watch	Ecological Monitoring & Assessment Network, Canada
Prince William Sound RCAC Community Outreach	PWSRCAC
Project FeederWatch	Cornell University Lab of Ornithology
REEF Fish Survey Project	REEF Environmental Education Foundation
Resource Abnormality Study	Div. of Subsistence, AK. Dept. of Fish and Game
RiverSmart	River Network, Oregon
Save Our Streams Program	Izaak Walton League of America
Scoter Research Project*	Alaska Department of Fish & Game
Ships-of-Opportunity Plankton Studies*	NOAA
Water Quality and Aquatic Environment Monitoring	Native American Fish and Wildlife Society

* Projects receiving EVOS or EVOS/GEM funding

Appendix 4. Addendum B.

GEM Citizen Science Database Fields

Basic Background Information

Program Name	Text
Program Description (+innovative/model aspects)	Text
Lead Organization Name	Text
Contact Information for Lead Organization	Text
Serve as Umbrella Organization/Links with Orgns.	Y/N
Agency Partner(s)	Y/N
Years of Program Operation	Number
Sources of Funding	(List of choices)
Target Geographic Area or Specific Communities	Geographic Area/Communities
Geographic Area	(List of choices)
Scope of Program	(List of choices)
Status	Completed/Inactive/Ongoing

Community Involvement

Program Management	Volunteer/Paid Staff/Combination
Number of Volunteers	1-50/51-100/101-1000/1001+
Number of Students and Teachers Involved	1-50/51-100/101-1000/1001+
Program Evaluation	Y/N
Evaluation Process	Formal-Regular/Formal-Irregular Informal-Regular/Informal-Irregular/ None
Availability of Program Evaluations	WEB/Print/None

For Citizen-Based Monitoring and Research Programs

Habitat Focus	(List of choices)
Biological Monitoring Type	(List of choices)
Physical/Chemical Water Quality Monitoring	Y/N
Climate Change Monitoring	Y/N
Human Impact Monitoring Type/Other Activities	(List of choices)
Standardized Protocol	Y/N
Standardized Protocol Availability	Print/Web/None
Issues of Concern/Reason for Monitoring/Research	Text
Data Uses	(List of choices)
Data Users	(List of choices)
Public Access to Data	Print/Web/None
Public Data Control	Edit/Data Entry/Full/None
Public Information	Print/Web/Media/None
Data Integrated	Y/N
Types of Data Integrated	(List of choices)

Community-Scientist (and/or Agency) Partnerships	Community-Driven/Collaborative/ Scientist (and/or Agency)-Driven
Community-Scientist Partnerships Description	Text
Included in National Volunteer Directory	Y/N
References	Text