

CONTRIBUTING TO OCEAN LITERACY IN ALASKA

AN EDUCATION PLAN FOR



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Created By

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EXECUTIVE SUMMARY

This education plan presents recommendations and action items for formal and informal education efforts of the Alaska Ocean Observing System (AOOS). Formal educators are defined as those who work in public or private schools or universities. Informal educators are those who work at organizations such as museums, aquariums, and science centers. Four methods of information gathering were used to inform and shape the plan: an online survey; an education workshop; a phone survey; and an environmental scan of existing marine science education programs in Alaska.

ONLINE SURVEY

The online survey asked questions that focused on three areas: audience; current programming; and anticipated use and needs. Part one posed questions to provide an audience profile of individuals interested in AOOS education products. Part two addressed existing programs that might be enhanced with AOOS data and information products. Part three posed questions to determine the types of AOOS products educators anticipate using and the content needs of this group. The main findings for the survey follow.

- Approximately half of the educators interested in using AOOS data and information do not have a scientific background. This means programs and products will need to be structured for a variety of users.
- All respondents reported full or occasional access to the internet, and a significant number, 77 percent, reported either full or occasional access to video streams. Given this information, it seems potential users of AOOS education products would be able to access the internet and download streaming video with education groups if AOOS created an education page on its website.
- Approximately 85 percent of formal and informal educators thought AOOS should create education website resources. Eighty percent of informal educators were interested in interpretive products such as displays, kiosks, and models, while 70 percent of formal educators were interested in additional training in the form of workshops.
- The most requested content area topics included data on animal tracking; animal behavior; ocean weather; wind speed and direction; and ocean contaminants.

EDUCATION WORKSHOP

A workshop was held Friday, October 7, 2005 to discuss education plans for the Alaska Ocean Observing System (AOOS). Participants included formal and informal educators from Anchorage, Barrow, Cordova, Fairbanks, Homer, Naknek and Seward. Two break-out sessions were included in the agenda to allow participants to give input on three major areas of the AOOS education plan: audience; national connections; and programs and products. To further inform the programs and products section of the plan, one break-out session concentrated specifically on website development. The following highlights provide a brief overview of participants' thoughts on the break-out session topics.

Topic 1: Audience

- Focus on one or two specific audiences to begin.
- Start with an audience of 7th to 10th grade students in a formal setting.
- If funding is available, invest in an awareness-building campaign aimed at a general public audience.

Topic 2: National Connections

- By producing education programs and products that are specific to Alaska, AOOS will provide content that is important to students, teachers and informal educators in Alaska.
- Lessons and activities should be produced in a template format so that multiple users could input local data.
- AOOS should encourage individuals working at the national level to concentrate on providing general lessons and information about ocean observing systems that could be used in multiple regions.
- AOOS can contribute to national efforts by concentrating on creating lessons and activities about the topics that make Alaska unique.

Topic 3: Programs and Products

AOOS programs and products should:

- focus on current events or issues.
- be highly visual, easy to use, and interactive.
- integrate local and traditional knowledge.
- integrate state and national standards in science, math, English, art, etc.; and
- include a training component eventually.

Recommendations regarding the education section of the AOOS website echoed recommendations regarding all programs and products. In addition to the recommendations listed above, participants suggested that the website designers:

- ensure easy site navigation.
- include a tool allowing users to search for lessons and activities by topic or grade level.
- be mindful of the background information required for each activity or lesson.
- provide links when appropriate.
- use archival data for most lesson plans and activities, but allow students to access real-time data through the navigation bar.

PHONE SURVEY

After the education workshop, a phone survey was conducted to further assess outreach needs to stakeholder groups outside of formal and informal educators. The following organizations were contacted: Alaska Native Science Commission; Barrow Arctic Science Consortium; Kachemak Bay Research Reserve; Prince William Sound Science Center; and Sea Grant. All five organizations felt there was a potential for integration of AOOS data and information into their existing programs and products. Two of the five mentioned that programs or products focusing on currents and sea surface temperature would be beneficial for their stakeholders. Four of the five felt that their stakeholders were unaware of AOOS. An awareness-building campaign was

suggested as a means to address this issue. An additional plan is being formulated by AOOS to address stakeholder outreach.

ENVIRONMENTAL SCAN

An environmental scan of marine science education programs was completed to assess the opportunity for inclusion of AOOS information and data. Organizations throughout Alaska were contacted. The list below represents Alaska organizations that offer programs or products that may be enhanced by the inclusion of AOOS data and information.

- **Anchorage:** Imaginarium; Alaska Youth for Environmental Action; Alaska Rural Systemic Initiative, Chugach School District's Youth Area Watch Program
- **Barrow:** Barrow Arctic Science Consortium
- **Cordova:** Prince William Sound Science Center
- **Fairbanks:** Sea Grant; GLOBE
- **Homer:** Center for Alaskan Coastal Studies; Kachemak Bay Research Reserve
- **Juneau:** Discovery Southeast
- **Seward:** Alaska SeaLife Center; Kenai Fjords Tours and Kenai Fjords National Park

AOOS GOALS

AOOS has the potential to significantly impact the advancement of ocean science literacy in Alaska. When fully developed, AOOS will provide a centralized location for:

- Data and information products from platforms such as buoys, providing wind and current speed and direction, wave height, sea temperature and salinity, and more;
- Enhancements to existing NOAA weather buoy data for specialized local needs;
- Processed satellite data providing Alaska-wide information on sea-surface temperature, ocean color (chlorophyll) and wind;
- Geographically comprehensive surface current data from high frequency radar;
- Data about fish, birds and marine mammals, the environmental effects of human activities, and any other information that can be used with the physical data to predict future changes to the ocean ecosystem.

This data and information is extremely important in Alaska where the oceans represent a large portion of the state's economic, recreational and cultural resources. In 2003, 85 percent of Alaska's population lived in coastal counties, as defined by the National Oceanic and Atmospheric Administration.¹ More than 4.46 billion pounds of seafood were harvested from Alaska waters in 2000, comprising nearly 48 percent of the entire U.S. Seafood harvest.²

¹ United States Census Bureau Online. Jan. 20, 2004. Strategic Environmental Assessments Division of the National Oceanic and Atmospheric Administration for the Bureau of the Census. Feb. 22, 2005. Available from <http://www.census.gov/geo/landview/lv6help/coastal_cty.pdf> and <http://quickfacts.census.gov/qfd/maps/alaska_map.html>

² Colt, Steve. What's the Economic Importance of Alaska's Healthy Ecosystems? Institute of Social and Economic Research, University of Alaska Anchorage. Anchorage: 2001.

According to the Alaska Department of Fish and Game's Division of Subsistence, the composition of the subsistence harvest by rural Alaskans consists of 60 percent fish, 20 percent game, 14 percent marine mammals, two percent shellfish, two percent birds and two percent plants.³ In the summer of 2004, 1.4 million tourists visited Alaska. Of those, 805,000 traveled via cruise ship.⁴ Alaskans, both rural and urban, benefit tremendously by maintaining the health of their oceans and watershed areas. In order to maintain ecosystem health, it is important to develop an awareness and understanding of the oceans today. Consider these statistics:

- A survey conducted by The Ocean Project found that only 39 percent of American adults surveyed knew that there is more plant and animal life found in the oceans than on land, and only 21 percent knew that oceans produce more of the earth's oxygen than forests.⁵
- In 1996, the last year Alaska students participated in the NAEP Science Assessment, nearly two-thirds of the Alaska student population scored below the proficient level.⁶

AOOS EDUCATION GOALS

AOOS has the potential to help change statistics such as these. To serve as a valuable source of information about the ocean for formal and informal educators, AOOS has identified two major education goals.

Goal 1:

AOOS will develop a network of educators from formal and informal settings who are knowledgeable of ocean observing systems and committed to advancing ocean literacy within their facilities and classrooms. This group should represent a coalition of education entities that have agreed on a united effort to expand the public knowledge of the ocean and ocean related issues.

Goal 2:

AOOS will develop exemplary education resources that can be used by educators in Alaska and throughout the world to further ocean literacy and encourage young people to pursue careers in science and technology.

³ Wolfe, Robert J. Subsistence in Alaska: A Year 2000 Update. Division of Subsistence, Alaska Department of Fish and Game. Juneau: 2000.

⁴ Alaska Travel Industry Association Online. Sept. 2004. Alaska Travel Industry Association. Feb. 2, 2005. Available <<http://www.alaskatourism.org/convention/2004/presentations/Kick-off%20presentation%20handout.pdf>>

⁵ The Ocean Project Online. Communicating About Ocean Health and Protection: An Analysis of Research for The Ocean Project by Belden Russonello & Stewart American Viewpoint. November, 1999. The Ocean Project. Feb. 20, 2005. Available from <<http://www.theoceanproject.org/images/doc/report.pdf>>

⁶ National Center for Education Statistics Online. TIMSS 2003, Trends in International Mathematics and Science Study. 2004. International Association for the Evaluation of Educational Achievement, TIMSS International Study Center, Boston College. Feb. 20, 2005. Available from <<http://nces.ed.gov/timss/>>

RECOMMENDATIONS

To begin meeting these goals, this plan presents three short-term recommendations:

- **Option 1:** Fund an education liaison position. This person would be responsible for building a public awareness campaign; informing decision makers of educators' needs; and creating contacts within the formal and informal education sectors.
- **Option 2:** Create an interactive model of a buoy that could be used at informal science centers, learning institutions and public gathering places to inform various audiences about the significance of ocean observation.
- **Option 3:** Create a web resource utilizing data collected on wind speed and direction. The scope of this resource would be highly dependent on funding.

In addition, the following long-term and overall recommendations are suggested:

- Once programming is established, create a training program for educators. This will help ensure continued collaboration within the education community, and it will encourage wide use of AOOS education programs and products.
- Create an online ocean world that allows website visitors to manipulate aspects of the environment and observe the results. Not only would AOOS data and information be used to create the simulation, but visitors could consult the AOOS website to make decisions about their online ocean.
- Include information on careers for each content area that is developed. For example, the focus on wind that was suggested as an initial unit could be enhanced by a look at the technicians and physical oceanographers that build, deploy, and maintain the tools that allow data gathering on wind.
- Establish an education advisory committee to inform the development of AOOS education programs and products.
- When possible, tie projects to current events to add relevance for learners.
- If AOOS chooses to take a clearinghouse approach to its website by linking to a number of existing marine science resources, a set of quality control criteria should be developed to ensure recommended activities and materials are of high caliber.

EDUCATION SURVEY SUMMARY



The AOOS education survey was conducted from May through September, 2005. Respondents were contacted using phone, e-mail, internet postings, and the Alaska Oceans Festival. The survey yielded 47 respondents from both formal and informal education. The survey group included: education directors; program and project coordinators; education specialists; geologists; outreach specialists; science directors; principals and assistant principals; professors and assistant professors; school district support personnel; superintendents of school districts; and K-12 teachers. The following organizations responded:

Formal Education Organizations

Alaska Pacific University; Anchorage School District; Fairbanks North Star Borough School District; Haines Borough School District; Northwest Arctic Borough School District; Pelican City School District; Pribilof School District; University of Alaska Fairbanks

Informal Organizations

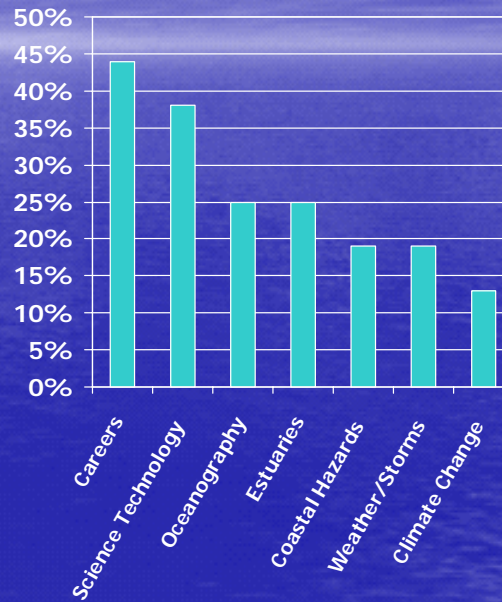
Alaska Department of Fish and Game; Alaska Natural History Association; Alaska Office of Boating Safety; Alaska Science Center; Alaska Volcano Observatory; Alaska Sea Grant UAF Marine Advisory Program; Alaska SeaLife Center; Denali Institute; Glacier Bay National Park and Preserve; Homer Society of Natural History; Kachemak Bay National Estuarine Research Reserve; Kenai Fjords National Park; North Pacific Research Board; Pratt Museum; Pribilof Islands Stewardship Program; Prince William Sound Science Center

Survey questions focused on three areas: audience; current programming; and anticipated use and needs. Part one posed questions to provide an audience profile of individuals interested in AOOS education products. Part two addressed existing programs that might be enhanced with AOOS data and information products. Part three posed questions to determine the types of AOOS products educators anticipate using and the content needs of this group.

Marine Science in Alaska Schools (Initial Survey of 7 Districts)

School District	Marine Science Course	Grades
Anchorage School District	Marine Biology Oceanography	10-12
Kenai Peninsula Borough	Marine Biology Oceanography	10-12
Fairbanks North Star Borough	Marine Biology	10-12
Haines Borough	Marine Biology	9-12
Mat-Su Borough	Marine Biology Oceanography	6, 10-12
Pelican City Schools	None	
Pribilof Schools	None	

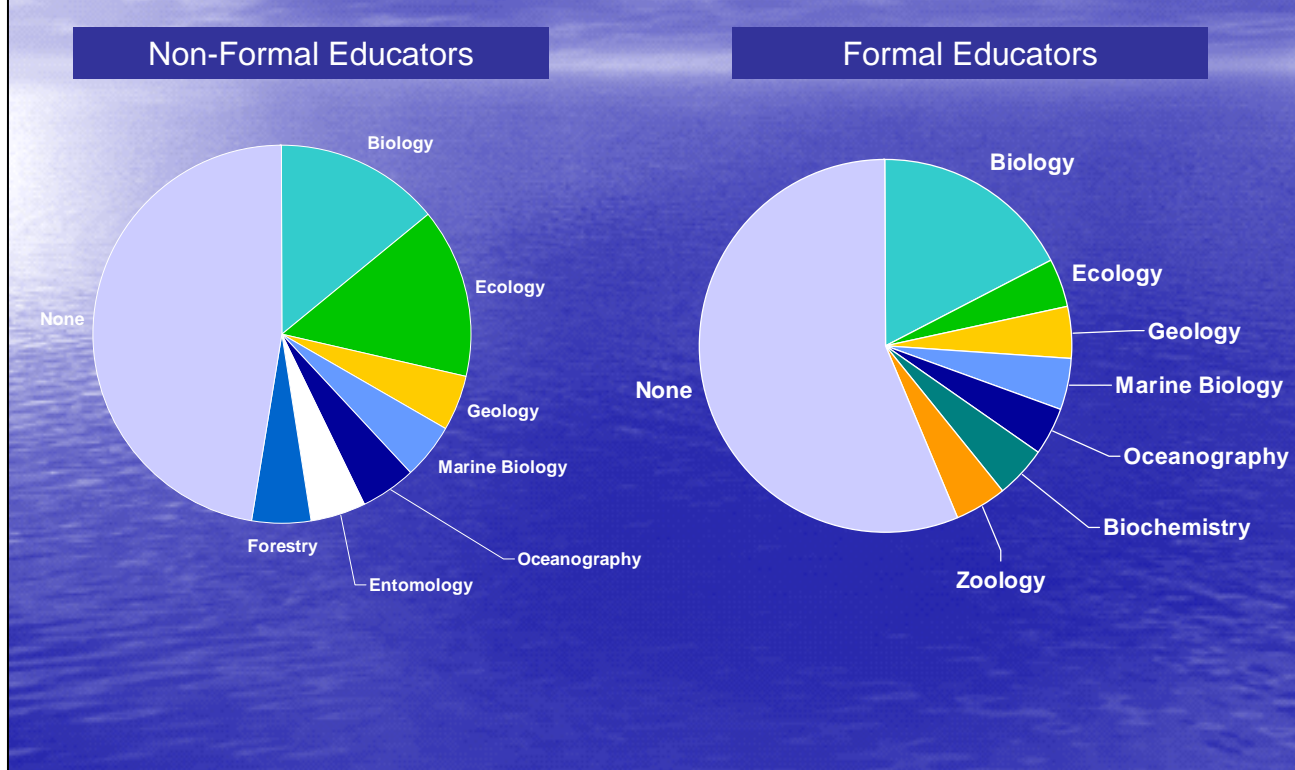
Informal Science Organization Programs With Possible AOOS Tie-In



One potential audience for AOOS products and programs are middle or high school students studying marine science. An initial survey of seven school districts in Alaska showed over half offer courses in either marine biology or oceanography. Teachers of these courses would likely have the background knowledge necessary to assist their students in making good use of AOOS data and information.

Informal science organizations also offer programs that could benefit from the inclusion of AOOS data and information. Respondents representing 16 Alaska informal science organizations were asked to list the program topics offered at their organizations. The graph (above right) shows some of the topics respondents identified. Those shown are programs most likely to benefit from the inclusion of AOOS information and data. AOOS data and information regarding careers would benefit approximately 44 percent of the organizations surveyed. AOOS might provide products such as job descriptions listing the educational background and daily tasks of individuals involved with data collection, model building, or buoy construction. AOOS data and information might be embedded into programs focused on science technology as well. Approximately 38 percent of the organizations surveyed offer science technology programs. To take advantage of this opportunity, AOOS might provide a way to help organizations construct and deploy student-made buoys, or AOOS might provide model buoys to organizations to use as a teaching tool or interpretation object.

Educational Background in Science



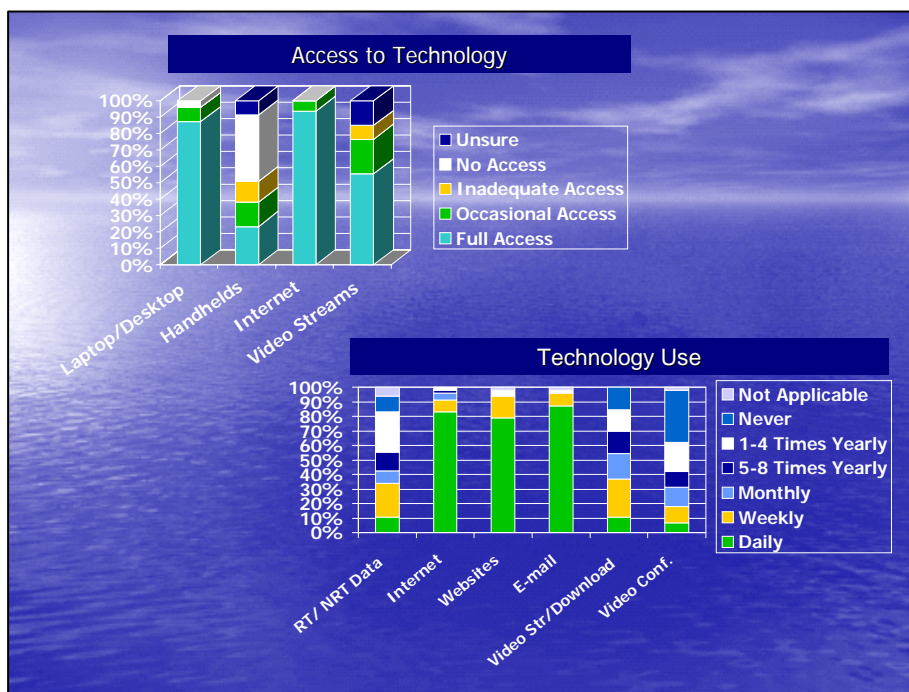
Approximately half of each audience has no formal training in science. When AOOS develops programs and products for formal and informal education organizations, this point should be considered. Depending on the program or product, it may be important to provide background information so those without a science background can make use of AOOS resources.

In addition to asking respondents about their personal science background, this survey asked if respondents had resources on staff who might be able to help them interpret ocean science data and information and geographic information system (GIS) data and information. Nearly half of the respondents answered no to both questions. Forty-four percent of the respondents could not identify a staff resource to help them interpret ocean science data and information, and 56 percent could not identify a staff resource to help them interpret GIS data and information.

The need for training is evident. If educators do not have the background knowledge to utilize ocean science data and information, and they have no staff resources, it is unlikely they will use AOOS resources. One solution is to implement a train-the-trainer model. AOOS could present training for lead educators who could then serve as staff resource people. Trainings could be conducted on a regional basis, and participants would be sent back to schools and informal science organizations equipped with the tools and resources to teach and inform others on their staffs. When asked about their preferred method of training, 41 percent of respondents requested

a workshop format. A train-the-trainer model would accommodate this request. If this method is employed, AOOS must develop strategies to overcome two possible obstacles. First, staffs at many Alaska schools and informal science organizations are small, and distances are great. On-site or regional training will be costly to implement well. In addition, the turnover rate for village schools is relatively high. Those chosen to participate in training would need to be willing to serve as staff resource people for a specified amount of time.

One method of overcoming both obstacles is to offer training online. An online course may be the ideal way to excite and encourage educators to use AOOS data and information in an education context. Forty-seven percent of survey respondents reported they would be willing to take part in either an internet tutorial or a distance learning opportunity to learn more about AOOS education resources.



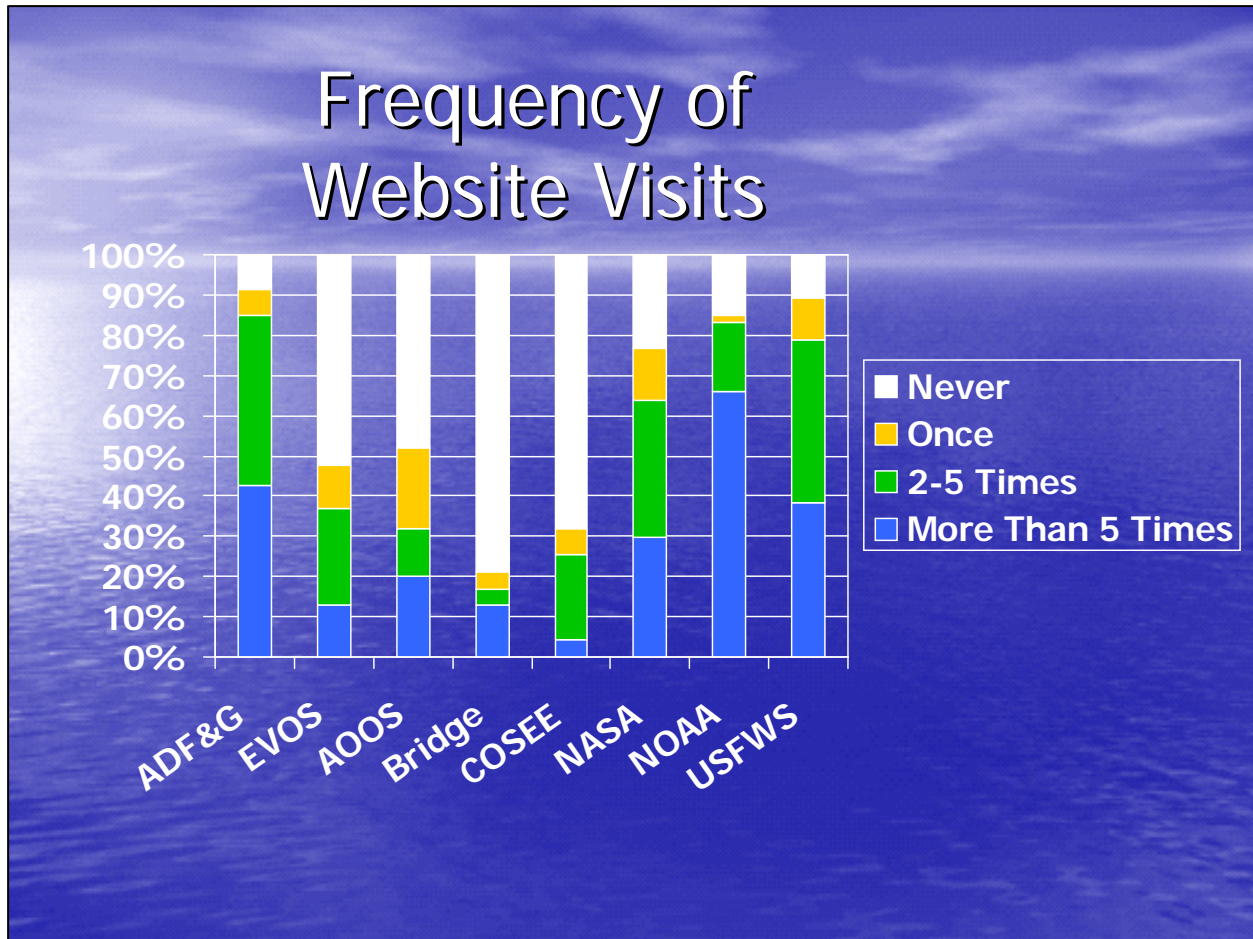
Survey respondents were asked about their access to technology to ascertain the possibility of disseminating AOOS data and information via the internet. All respondents reported full or occasional access to the internet, and a significant number, 77 percent, reported either full or occasional access to video streams. Given this information, it seems potential users of AOOS education products would be able

to access the internet and download streaming video with education groups if AOOS created an education page on its website.

Applications designed with the use of handhelds in mind might not be helpful to individual education organizations, but if funding is available, AOOS might consider developing outreach programming using this technology. Handhelds would be novel to most students, and they would provide an interesting way for large groups to individually interact with data and information.

The questions regarding technology use showed that respondents are comfortable accessing the internet and gathering information from websites, but that they do not access video streams or use real-time or near real-time data very often. Users may simply not know about the videos and near real-time data activities that are available, or users may feel too much time is required to use video streams or near real-time data for education purposes. Any activities presented on an AOOS education page will likely require users to access video streams or use near real-time data.

To ensure wide use of AOOS education products, AOOS should consider embedding real-time data use and the use of video streams into lessons created for educators. If possible, educators should be introduced to AOOS content in training sessions that provide an overview of the site and allow educators to experience the wide range of resources offered on the site.



Survey respondents were asked how frequently they visit certain websites. Alaska-based websites on the list included the Alaska Department of Fish and Game, the Exxon Valdez Oil Spill council, and the Alaska Ocean Observing System. Of these three sites, the Alaska Department of Fish and Game was visited most often by respondents. Educators may be interested in this site because the education page offers a substantial number of resources and programs. It includes full curriculums, videos, kits, skulls and furs to check out, hands-on activities and information pages. Information regarding education workshops and outreach education is included. This site also features a guide that tells educators how ADF&G curriculums correlate with state standards. Additional research would be necessary to determine the popularity of the ADF&G site because some educators may be accessing the site for purposes other than education.

Over half the audience had heard about AOOS prior to taking the survey, but this may have been slightly biased based on the survey audience. Some respondents visited the site in order to take

the survey. Regardless, if an education page were developed on the AOOS website, there is a group of educators who are aware of the site now.

The Bridge and COSEE are two sites specific to marine science education. The Bridge is a COSEE partner, and it is supported by Sea Grant and the National Marine Educators Association. COSEE is an education program managed by the Consortium for Oceanographic Research and Education with support from the Office of Naval Research and Southeastern Universities Research Association. There is one COSEE site organized at a national level, and several regional COSEE sites that focus on locations in the contiguous United States. Very few survey respondents were aware of these resources, but the majority of visits reported were return visits. This means the sites are useful to educators once they discover them. It also means that valuable sites can be underutilized if educators do not know about them.

Three nation-wide sites were frequented by a high percentage of survey respondents: the NASA site, the NOAA site, and the US Fish & Wildlife Service site. Each of these sites provides a wealth of education materials and activities; however, additional research would be necessary to determine the popularity of these sites. AOOS web designers and those creating content for the website should investigate these three sites if AOOS decides to develop education pages for its website.



Formal and informal educators were asked to identify the types of products that would be most helpful to them. The groups were provided with slightly different choices because the nature of their needs is slightly different. Both groups

were most interested in website resources. Informal educators were also interested in interpretive products such as displays, kiosks, and models, while formal educators were interested in additional training in the form of workshops.

Helpful Content

(Ranked from most to least requested)
(Respondents were able to choose as many topics as they wanted.)

- Animal Tracking Data (33)
- Animal Behavior Data (27)
- Ocean Weather Data (24)
- Wind Speed and Direction (23)
- Ocean Contaminants (21)
- Sea Surface Temperature (21)
- Ocean Current Speed and Direction (20)
- Acoustic Monitoring of Fish & Marine Mammals (20)
- Foraging Ecology Data (19)
- Wave Height (18)
- Salinity (17)
- Sea Ice Data (17)
- Ocean Color – Chlorophyll (17)
- Atmospheric Circulation Model (16)
- Probable Spill Trajectories (15)
- Hydrography Data (13)
- Bathymetry Data (12)
- Glacial Tracking (1)
- Animal Population Densities (1)

Survey respondents were asked to choose helpful content from the above list of topics. Respondents were able to choose as many topics as they wanted. The number in parentheses represents the number of respondents who identified the topic as helpful. Considering the topics offered at informal science organizations are largely centered on animal themes, the top two requests are not surprising. If AOOS feels it is important to develop applications to display information such as salinity and sea ice data, it will be important to show educators the significance of such data so that they can envision how they would incorporate it into their programs and lessons.

AOOS EDUCATION WORKSHOP SUMMARY

A workshop was held Friday, October 7, 2005 to discuss education plans for the Alaska Ocean Observing System (AOOS). Participants included formal and informal educators from Anchorage, Barrow, Cordova, Fairbanks, Homer, Naknek and Seward. Formal educators are defined as those who work in public or private schools or universities. Informal educators are those who work at organizations such as museums, aquariums, and science centers. A participant list and meeting agenda are included in the appendixes. Two break-out sessions were held during the workshop. These sessions were structured to allow participants to give input on three major areas of the AOOS education plan: audience; national connections; and programs and products. To further inform the programs and products section of the plan, one break-out session concentrated specifically on website development. A summary of participants' thoughts on the break-out session topics follows.

TOPIC 1: AUDIENCE

- Focus on one or two specific audiences to begin.
- Start with an audience of 7th to 10th grade students in a formal setting.
- If funding is available, invest in an awareness-building campaign aimed at a general public audience.

Due to constraints of time and funding, AOOS should initially focus on one or two specific audiences when creating education products and services. This will increase the likelihood of AOOS creating a successful education product. Without a focused audience, resources may be spread too thin, and multiple audiences may be served inadequately. Once initial projects are successfully completed, outreach to additional audiences can be considered.

Workshop participants agreed that informal audiences are likely to make use of products and services that are created with a formal audience in mind. Much discussion led the group to decide upon an audience of 7th to 10th grade students in a formal setting for phase one of AOOS education and outreach. Materials and programs produced for a formal setting could be adapted for use in an informal setting, and a middle school audience would allow for eventual programmatic growth to reach an older audience. There was also discussion about structuring outreach to this or other audiences by geographic region or another thematic approach.

Additional stage one funds could be invested in interpretive centers to excite and inform a general public audience about the importance of ocean observing. Possible products might include a kiosk, an interactive map, or a replica of a buoy. Products could be housed in the partner science centers in Alaska.

TOPIC 2: NATIONAL CONNECTIONS

- By producing education programs and products that are specific to Alaska, AOOS will provide content that is important to students, teachers and informal educators in Alaska.
- Lessons and activities should be produced in a template format so that multiple users could input local data.
- AOOS should encourage individuals working at the national level to concentrate on providing general lessons and information about ocean observing systems that could be used in multiple regions.
- AOOS can contribute to national efforts by concentrating on creating lessons and activities about the topics that make Alaska unique.

The focus of AOOS education products should be at the regional or local level. AOOS should attempt to build capacity using a model program, such as Project Learning Tree. Regions or sub-regions should produce education products that pertain to their local areas in template format. Lessons and activities should focus on issues of local interest; however, because they would be developed using a template, other regions would be able to use the same activity or lesson by plugging in their local data. In this way, regions would be able to highlight special features of their local environments while still contributing to larger-scale efforts. A regional or sub-regional education team might produce the following products:

- Webcasts of research or fishing vessels
- Lessons on local currents, tides, weather etc.
- A speakers bureau allowing students and teachers to hear from professionals involved with ocean observing systems, either via the internet or in person
- A portal to collect and disseminate information on available resources outside of AOOS
- A method to promote collaboration across the state for teacher and students
- An educator training program to teach educators how to use AOOS data

AOOS should try to support national Ocean Observing System efforts by advocating a nested structure of product development. At the national level, ocean observing system outreach should provide general information that could be used in multiple regions. A national level education team might produce the following products:

- A concepts glossary defining terms central to the operation of observing systems and data collection
- Activities focusing on remote sensing that would include broader science concepts such as acoustics, radar, or magnetic fields
- An overview of modeling that could be applied to the regional or local level
- Information on the development and operation of ocean observing equipment
- A primer for data interpretation including general information such as how to read a map showing ocean surface current velocities
- Training protocols

TOPIC 3: PROGRAMS AND PRODUCTS

AOOS programs and products should:

- focus on current events or issues.
- be highly visual, easy to use, and interactive.
- integrate local and traditional knowledge.
- integrate state and national standards in science, math, English, art, etc.; and
- include a training component eventually.

Recommendations regarding the education section of the AOOS website echoed recommendations regarding all programs and products. In addition to the recommendations listed above, participants suggested that the website designers:

- ensure easy site navigation.
- include a tool allowing users to search for lessons and activities by topic or grade level.
- be mindful of the background information required for each activity or lesson.
- provide links when appropriate.
- use archival data for most lesson plans and activities, but allow students to access real-time data through the navigation bar.

Programs and products were prioritized for both informal and formal audiences. The group noted several areas of overlap between the two audiences. The table below outlines the suggestions of the group.

PRIORITY LEVEL	AUDIENCE	PROGRAM OR PRODUCT DESCRIPTOR
High	Formal and Informal	Products that would tie into current events or issues such as tsunamis, oil spills, or global warming, or those that focus on information a general public audience might find highly useful such as weather forecasting
High	Formal and Informal	Products that are highly visual, easy to access, and interactive; Might include displays, websites, and opportunities for students to engage in science by collecting and contributing data; Displays should be provided to partner sites for exhibition
Medium-High	Informal	Products and programs that integrate local and traditional knowledge; By adding community member observations, long-term data sets might be extended and the intergenerational nature of audiences can be addressed
Medium-High	Formal	A lesson databank for grades 7-12; Topics should be related to Alaska school curriculum frameworks; Thematic lesson plans for grades K-6; Links to existing resources
Medium	Formal and Informal	Training listed as a medium-level priority because it will be needed after products and programs are created; Formal and informal educators are interested in on-site training at their organizations or on-line training options such as distance delivery or on-line tutorials; A launch followed by annual trainings or a train-the-trainer model were suggested
Medium	Formal and Informal	An Alaskan ocean literacy framework tied to state education standards; Could be put into practice in classrooms or on school field trips to informal education institutions
Medium-Low	Informal	Interpretation of real-time data where it's being collected (displays on ferries or at harbors); Note possible trouble with vandalism

This group provided the following general suggestions:

- Provide data in formats that are familiar to schools like Excel spreadsheets
- Provide education institutions with free programs and products; Allow CD duplication
- Continue to involve educators and stakeholders in the development process
- Promote field experiences as part of the product mix; Sponsor events or products that are linked to buoy deployments
- Use the Project Learning Tree model when developing programs and products

HIGHLIGHTS FROM WEBSITE BREAKOUT SESSIONS

The suggestions below were mentioned by multiple groups or engaged the large group during discussion.

1. Teachers and students want a dynamic site connected to current events. Consider the possibility of using a story format to get students involved. Students might be able to follow the launching of a mooring, for example. Keep lesson plans fresh, and archive old activities.
2. Provide interactive activities and models allowing students to use higher-order thinking skills to solve problems and work with real data. Inquiry-based learning helps develop scientific thought processes.
3. Link activities to state and national standards. Use a multi-disciplinary approach by including standards from all disciplines, including science, math, English, art, etc. when applicable.
4. Be careful not to require too much background information to participate in activities. If background knowledge is required, include optional lessons for students who need the additional content, or use existing information found at other websites for general concepts. Include links to these sites, and take the learning to the next level on the AOOS site by focusing on the specifics of Alaska's waters.
5. Ensure the site is easy to navigate. Include a search tool and a database of lessons or activities organized by topic and/or grade level. Include reciprocal links so users have a way to get back to the AOOS site after linking to other sites, and make it easy to return to the home page.
6. Lay out lesson plans in a similar and standard format.
7. Use archival data for most activities, but allow access to real-time data through the navigation bar.

PHONE SURVEY SUMMARY

After the education workshop, a phone survey was conducted to further assess outreach needs to stakeholder groups outside of formal and informal educators. The following organizations were contacted: Alaska Native Science Commission; Barrow Arctic Science Consortium; Kachemak Bay Research Reserve; Prince William Sound Science Center; and Sea Grant. Though the focus of this phone survey was stakeholder outreach, the information obtained presented implications for the formal and informal education plan. All five organizations felt there was a potential for integration of AOOS data and information into their existing programs and products. Four of the five felt that their stakeholders were unaware of AOOS. An awareness-building campaign was suggested as a means to address this issue. Each organization discussed important points. An overview is presented below. A separate AOOS report will be developed concentrating on stakeholder outreach.

Alaska Native Science Commission

- The best ways to communicate include: on-site public meetings or events; posters; articles in newsletters; and visits to regional meetings.
- Language differences might pose a barrier. Plan to use interpreters when necessary.
- Ensure collaboration between researchers and the community. Communities do not benefit from research that is conducted but not shared.

Barrow Arctic Science Consortium

- Currents make a good topic for education and outreach. Local knowledge can easily be paired with AOOS data to provide micro and macro perspectives.
- The Barrow Area Information Database – Internet Map Server (BAID-IMS) can be used as a template for the AOOS database.
- The North Slope Science Initiative and AOOS could work together to mesh data/info from land and sea.


Kachemak Bay Research Reserve

- Provide a suite of outreach tools including real-time data displays; PowerPoints; videos; and traveling displays. To ensure the community will support AOOS financially, it will be important to get the public to understand the significance of ocean observing.
- Water quality information is important to mariners.
- Sea surface temperature is important to those interested in vibrio detection.
- Currents are a big interest for those wishing to calculate travel time.
- Marine weather is in higher demand than oceanographic information.

Prince William Sound Science Center

- The largest stakeholder groups consist of recreational users and mariners.
- At the conclusion of the Alaska Ocean Observing System Workshop in Prince William Sound, it was determined that all stakeholder groups want something different. Policy makers want long-term data to analyze trends. Pilots need real-time forecasts, no longer than six hours, to determine safe flying conditions. Fishermen request multi-day forecasts to plan long fishing trips.

Sea Grant

- Information on wave height and wind speed is of interest for safety reasons.
 - Sea surface temperature is important to aquaculturists for vibrio detection and for fishermen who apply temperature-directed fishing.
 - Sea Grant is attempting to update its Sea Week curriculum and will likely be able to integrate AOOS data and information into this document.
- 

AN ENVIRONMENTAL SCAN OF MARINE EDUCATION PROGRAMS IN ALASKA

ANCHORAGE-BASED PROGRAMS

Organization	Alaska Public Lands Information Center	Location	Anchorage
Contact Person	Joanne Welch	Locations Served	Anchorage, Greater Alaska, National, International
Students Involved in Education Programming	NA	Number of Education Staff	2+

The Alaska Public Lands Information Center provides a venue for weekly talks given by individuals from places like Bird Treatment and Learning Center, the Alaska Zoo, and the Alaska SeaLife Center. Animals are generally the focus of those talks. An older audience may become engaged by a talk focusing on marine mammal tracking or sonar fish counts.

Organization	Alaska Zoo	Location	Anchorage
Contact Person	Katie Larson	Locations Served	Anchorage, Mat-Su
Students Involved in Education Programming	NA	Number of Education Staff	2

The Alaska Zoo offers three levels of camps for various age groups. Topics vary, but center around animals. Presentations focused on polar bears and sea ice data may work well into the existing program structure.

Organization	Alaska Youth for Environmental Action	Location	Anchorage
Contact Person	Polly Carr	Locations Served	Alaska
Students Involved in Education Programming	NA	Number of Education Staff	NA

Alaska Youth for Environmental Action is an environmental organization created by teens for teens, sponsored by the National Wildlife Federation. The mission of Alaska Youth for Environmental Action is to inspire, educate, and take action on environmental issues facing Alaska communities. Members get involved through hands-on projects and campaigns.

Organization	Alaska Rural Systemic Initiative	Location	Anchorage
Contact Person	Frank Hill	Locations Served	Rural Alaska Schools
Students Involved in Education Programming	NA	Number of Education Staff	NA

The Alaska Federation of Natives, in cooperation with the University of Alaska and the Alaska Department of Education and Early Development, has implemented a ten-year rural school improvement effort -- the Alaska Rural Systemic Initiative (AKRSI). The purpose of the AKRSI is to coordinate a series of initiatives aimed at systematically documenting the indigenous knowledge systems of Alaska Native people and developing pedagogical practices and school curricula that appropriately incorporate indigenous knowledge and ways of knowing into the formal education systems. Funded by the National Science Foundation and sponsored by the Alaska Federation of Natives, initiatives are carried out by statewide partners including the University of Alaska, Alaska Department of Education and Early Development, rural school districts, and Native Teacher organizations.

Organization	Chugach School District	Location	Anchorage
Contact Person	Sheryl Salasky	Locations Served	Chugach School District, Seward, Valdez, Nanwalek, Seldovia, Port Graham
Students Involved in Education Programming	25-30	Number of Education Staff	Approx. 30 trained teachers

Youth Area Watch (YAW) is a program run by the Chugach School District and funded by the Exxon Valdez Oil Spill (EVOS) Trustee Council. The program is designed to allow students to interact with scientists while making a meaningful contribution to research and long-term monitoring projects in oil spill affected Prince William Sound and Cook Inlet communities. Students of the Youth Area Watch program could benefit from the infusion of AOOS data and information into the program. The program goals include: giving students "hands on" experiences with scientists; enabling students to make meaningful contributions to community-based research occurring in Exxon Valdez oil spill affected areas; helping increase communication between scientists and the communities affected by the oil spill; undertaking long-term monitoring projects within oil spill affected communities; and increasing awareness about a variety of ecosystems.

The director of this program is planning to implement the NASA sponsored Signals of Spring program (see description in Nationwide Programs section). There is a possibility of collaboration between AOOS, YAW and Signals of Spring to build an Alaska component of Signals of Spring.

Organization	Imaginarium	Location	Anchorage
Contact Person	Erin Graves	Locations Served	Alaska Wide
Students Involved in Education Programming	NA	Number of Education Staff	6

The Imaginarium offers four marine-related programs for students in grades K-8. An oceanography program focusing on an older audience is in the development stage. Program Developer Erin Graves attended the AOOS education workshop and is working with Kate Alexander of the Prince William Sound Science Center to incorporate AOOS data and information into the oceanography program.

BARROW-BASED PROGRAMS

Organization	Barrow Arctic Science Consortium	Location	Barrow
Contact Person	Glenn Sheehan Jill Exe	Locations Served	Barrow Area and Tourists Worldwide
Students Involved in Education Programming	45 presentations/ year	Number of Education Staff	1

The Barrow Arctic Science Consortium (BASC) provides a series of talks every Saturday entitled Schoolyard Saturdays. This is a science education outreach program funded by the National Science Foundation wherein local teachers team up with visiting (or local) scientists to present a public presentation of the researcher's project or area of interest. The audience is largely made up of adults; however some students attend as well. BASC also provides ways for students and researchers to collaborate. Each year up to 24 students become involved in various research projects associated with BASC. When the cabled seafloor observatory is complete, it is likely that students will learn about it through contact with researchers and programs such as Schoolyard Saturdays.

CORDOVA-BASED PROGRAMS

Organization	Prince William Sound Science Center	Location	Cordova
Contact Person	Kate Alexander	Locations Served	Cordova, Chenega Bay, Tatitlek
Students Involved in Education Programming	NA	Number of Education Staff	3

Program topics at the Prince William Sound Science Center (PWSSC) vary each month. This means there is ample opportunity to develop education programming using AOOS data. PWSSC features a weekly community program during the school year featuring researchers who present the work they are doing in the region. The weekly community program could be a venue to increase community awareness of AOOS and for AOOS scientists to present their work and findings. PWSSC also broadcasts a weekly radio show called “Field Notes” on KCHU. “Field Notes” reaches the communities of the Prince William Sound and Copper Valley areas. The host of the show is planning to feature AOOS in some programs. PWSSC summer programs serve all ages and locations. Three-day workshops for adults and teachers are offered, and an oceanography workshop is planned for 2006 that will incorporate AOOS information into activities. Youth summer camps focus on ocean explorations. In the summer of 2006, the Center will expand summer camp offerings to teachers. PWSSC is also working on an oceanography program in conjunction with the Imaginarium that will feature AOOS information.

FAIRBANKS-BASED PROGRAMS

Organization	Alaska Sea Grant	Location	Fairbanks
Contact Person	Sherri Pristash	Locations Served	Alaska, Greater U.S.
Students Involved in Education Programming	NA	Number of Education Staff	NA

Alaska Sea Grant is a university-based program that is part of a national network of Sea Grant programs in all the coastal and Great Lakes states. Sea Grant funds marine research, provides education and advisory services, and distributes information about Alaska's seas and coasts. They produce and distribute a variety of publications for the general public, K-12 educators, fishermen, and others. Sea Grant is planning to update one of its publications, the Alaska Sea Week Curriculum. This project provides potential for collaboration with AOOS. Alaska Sea Grant's extension program, the Marine Advisory Program, offers technical assistance and information to individuals and businesses that enjoy and depend on Alaska's seas and coasts. Agents are located in Anchorage, Bethel, Cordova, Dillingham, Fairbanks, Homer, Ketchikan, Kodiak, Petersburg, and Unalaska. In some locations, agents work with schools or science centers to provide education programming. Some of these agents have already expressed interest in using AOOS data and information for education purposes.

Organization	Alaska Earthquake Information Center	Location	Fairbanks
Contact Person	Glenda Findly	Locations Served	Rural Alaska Villages
Students Involved in Education Programming	NA	Number of Education Staff	NA

Each year, the Alaska Earthquake Information Center takes part in the University of Alaska Fairbanks Geophysical Institute's Science and Math Enrichment Program which provides an opportunity for middle school students from rural Alaska villages to visit the Geophysical Institute and other research centers at UAF. The Enrichment Program aims to inspire Alaska Native students to excel in science in high school and pursue higher education and science careers later in life. All of the hands-on lessons in the Enrichment Program are based on recent geophysical research, and are designed to show students how math and science skills are used by professionals to solve real-life problems in Alaska. Measurements of ocean floor seismic activity could add to this program. If this type of data is collected by AOOS, the Science and Math Enrichment program could provide an opportunity to use the information in an education context.

Organization	Globe Program UAF	Location	Fairbanks
Contact Person	Elena Sparrow	Locations Served	Alaska Wide
Students Involved in Education Programming	about 40 active schools	Number of Education Staff	120 trained teachers

GLOBE (Global Learning and Observations to Benefit the Environment) is a worldwide hands-on, primary and secondary school-based education and science program. Through GLOBE, students are taught to take scientifically valid measurements in the fields of atmosphere, hydrology, soils, and land cover or phenology. Students report their data through the Internet, and they publish research projects based on GLOBE data and protocols. AOOS data and information will be of use to students and teachers participating in the GLOBE program. By comparing their own data to the data scientists are collecting, students will be able to better understand their environments.

HOMER-BASED PROGRAMS

Organization	Center for Alaskan Coastal Studies	Location	Homer
Contact Person	Bree Murphy	Locations Served	Homer, Kenai Peninsula
Students Involved in Education Programming	NA	Number of Education Staff	2

The Center for Alaskan Coastal Studies offers a number of marine science programs for a variety of ages. Two of those programs, the four and six-hour Onboard Oceanography cruises, would provide a venue for educators to discuss observing systems. The Center also offers dock tours for interested individuals. Tides and currents are discussed during the tours. AOOS data might help educators provide accurate information.

Organization	Kachemak Bay Research Reserve	Location	Homer
Contact Person	Terry Thompson	Locations Served	Homer, Kenai Peninsula
Students Involved in Education Programming	NA	Number of Education Staff	4

Kachemak Bay Research Reserve (KBRR) offers a number of programs on a variety of marine science topics. Students in the upper level High Seas Drifter programs investigate topics such as tides, currents, the water column, temperature, and turbidity. AOOS data and information could fit well into these programs. KBRR also offers a program called Careers in Marine Science that might be enhanced by information that AOOS could provide.

Organization	Pratt Museum	Location	Homer
Contact Person	Lois Bettini	Locations Served	Homer, Kenai Peninsula
Students Involved in Education Programming	NA	Number of Education Staff	1

The Pratt Museum offers two programs that deal with research technology. There is a possibility of including information regarding AOOS in both programs.

JUNEAU-BASED PROGRAMS

Organization	Discovery Southeast	Location	Juneau
Contact Person	Jan Carlile, Dana Owen	Locations Served	Southeast Alaska
Students Involved in Education Programming	1,200	Number of Education Staff	14

Discovery Southeast is one of the main organizations in Southeast Alaska for environmental education programs. They offer a Nature Studies program for all Juneau public schools students in grades 3-5. This program provides opportunities for Discovery Southeast education specialists to interact with students three times each year. Topics vary and could easily include information regarding ocean observing systems. In the past, Discovery Southeast offered a program focused on watersheds. The program was cut due to decreases in funding. Perhaps with additional funding or assistance, Discovery Southeast would be able to create programming specifically focused on AOOS information and data. If AOOS related programming is to reach the southeast area, Discovery Southeast is likely the best organization to offer it.

Organization	National Forest Service	Location	Juneau
Contact Person	Karen Maher	Locations Served	Mainly Juneau Area
Students Involved in Education Programming	382 (Sea Week Only) 3,500 Total	Number of Education Staff	1.75 +

The Forest Service provides Sea Week programming every year; however, their programs are currently set up to focus on inland resources. It is not likely that Forest Service personnel would use AOOS data and information for education programming, but they may serve as good contacts to other outreach organizations in the Juneau area.

KENAI-BASED PROGRAMS

Organization	Challenger Learning Center	Location	Kenai
Contact Person	Susan Hawker	Locations Served	Kenai Peninsula, Greater Alaska
Students Involved in Education Programming	NA (new program)	Number of Education Staff	2 +

One of the new programs offered at the Challenger Learning Center focuses on how NASA looks at weather. This program incorporates aspects of the GLOBE program, and would likely present a venue for educators to incorporate AOOS data and information.

SEWARD-BASED PROGRAMS

Organization	Alaska SeaLife Center	Location	Seward, Anchorage
Contact Person	Dana Sitzler	Locations Served	Alaska Wide
Students Involved in Education Programming	2,500	Number of Education Staff	7

The Alaska SeaLife Center offers a number of marine science programs for a variety of ages. AOOS data and information could be embedded into existing programs, such as Radio Collar Round Up, Marine Investigators, Seabird Scientists or Marine Science Careers Class. Additional programs might be created to focus on ocean observing systems as well.

Organization	Kenai Fjords Tours and Kenai Fjords National Park	Location	Seward and Whittier
Contact Person	Jenna Kelly	Locations Served	Alaska Wide
Students Involved in Education Programming	3,000	Number of Education Staff	8

Kenai Fjords Tours teams up with a ranger from Kenai Fjords National Park to provide boat tours out of Seward. Additional tours, without Kenai Fjords Rangers, debark from Whittier. On the Seward trip, students explore plankton, salinity, weather, and marine mammals. Students aboard the Whittier trip examine glaciation, plankton, GPS, mapping and birds. AOOS data and information would likely enhance both programs.

SITKA-BASED PROGRAMS

Organization	Sitka National Historical Park	Location	Sitka
Contact Person	Lisa Matlock	Locations Served	Sitka Area
Students Involved in Education Programming	NA	Number of Education Staff	1

The education specialist at Sitka National Historical Park offers a beach exploration program focused on the intertidal zone. Information about currents and tides might be helpful for the presenters of this program.

NATIONWIDE PROGRAMS

Organization	MARE (Marine Activities, Resources & Education)	Location	U.S.A. and Mexico
Contact Person	email: mare_lhs@berkeley.edu	Locations Served	U.S.A. and Mexico
Students Involved in Education Programming	300,000	Number of Education Staff	15,000

MARE is a K–8, inquiry-based science program that involves entire elementary and middle schools in ocean exploration. The K-8 MARE curriculum focuses each grade on a different aquatic habitat. Primary grades focus on nearshore, habitats. Offshore marine habitats are explored with upper elementary students, and middle school students explore coral reefs and the polar seas. The disciplines of earth, life and physical science, as well as, language arts, music, mathematics and visual arts are used to convey important aspects of each marine environment.

MARE teacher professional development and curriculum focus on the integration of literacy with science. The MARE program is administered throughout the USA and Mexico by six regional MARE Centers. Each Center receives training and support from MARE at the Lawrence Hall of Science and provides professional development to teachers in their respective communities. Each MARE center is staffed by MARE Associates (MARE Leaders who have assumed roles beyond their individual schools or institutions) who implement their own MARE professional development workshops and Summer Leadership Institutes.

Organization	Signals of Spring	Location	Washington, D.C.
Contact Person	Glenn Schuster	Locations Served	Worldwide
Students Involved in Education Programming	NA	Number of Education Staff	NA

Signals of Spring is a curriculum-based middle or high school product designed to increase student performance in science. Students use current Earth image data to explain the movement of animals tracked by satellites. Activities emphasize scientific method and inquiry. The program is set up to meet state and local standards in life and Earth science. Students are trained to incorporate their knowledge of life and earth science concepts into the process of analyzing animal movement. Over a dozen earth and species scientists help with student investigations, and students have access to online journals to which scientists from the field can contribute. Teachers are trained on-site or by live, interactive webcasts. There is a possibility of collaboration between AOOS, Signals of Spring and the Youth Area Watch program. The idea is to build an Alaska component of Signals of Spring using AOOS data and/or contributions from AOOS scientists.



S.W.O.T. ANALYSIS OF AOOS EDUCATION PROGRAMMING POSSIBILITIES

EXAMINING STRENGTHS, WEAKNESSES, OPPORTUNITIES AND THREATS

STRENGTHS

- Board represents many groups; Broad range of knowledge presents many opportunities for developing contacts and broadening the scope of education programming.
- Prince William Sound project now offers a substantial amount of information and data.
- A core group of educators is interested in developing resources and learning more. Educator participation from the beginning will help AOOS develop tools that will be utilized.
- Both informal and formal educators agree that funding should be used to develop website resources. Both groups also tentatively agreed on an audience of 7th – 10th grade students.
- Individuals from various regions of Alaska took part in the education survey and workshop.
- The majority of the target audience reported full access to the internet and to streaming video.
- Similar to the requests of various stakeholder groups, educators are interested in both archival and (near) real-time data.

WEAKNESSES

- Current funding imposes limits on the development of the types of interactive tools that would really be useful to education.
- AOOS is just beginning to provide information for the public. It is difficult to get people interested in an organization that is still developing.
- The significance of ocean observing systems has not been presented to the general public in Alaska. Educators need information on the significance of this project if they are going to be compelled to put it into use in their programs and classrooms.
- About half the audience interested in AOOS education products does not have a formal background in science.
- Training and follow-up support will be important components of the success of AOOS education programs and products. Training is made difficult by distance, small staff size, and high turnover rates.
- Though the majority of the target audience has access to streaming video and real-time or near real-time data, less than half use these resources on a monthly basis. AOOS will need to address such technology issues if its education programs and products require such resources.
- Educators surveyed were most interested in information regarding marine biology. The top two requests for content were animal tracking data and animal behavior data. AOOS does not currently offer this information.

OPPORTUNITIES

- AOOS is still in development. Educators have time to give input.
- Collaboration between scientists and educators can be a powerful opportunity for students. If scientists from partner organizations like NPRB are interested in working with educators, AOOS could help produce engaging and useful programs.
- National education efforts are developing. If those at the national level find funding, products they produce could be helpful at a regional level. AOOS has the opportunity to contribute to national efforts.
- AOOS partner organizations all offer varied resources that could present educators with a broad range of topics for curriculum or program enhancement.
- There are a number of informal science organizations in Alaska that are interested in working with AOOS. In addition to AOOS partner organizations, individuals from Discovery Southeast, the Center for Alaskan Coastal Studies, the Imaginarium, the GLOBE program and the Youth Area Watch program have all expressed interest in AOOS. Glenn Shuster, Director of NASA-Funded programs at Signals of Spring.net has also expressed interest in collaboration.
- An initial survey of seven school Alaska school districts showed over half offer marine science and/or oceanography courses at the middle or high school level. Students and teachers involved in these courses would have the background knowledge necessary to make good use of AOOS data and information.
- Educators are interested in the integration of local and traditional knowledge. Relationships with the Alaska Native Science Commission and the Barrow Arctic Science Consortium can offer assistance with developing such resources.

THREATS

- Future funding at the national level is uncertain. If funding is not secured and development comes to a halt during the development process, AOOS could lose credibility with educators.
- AOOS does not have the funds to commit to a broad range of education projects at this time. Maybe only one or two education projects will be possible using available resources. If groups involved cannot agree how to move forward on a focused priority, AOOS will have a difficult time producing valuable resources.

AOOS EDUCATION PLAN RECOMMENDATIONS

SHORT-TERM RECOMMENDATIONS

Option 1

According to workshop participants, educators want to be involved in the development process of AOOS. Everyone who attended the AOOS education workshop was interested in taking part in future discussions focusing on AOOS education efforts. A follow-up phone survey indicated that a limited number of people know about AOOS. Representatives of five Alaska science centers were contacted, and four of the five stated that their stakeholders were not asking about AOOS, most likely because they were unaware of the existence of the organization. To address these issues, AOOS could create an education liaison position. The responsibilities of this person would include:

- building a public awareness campaign;
- informing decision makers of educators' needs; and
- creating contacts within the formal and informal education sectors.

AOOS needs an individual dedicated to informing the general public, educators and students about ocean observing on a basic level. To build awareness, this person could produce general resources that would inform educators and the public about the significance of ocean observing. To begin, the liaison could build a few education pages on the AOOS website. Due financial reasons, initial pages would need to be kept simple, but general information about ocean observing could be conveyed nonetheless. A liaison could submit stories focusing on ocean observing to organizations such as the Alaska Science Teacher's Association, the Alaska Native Science Commission and the Prince William Sound Science Center for publication in their newsletters. Once AOOS has developed further, press releases could be sent to news organizations to inform a general public audience about AOOS as an organization. The liaison could attend festivals, such as the Oceans Festival in Anchorage, to showcase ocean observing systems in an education context. If possible, the liaison could share models or parts of ocean observing tools with festival goers and school audiences in order to educate people about ocean observing.

As AOOS continues to develop its infrastructure, an individual who could serve as the voice of educators would be an asset. An education liaison could participate in AOOS planning meetings to represent the needs of educators and students.

There is a core group of educators who are interested in using the Alaska Ocean Observing System for education purposes. An education liaison could further relationships with these educators and build contacts with additional educators who may know little about ocean observing systems. Participants deemed the first AOOS education workshop a success. An education liaison could implement future workshops to maintain involvement from the education community.

Option 2

Eighty percent of the informal education audience requested that AOOS produce interpretive products. Workshop participants ranked “products that are highly visual, easy to access and interactive” as a high priority. Participants noted that these products might take the form of displays or websites and that displays should be provided to partner organizations for exhibit. A follow-up phone survey indicated that very few people know about AOOS. Representatives of five Alaska science centers were contacted, and four of the five stated that their stakeholders were not asking about AOOS, most likely because they were unaware of the existence of AOOS.

To meet the expectations of the informal audience, and to inform a broader audience of the existence of the organization, AOOS could create a scaled version of a buoy to use as an interpretive object in key locations throughout the state. The buoy would feature instruments, or replicas of instruments, found on buoys in Alaska waters. It would be as functional as possible, depending on cost. People could interact with the buoy by measuring such things as temperature, salinity, wind direction and wind speed. The instruments might not work exactly as those on an actual buoy, but people would get a sense for what types of data is collected by buoys and why. The idea is to make the buoy interactive to draw people in. Once they begin exploring the buoy’s sensors, they may be compelled to explore supplemental material. Supplemental material might include maps showing the location of various ocean-observing instruments, graphics that lay out the organization of AOOS, or reading materials that explain the significance of ocean observing. If funding permits, a computer terminal might be located nearby so that people could access actual data from an authentic buoy.

The buoys could be displayed somewhere in Anchorage like a park or the library and at various Alaska science centers, including one in southeast. If the display is costly, it might be made to travel so that it could be shared amongst partner organizations. In most locations staff interpreters could add to the experience of the visitor by answering questions and providing additional information.

Option 3

Approximately 85 percent of the survey respondents, including formal and informal educators, identified websites as an important resource that AOOS could provide. Workshop participants also requested highly visual, easy to access, and interactive products such as displays or websites.

When AOOS is ready, an education component should be added to its website. One possibility for the short-term might be to create a product allowing students to explore wind. Wind speed and direction was ranked fourth in a list of 19 topics that educators might find helpful. The top two requests on the list, animal tracking data and animal behavior data, are not available on AOOS yet. Until they are, an exploration of wind might be a good way for AOOS to begin producing education resources. The project could be presented in a game format. Website visitors could be given a mission and required to use information about wind speed and direction to make the best choices to complete the mission. For example, users might be put in charge of getting a chemical or oil spill clean-up crew to a specific location. They would need to determine the best route, the amount of gas they might need, and whether or not the spill or wreck would shift positions due to wind. Obstacles might be introduced along the way to keep the scenario interesting. Perhaps the wind shifts or increases in intensity while the team is en route. A project such as this might give website visitors an opportunity to compare actual measurements of wind speed to visual observations of wind speed using the Beaufort scale; explore the relationship between wind speed and pressure gradients; investigate the effects of wind speed on pollution spread; or determine the effects of wind speed on fuel consumption.

Workshop participants indicated a high priority level for products tying into current events such as tsunamis, oil spills or global warming, or those that focus on most information a general public audience

might find highly useful such as weather forecasting. Given the number of spills that occur yearly, such a product might be a useful and relevant teaching tool. There must be a link between the data and information that is being collected for research purposes and the projects created for education purposes. The Prince William Sound project already provides information on wind speed and direction. This information could be used to create the project, and visitors could be directed to the Prince William Sound data sets to get information to make decisions about their missions. Depending on how it is implemented, this project may be too costly to take on initially, but the option is worthy of exploration.

The focus group that discussed possible audiences for AOOS education efforts suggested AOOS initially target an audience of 7th through 10th grade students. The rationale provided was twofold. Focusing on students in middle school and lower high school would allow the program to expand into a program for high school students, and content focused on this age student is likely to be of use for a general audience, so informal educators could benefit from this target as well. By shifting this focus somewhat, however, to an audience of 9th through 12th grade students, AOOS would be able to leverage existing capacity of marine science courses offered in Alaska schools. If AOOS undertakes this project first, there will likely be no funding for an employee to devote time to inform or train educators. In this case, a pre-existing audience of marine science students and teachers would likely be the easiest to target. It is recommended that initially, a 9th through 12th grade audience be the focus of this project. Eventually, products could be created for additional audiences.

LONG-TERM RECOMMENDATIONS

Depending on the path AOOS decides to take, the unused options above should be considered as projects to develop in the long-term. In addition, the following recommendations are provided for future projects.

- The survey indicated that approximately half of the educators interested in teaching about ocean observing did not have a science background. Furthermore, 70 percent of formal educators who responded to the education survey requested workshops to learn more about ocean observing. To meet these requests, AOOS should create a training program to teach educators about oceanography and marine science in general and about the education products AOOS creates. Education workshops will be an important outreach tool to keep educators involved and interested in ocean observing.
- One way to present multiple topics focused on ocean observing is to create an online ocean world that website visitors could manipulate. This would look similar to the game Sim City, but it would be focused on the ocean. It could be an exciting way to organize and teach about a multitude of topics related to ocean observing. As users interact with their ocean, situations would be created and users would need to respond. The situations would all be based on actual data and information obtained by AOOS. Website users could use ocean-observing tools to determine what was going on and why. They would need to decide which tools would be most effective for a given situation and where to locate them. Funding would be a part of the equation, as would environmental and anthropogenic factors. Users could access actual AOOS data and information to make good decisions about their ocean world. This format holds a number of possibilities for AOOS education.

OVERALL RECOMMENDATIONS

- The informal education survey indicated a high number of Alaska science organizations offer courses on careers. Formal educators who attended the education workshop also expressed an interest in career information. Each content area developed on the AOOS education page would likely be enhanced with a side note on careers. For example, the focus on wind that was suggested

as an initial unit could be enhanced by a look at the technicians and physical oceanographers that build, deploy, and maintain the tools that allow data gathering on wind. Information should be presented in the form of biographies, perhaps in an interview style.

- Every workshop participant was interested in being a part of the initial project. Get their feedback before launching new projects or programs.
- Workshop participants indicated that it would be important to tie projects to current events. If possible, try to launch new projects or programs in conjunction with events like a buoy deployment, the release of a new global warming study, or World Oceans Day. Publicize the event and the new resources in education journals, science list serves, and science or education newsletters.

GOALS, ACTION ITEMS AND EVALUATION PLAN

Goals	Time Frame	Action Item	Evaluation
<p>GOAL 1: AOOS will develop a network of educators from formal and informal settings who are knowledgeable of ocean observing systems and committed to advancing ocean literacy within their facilities and classrooms. This group should represent a coalition of education entities that have agreed on a united effort to expand the public knowledge of the ocean and ocean related issues.</p>	Year 1	create an education liaison position at AOOS to inform education efforts	Yearly performance evaluation
	Year 1	develop an education advisory committee to inform education efforts	survey advisory committee yearly on effectiveness of AOOS education programs and products
	Years 1-5	maintain contact with educators who participated in initial education survey and workshop; develop contacts with additional interested educators	track the number of educators who continue participating in AOOS workshops and events from year to year
	Years 1-2	build public awareness of the significance of ocean observing to stimulate interest in AOOS data and information	track number of hits to education website
	Years 2-5	plan and implement yearly AOOS education workshops to inform and train educators	track number of educators who participate in training debrief with participants at end of workshop
	Years 3-5	implement recommendations provided by educators who participate in AOOS planning efforts when possible	comment form available on website to elicit feedback

Goals	Time Frame	Action Item	Evaluation
GOAL 2: Develop exemplary education resources that can be used by educators in Alaska and throughout the world to further ocean literacy and encourage young people to pursue careers in science and technology	Year 1	develop education web pages with general information regarding ocean observing	track number and length of website visits
			evaluation form available for comments and suggestions
	Years 1-2	identify existing web resources so that AOOS is not re-creating materials and activities; depending on quality of resources; AOOS could determine to link to existing activities instead of creating a new product	develop quality criteria for ranking existing web resources
	Years 2-3	develop first interactive website component	track number and length of website visits
			evaluation form available for comments and suggestions
	Year 4-5	add interactive components to website	track number and length of website visits
			evaluation form online for comments and suggestions
	Years 4-5	develop programs to promote ocean literacy that could be delivered at informal science organizations or at youth organizations like Boys and Girls Club	evaluation forms filled out by participants and/or group supervisors
			track number of programs presented
	Years 1-5	develop suite of outreach products that interpreters at informal science organizations can use to educate about ocean observing (Possible products: PowerPoint presentations; displays; videos; audio footage; oral presentations; fact sheets; posters)	illicit feedback from interpreters who are using the products
Years 1-5	develop press releases for local newspapers and articles that could be reprinted in existing newsletters of interested groups	track number of publications reached	
		track number of articles published	
Years 2-5	plan and implement training program for educators interested in using AOOS information (may include workshops, online training, on-site training, etc.)	track number of educators who participate in training	
		debrief with participants at end of sessions	

APPENDIX A: AOOS EDUCATION PARTNER ORGANIZATIONS

Organization	Contact (Education or Other)	Title
Alaska Native Science Consortium	Patricia Longley Cochran	Executive Director
Alaska Sea Grant	Sherri Pristash	Meetings and Education Coordinator
Alaska SeaLife Center	Dana Sitzler	Education Director
Barrow Arctic Science Consortium	Glenn Sheehan	Executive Director
Kachemak Bay Research Reserve (ADF&G)	Terry Thompson	Education Coordinator
Prince William Sound Science Center	Kate Alexander	Educator



APPENDIX B: ONLINE SURVEY QUESTIONS

AOOS conducted two online surveys of formal and informal educators from May until September, 2005. The survey results were used to inform the AOOS Education Plan. Following is a condensed version of the questions asked in the online version of the survey. Though similar, the surveys were tailored to formal and informal educators. Both surveys are included here.

Informal Education Survey Questions

Personal Profile

Your Position / Your Contract Status / Your Highest Degree Level / Your Major Area of Study

Organizational Profile

Name of Your Organization / Organization Location / Locations Served by Your Organization
Audiences Served By Your Organization/ Number of People Served Yearly/ Total Number of Employees Working at Your Organization / Number of Staff in Education Department / Education Background (Degree and Major Area of Study) / Overall Yearly Education Budget

Current Programming

Please choose descriptors from each drop-down list to account for all the programs offered at your organization.

Current Program Topics Offered at Your Organization

Animal Adaptations	Archeology	Hydrothermal Vents
Animal communications	Careers	Kelp Forests
Animal Anatomy/Physiology	Climate Change	Sea Grass Beds
Animals, General	Conservation/Environmental	Tide Pools
Amphibians	Concerns	Life Cycles
Birds	Ecosystems	Marine Ecology
Fish	Habitats	Oceanography
Invertebrates	Beaches	Science Technology
Mammals	Coral Reefs	Weather/Storms
Reptiles	Estuaries	Other:

What level of importance do you place on using actual and/or real-time data for public education purposes?

Not important Minor Average High Maximum

What is your level of access to technology that supports:

Internet Services Hand-Held Computers
Desktop/Laptop Computers Video Streaming

How often do you:

use actual and/or real-time data when teaching? use desktop video?
use Internet services? receive video streams?
use websites? use video conferencing?
use e-mail?

How many times this year have you used the Internet to:

plan a lesson? engage a group in an online activity?
check facts? participate in online training?
obtain supplementary materials for group presentations?

How often, if ever, have you visited the following sites? If you are unsure, make your best guess.

AOOS: Alaska Ocean Observing System www.aoos.org
IOOS: Integrated Ocean Observing System www.ocean.us
GOOS: Global Ocean Observing System <http://ioc.unesco.org/goos/>
Alaska Department of Fish and Game <http://www.adfg.state.ak.us/>
Alaska Sea Grant <http://www.uaf.edu/seagrant/>
Alaska SeaLife Center <http://www.alaskasealife.org/>
Barrow Arctic Science Consortium <http://www.sfos.uaf.edu/basc/>
The Bridge Ocean Sciences Education Teacher Resources Center <http://www.vims.edu/bridge/>
Bristol Bay Science & Research Institution <http://www.bbedc.com/bbsri/index.php>
Center for Innovation in Engineering and Science Education <http://www.k12science.org/collabprojs.html>
Challenger Learning Center of Alaska <http://www.akchallenger.org/public/index.cfm>
COSEE websites such as www.cosee.net

Exxon Valdez Oil Spill Trustee Council <http://www.evostc.state.ak.us/>
 Kachemak Bay Research Reserve <http://www.habitat.adfg.state.ak.us/geninfo/kbrr/index.html>
 NASA <http://www.nasa.gov/home/>
 National Oceanic Atmospheric Association (NOAA) <http://www.noaa.gov/>
 North Pacific Research Board <http://www.nprb.org/>
 Prince William Sound Science Center <http://www.pwssc.gen.ak.us/pwssc/pwssc.html>
 U.S. Fish and Wildlife Service <http://www.fws.gov/>
 University of Alaska Anchorage <http://www.uaa.alaska.edu/>
 University of Alaska Fairbanks <http://www.uaf.edu/>

Needs

Which statement(s) apply to you or the staff with whom you work?

- would like to learn more about interpreting scientific data sets and spreadsheets
- would like to learn more about data that is available on the internet
- would like to learn more about how scientists apply data
- would like to learn more about how to use scientists' data with the general public

List Current Program Needs:

- | | |
|---------------------------|---|
| Additional Staffing | Office Space |
| Staff Training | Presentation Areas |
| Technology Infrastructure | Participant Housing |
| Current Research Data | Classroom Space |
| Access to Scientists | Teaching Resources (materials, props, etc.) |

How could your organization use scientific data provided by AOOS?

- | | |
|--------------------------------|----------------------|
| Interactive displays | Public materials |
| Curriculum development | Staff education |
| Group presentations or classes | Website improvements |
| Program materials | Other: |

What type of data would be most helpful to your organization? (Check off all that apply)

- | | |
|---|--|
| Acoustic Monitoring of Fish and Marine | Ocean Current Speed and Direction |
| Mammals | Ocean Weather Information |
| Animal Behavior Data | Organizational Profile |
| Animal Tracking Data | Probable Spill Trajectories Based on Modeled |
| Atmospheric Circulation Model Coupled w/ an | Scenarios |
| Ocean Circulation Model | Salinity |
| Bathymetry Data | Sea Surface Temperature |
| Foraging Ecology Data | Sea Ice Data |
| Hydrography Data | Wave Height |
| Ocean Color (Chlorophyll) | Wind Speed and Direction |
| Ocean Contaminants Levels | |

List additional information AOOS might provide that would benefit your organization.

What would be the best way to learn about available data sets and their applications?

- | | | |
|---------------------------|-------------------|--------------------------|
| On your own | Internet tutorial | Distance learning course |
| Workshop (central locale) | Other: | |

If you had access to real data collected by and for scientists in the field, how often would you or your staff use it?

What barriers might keep you or your staff from using actual scientific data?

- Inadequate technology
- Lack of time
- Unaware of available data
- Lack of training concerning data interpretation and application
- No barriers. We're fully ready to use it when it becomes available.
- Other:

If there is any other information you would like us to know regarding the use of data at informal science organizations, please provide your comments here.

Formal Education Survey Questions

Personal Profile

Position / Contract Status / Level of Students You Work With / General Subject Area You Teach or Supervise/ Your Highest Degree Level / Your Major Area of Study

Organizational Profile

Name of Your Organization / Organization Location / Number of Students Served by Your School District, College, University / Total Number of Employees Working at Your School District, College, University

**Do you know of anyone on your staff with the background or expertise to interpret ocean science data or information?
Do you know of anyone on your staff with the background or expertise to use Geographic Information System data?**

Current Programming

What level of importance do you place on using authentic (near) real-time for public education purposes?

What is your level of access to technology that supports:

Internet Services

Desktop/Laptop Computers

Hand-Held Computers

Downloading Video off the Internet

How often do you:

use authentic real-time or near real-time data
when teaching?

use Internet services?

use websites?

use e-mail?

use desktop video?

receive video streams?

use video conferencing?

How many times in the last year have you used the Internet:

to plan a lesson?

to check facts?

to obtain supplementary classroom materials?

to gather data with your class?

to engage your class in an online activity?

to take your class on a virtual field trip?

to participate in online training?

as a requirement for an assignment you've given

to students?

How often, if ever, have you visited the following sites? If you are unsure, make your best guess.

AOOS: Alaska Ocean Observing System www.aoos.org

IOOS: Integrated Ocean Observing System www.ocean.us

GOOS: Global Ocean Observing System <http://ioc.unesco.org/goos/>

Alaska Department of Fish and Game <http://www.adfg.state.ak.us/>

Alaska Sea Grant <http://www.uaf.edu/seagrant/>

Alaska SeaLife Center <http://www.alaskasealife.org/>

Barrow Arctic Science Consortium <http://www.sfos.uaf.edu/basc/>

The Bridge Ocean Sciences Education Teacher Resources Center <http://www.vims.edu/bridge/>

Bristol Bay Science & Research Institution <http://www.bbedc.com/bbsri/index.php>

Center for Innovation in Engineering and Science Education <http://www.k12science.org/collabprojs.html>

Challenger Learning Center of Alaska <http://www.akchallenger.org/public/index.cfm>

COSEE websites such as www.cosee.net

Exxon Valdez Oil Spill Trustee Council <http://www.evostc.state.ak.us/>

Kachemak Bay Research Reserve <http://www.habitat.adfg.state.ak.us/geninfo/kbrr/index.html>

NASA <http://www.nasa.gov/home/>

National Oceanic Atmospheric Association (NOAA) <http://www.noaa.gov/>

North Pacific Research Board <http://www.nprb.org/>

Prince William Sound Science Center <http://www.pwssc.gen.ak.us/pwssc/pwssc.html>

U.S. Fish and Wildlife Service <http://www.fws.gov/>

University of Alaska Anchorage <http://www.uaa.alaska.edu/>

University of Alaska Fairbanks <http://www.uaf.edu/>

Which statement(s) describe you? (Please check all that apply.)

I do not teach science.

I am comfortable teaching science using textbooks.

I am comfortable teaching science using pre-made kits.

I am comfortable teaching science using multiple sources found on my own

I am comfortable teaching inquiry-based science.

I am comfortable teaching science in a lab setting.

Needs

Which statement(s) describe you? (Please check all that apply.)

- I do not teach science.
- I would like to learn more about interpreting scientific data sets and spreadsheets.
- I would like to learn more about data that is available on the Internet.
- I would like to learn more about how scientists apply data.
- I would like to learn more about how to use scientists' data effectively with students.
- I am comfortable interpreting and applying data on my own. I only need access to additional data.

On which of the following topics/subject areas could your organization use more data, materials and information?

- | | | |
|--|----------------|-----------------|
| Acoustics | Ecosystems | Physics |
| Algal blooms | Energy | Physiology |
| Anatomy | Geochemistry | Plate Tectonics |
| Archaeology | Geology | Pollution |
| Biochemistry | Geophysics | Robotics |
| Biology | Glaciology | Seismology |
| Botany | Hurricanes | Thermodynamics |
| Cartography | Hydrology | Tsunamis |
| Chemistry | Ichthyology | Volcanology |
| Climate | Marine Biology | Water Quality |
| Cycles | Meteorology | Wind |
| Dependence/Interdependen
ce Earthquakes | Microbiology | Zoology |
| Ecology | Oceanography | Other: _____ |
| | Paleontology | |

What type of data would be most helpful to your organization? (Check all that apply)

- | | |
|---|--|
| Acoustic Monitoring of Fish and Marine Mammals | Ocean Current Speed and Direction |
| Animal Behavior Data | Ocean Weather Information |
| Animal Tracking Data | Organizational Profile |
| Atmospheric Circulation Model Coupled w/ an Ocean Circulation Model | Probable Spill Trajectories Based on Modeled Scenarios |
| Bathymetry Data | Salinity |
| Foraging Ecology Data | Sea Surface Temperature |
| Hydrography Data | Sea Ice Data |
| Ocean Color (Chlorophyll) | Wave Height |
| Ocean Contaminants Levels | Wind Speed and Direction |

List additional information AOOS might provide that would benefit your organization.

What would be the best way to learn about available data sets and their applications?

- | | | |
|---------------------------|-------------------|--------------------------|
| On your own | Internet tutorial | Distance learning course |
| Workshop (central locale) | Other: | |

If you had access to real data collected by and for scientists in the field, how often would you or your staff use it?

What barriers might keep you or your staff from using actual scientific data?

- | | |
|---|---|
| Inadequate technology | No barriers. We're fully ready to use it when it becomes available. |
| Lack of time | Other: |
| Unaware of available data | |
| Lack of training concerning data interpretation and application | |

If there is any other information you would like us to know regarding the use of data at informal science organizations, please provide your comments here.

APPENDIX C: WORKSHOP AGENDA

CREATING AN EFFECTIVE PLAN FOR FORMAL AND INFORMAL EDUCATION EFFORTS

AN ALASKA OCEAN OBSERVING SYSTEM WORKSHOP

DATE: Friday, October 7, 2005 -- 9:00 a.m.-4:00 p.m.

LOCATION: North Pacific Research Board Conference Room -- 1007 West 3rd Avenue, Suite 100, Anchorage

Agenda: Friday, October 7

***Please note:** This workshop will deal with formal and informal education audiences only. Formal educators are defined as those who teach at the K-12 or university level. Informal educators are defined as those who teach at informal science institutions such as aquariums, museums, science centers, etc. Outreach to stakeholder groups will be addressed separately.

Time	Speaker	Topic
8:30 am- 9:00 am		Registration and Continental Breakfast
9:00 am – 9:15 am	Chris Wettstein Education Project Planner Alaska SeaLife Center	Overview of Day – Introductions/ Audience Definitions/ Objectives
9:15 am – 9:45 am	Molly McCammon Director Alaska Ocean Observing System	Overview of AOOS – What is an Ocean Observing System? Where are we in the process of implementing the Alaska Ocean Observing System? Ms. McCammon will answer these basic questions in her overview.
9:45am - 10:15 am	Dr. Carl Schoch Science Director Prince William Sound Science Center	Overview of PWSOOS –Dr. Schoch will share highlights of the Prince William Sound Observing System, a pilot project for AOOS. He will describe its various components and potential applications.
10:15 am- 11:45 am	Small Groups – Leader #1: Robby Bear (Conference Rm.) Leader #2: Kate Alexander (Conference Rm.) Leader #3: Rusty Myers (M. Illenberg’s Office) Leader #4: Sheri Pristash (Library) Leader #5: Tim Buckley (Extra ASLC Office)	Break Out Session #1 – In small groups, participants will be given a chance to examine and discuss a number of websites and tools that were created to make use of science data and information. Each group will determine positive and/or negative aspects of the websites they examine and focus on how these could be used by AOOS to create products for educational and outreach use.
11:45 am- 12:30 pm	Small Group Leaders (5-10 min. each)	Conclusions from Break Out Session #1 -- Small group leaders will present the thoughts their group came up with regarding the website examination discussions. Groups should focus on how AOOS can use this information to create a product for educational use. This will be done with the whole group.
12:30 pm – 1:10 pm	Lunch (working lunch if necessary)	
1:10 pm – 1:30 pm	Chris Wettstein Education Project Planner Alaska SeaLife Center	AOOS Education Survey Results – Chris will present data regarding the following questions: What kind of an audience will likely use AOOS data and information? What programming exists that educators might try to incorporate AOOS data and information into? What products did educators indicate they would like AOOS to create?
1:30 pm – 1:50 pm	Dana Sitzler Education Director Alaska SeaLife Center	National Efforts – What other organizations are focusing on the use of ocean observing system data and information? What education efforts are being developed nation-wide? What education resources have already been developed by other regional ocean observing systems?

<p>1:50- pm 2:50 pm</p>	<p>Small Groups</p> <p><u>Group Leader #1: Katie Turner</u> (Meet in Conference Room)</p> <p>Kate Alexander Torie Baker Dan Belanger Jodi Doster Dona Helmer Trish Herminghaus Carl Schoch Christine S'gro</p> <p><u>Group Leader #2: Terry Thompson</u> (Meet in Library)</p> <p>Brett Bissell Tim Buckley Erin Graves Joanna Hubbard Micah Kiehl Sherri Pristash Gail Raymond Brendan Smith</p> <p><u>Group Leader #3: Marilyn Sigman</u> (Meeting Space TBA)</p> <p>Susan Bissell Jennifer Adleman Robby Bear Rich Capitan Jo Ellen Dunning Rusty Meyers Crystal Wrabetz</p>	<p>Break Out Session #2 – In small groups, participants will take part in a strategic planning session. Topics to be addressed include: “National Connections,” “Audience” and “Programs and Products.” The questions on the next page should guide each discussion. If your group finishes with the assigned topic, feel free to discuss the other two topics.</p> <p><u>National Connections:</u> A recent workshop hosted by the Monterey Bay Aquarium Research Institute focused on the creation of national instructional materials using ocean observing system data. Eighty-six percent of the workshop participants agreed the ocean observing community can and should develop a national education product. In light of this proposal, how should AOOS proceed to build its education efforts? What can we contribute to national efforts? Should AOOS concentrate entirely on creating its own Alaska-based education products, or should AOOS try to incorporate data from Alaska into a national product? What percentage of AOOS’s resources should be committed to national efforts? What does a national development push mean to AOOS in terms of product development, training and organizational structure?</p> <p><u>Audience:</u> Envision an audience that would be well-suited to learn from AOOS data and information. What does that audience look like in terms of age, location, and organizational affiliation? (Possible audiences may include community audiences such as coastal residents, science institution visitors, or business owners, and students at the elementary, middle, high school, or university levels.) Could programming targeted at informal audiences also be used for formal audiences and vice versa? Why or why not? What percentage of AOOS’s resources should be committed to various education audiences? As a group, decide which audiences should be addressed first, second and so on. What can AOOS do to create awareness of new resources amongst potential audience members?</p> <p><u>Programs and Products:</u> AOOS could create products such as education-specific web pages and tools, videos, public service announcements, etc. As a group, first decide which products would be most important to focus on creating. Then, determine how some of these products might be developed. Which sets of data and information would be most important to various audiences? Which products would likely benefit both formal and informal audiences? How much, if any, funding should go toward training various audiences how to use AOOS education products? What might some possible training sessions look like? Should training take the form of teacher workshops, student courses or community training? Should programs and products be developed by AOOS directly, or should individual organizations and school districts apply for AOOS funding to develop their own programs and products that could be shared with others?</p>
<p>2:50 pm – 3:20 pm</p>	<p>Small Group Leaders (10 min each)</p>	<p>Conclusions from Break Out Session #2 – Small group leaders will present their ideas on how AOOS should move forward in creating an education plan.</p>
<p>3:20 pm – 4:00 pm</p>	<p>Round Robin Session – Each participant will be given a final chance to share.</p>	<p>Final Assessments: In your opinion, what are the priorities AOOS should be focusing on as it develops an education plan?</p>

APPENDIX D: WORKSHOP PARTICIPANTS

City/Village	First Name	Last Name	Organization
Fairbanks	Sherri	Pristash	Alaska Sea Grant (Fairbanks office)
Barrow	Tim	Buckley	Barrow High School
Anchorage	Molly	McCammon	Alaska Ocean Observing System
Anchorage	Rusty	Myers	Alaska Pacific University
Anchorage	Jennifer	Adleman	Alaska Volcano Observatory / USGS
Anchorage	Robby	Bear	Anchorage School District
Anchorage	Crystal	Wrabetz	Anchorage School District
Anchorage	Micah	Kiehl	Anchorage School District, South Anchorage High School
Anchorage	Dona	Helmer	College Gate Elementary School
Anchorage	Erin	Graves	The Imaginarium
Anchorage	Katie	Turner	West High School
Cordova	Torie	Baker	Alaska Sea Grant Marine Advisory Program
Cordova	Kate	Alexander	Prince William Sound Science Center
Cordova	Carl	Schoch	Prince William Sound Science Center
Homer	Marilyn	Sigman	Center for Alaskan Coastal Studies
Homer	Terry	Thompson	Kachemak Bay Research Reserve
Seward	Dana	Sitzler	Alaska SeaLife Center
Seward	Brendan	Smith	Alaska SeaLife Center
Seward	Chris	Wettstein	Alaska SeaLife Center
Naknek	Jodi	Doster	Bristol Bay Borough High School



APPENDIX E: PHONE SURVEY QUESTIONS

After the education workshop, a phone survey was conducted to further assess outreach needs to stakeholder groups outside of formal and informal educators. The following questions were used to guide each discussion.

Phone questionnaire – AOOS Stakeholder Outreach

Name / Organization

Stakeholders your organization represents

Locations Represented

Approximate numbers for each group

What programs/products do you currently offer to stakeholder groups?

What programs/products do you currently offer stakeholders that might be enhanced by using AOOS data/information?

What products are stakeholders asking for? Rank them in order of need.

- Displays/kiosks in multiple locations to learn about ocean observing systems

- Website to access data and information

- Books/pamphlets

- Other

What programs are stakeholders asking for? Rank them in order of need.

- Training on using data tools

- Training on general ocean science

- Other – give examples

What content needs do stakeholders have?

- Ocean weather forecasts

- Ocean weather nowcasts

- Wave height forecasts

- Wave height nowcasts

- Sea surface temperature forecasts

- Sea surface temperature nowcasts

- Other

What difficulties might stakeholders have in accessing AOOS data and information?

Have any stakeholders contacted you (or anyone in your organization) about AOOS specifically?

What were their specific comments?