

COSEE Alaska: People, Oceans and Climate Change Annual Report Year Two (Aug 1, 2009 – May 1, 2010)

Executive Summary

COSEE Alaska, with a geographic emphasis on the U.S. Arctic and sub-Arctic coasts and a nationally significant thematic focus on ocean climate change, recently completed its second year as a partnership between the Alaska Ocean Observing System (AOOS), the Alaska SeaLife Center (ASLC), the University of Alaska Fairbanks School of Fisheries and Ocean Sciences (SFOS), the University of Alaska Fairbanks Center for Cross-Cultural Studies (CXCS), the Anchorage School District (ASD), and the Alaska Sea Grant Program (ASG).

During our second year, COSEE Alaska met with its expanded regional advisory board, accomplished many of our Year Two goals (detailed below) and participated in numerous national activities, including the national COSEE Council, COSEE Network and several working groups. Although one of the newest members of the COSEE network, we have been contributing to the development of reports and data in preparation for the upcoming COSEE National Program Decadal Review by the National Science Foundation. We forged new strategic alliances and partnerships with organizations that expand our ability to network ocean scientists with diverse educational and public audiences both in Alaska and in the nation, and successfully reached out to coastal Alaska and its diverse communities.

COSEE Alaska Year Two Overview

During the second year of our funding, we achieved many of our goals as well as capitalized on unique opportunities and collaborations.

Traditional Knowledge

- ***Ocean Science Fairs:*** We expanded our Ocean Science Fairs to include cyberfairs and published a collection of Ocean Science Fair Activities and how-to videos.
- ***Publications & Resources:*** A new book entitled *Alaska Native Education: Views from Within* was co-edited by PI Dr. Ray Barnhardt and published with supplemental funds from NSF. PIs also developed a COSEE Science Fairs Handbook and how-to videos.

Reaching Ocean Scientists

- ***Workshops & Seminars:*** In January 2010, we hosted another successful Communicating Ocean Science Fair Workshop, featuring COSEE National Advisory Council member Dr. George Matsumoto, COSEE California PI Craig Strang, and COSEE OS PI Annette de Charron, among other speakers, while also hosting outreach luncheon speakers for nearly 800 scientists at the 2010 Alaska Marine Science Symposium. We coordinated the education and outreach strand of an Ocean Acidification Workshop, leading a break-out discussion with scientists, journalists and educators, and hosted a well-attended GOOGLE Ocean workshop. To reach more researchers, we gave a university-wide seminar at UAF as well as advised scientists on their broader impacts proposals.

- ***SEANET:*** We grew SEANET, elected a Steering Committee, and launched an Ocean SEANET networking site on Ning, as well as a listserv.
- ***COSIA:*** We set the groundwork for bringing the COSIA course to Alaska in the spring of 2011 preceded by a training workshop in the fall of 2010, with a traditional knowledge element.
- ***Multimedia:*** We collaborated with COSEE NOW on two podcasts featuring ocean scientists in the field, and developed lesson plans for the Prince William Sound Field Experiment on the 20th anniversary of the *Exxon Valdez* Oil Spill. We also developed three short *Faces of Climate Change* videos featuring Alaska Natives and western scientists.

Resources for Educators

- ***Virtual Field Trips:*** Midyear we launched virtual field trip development in Barrow, Alaska.
- ***Professional Development:*** We participated in teacher professional development workshops with partners and shared Ocean Science Fairs “best practices” at the Alaska Math and Science Teachers Association.

Ocean Literacy Awards

- ***Alaska Ocean Leadership Award:*** We awarded the first annual Alaska Ocean Leadership in Ocean Literacy Award during the Alaska SeaLife Center’s Ocean Gala on the eve of the Alaska Marine Science Symposium.

Strategic Planning

- ***Signature Programs:*** Towards the end of Year Two, COSEE Alaska PIs and staff re-organized the original set of Activities to better reflect our key signature programs, which will be reflected in our Year Three Work Plan, which is currently under development.

Overall description of program

COSEE Alaska was designed to bring together researchers and educators to develop collaborations that integrate, synthesize and enhance the ocean literacy of students and the public in Alaska, as well as that of national audiences. As described in our original grant proposal, our goal is to create a long-lasting network of scientists and educators that will work together to:

- increase ocean literacy inside and outside Alaska;
- use ocean climate change as a theme for developing resources to enhance ocean and science curricula by including Alaska Native knowledge and sharing that knowledge with educators and students in Alaska and the rest of the nation;
- take advantage of the Internet and distance learning as tools for disseminating these materials;
- provide professional teacher development and training opportunities; and,
- leverage these activities with other existing programs to create additional synergism.

We proposed to achieve these objectives with these activities:

- WEAVE: Increase collaboration and interaction between ocean scientists, educators, students, and coastal communities in Alaska and the nation with an emphasis on ocean climate change.
- PATHFIND: Provide tools, services and training to help ocean scientists effectively participate in education and outreach with a focus on ocean climate change and ocean literacy.
- SHARE: Enhance teacher capabilities for incorporating ocean climate change information and “place-based” knowledge into existing curricula through professional development and training.
- INVITE: Increase access to and participation in ocean sciences by underrepresented and underserved populations.
- BRIDGE: Increase and broaden communication about ocean science and traditional knowledge of ocean climate change to audiences in Alaska and the nation, including the COSEE network

Our original set of activities to achieve these objectives included the Communicating Ocean Sciences Workshop (COSW) to be held annually in conjunction with the Alaska Marine Science Symposium, establishment of a scientist-educator network called SEANET, development of a variety of virtual field trips, teacher professional workshops, and other educational materials, and establishment of an Ocean Science Fair program (Appendix A).

With the refined direction from NSF for all COSEE Centers to focus on helping ocean scientists achieve excellence with their “broader impacts,” shared at the 2008 COSEE Network meeting in California, we have identified key signature programs of excellence among these activities, focusing on those programs that distinguish our Center among others in the Network, and reclassified other planned activities as tools or products that support those signature programs. These will be reflected in our Year Three Work Plan.

Year Two Highlights

COSEE Alaska Management and Leadership The Senior Management Team, which consists of representatives from each of the partner organizations, the director and the program manager, met via teleconference and in person to coordinate overall activities, respond to opportunities to collaborate and review progress on key activities. Additionally, Lead PI McCammon met frequently with Director Deans and Program Manager Sigman on specific COSEE Alaska business. Working together in the same physical location facilitates these relationships.

COSEE Alaska Advisory Council: The COSEE Alaska Advisory Council (Appendix B) held its second meeting in Anchorage on October 5, 2009, and NSF Program Manager Don Elthon, and COSEE Council

Chair Lundie Spence addressed the group via teleconference to provide an overview of the national program and talk specifically about the COSEE National Program Decadal Review currently underway at NSF. Molly McCammon and Co-Chair Larry LeDoux facilitated the meeting, in which staff and principal investigators shared details about the COSEE Alaska program, and engaged in lively discussion with the advisors. Appendix C includes detailed minutes of the October 5 meeting, with key action items listed at the conclusion of the minutes. Highlights include the Council advising PIs to consider focusing on key signature programs of excellence, identifying other planned activities as tools or products that support those signature programs. The Senior Management Team later held a working teleconference in early spring and agreed upon signature programs that are being incorporated into our Year Three Work Plan.

Partners and Collaborators: COSEE Alaska collaborated with a wide variety of organizations representing key stakeholders in the research and education communities. COSEE Alaska has catalyzed a number of partnerships in response to requests from scientists and educators (Appendix D). An extensive list of collaborators are listed in Appendix E and includes organizations within the Alaska region as well as a number of existing COSEE Centers (COSEE NOW, Coastal Trends, California, Ocean Systems, Pacific Partnerships) and those proposing new centers in Hawaii and Nebraska.

COSEE Council and Network: Molly McCammon, COSEE Council member, and alternate Nora Deans attended monthly COSEE Council teleconference calls. Deans represented COSEE Alaska at the annual COSEE Council/National Advisory Committee meeting in November 2009 in Washington D.C. Dr. Ray Barnhardt participates in the COSEE Network Diversity Working Group, and Marilyn Sigman participates in the Web Working Group and ENTs. Dr. Andrea Anderson is involved in the Evaluation Working Group and links closely with the National Evaluation Team, and she and co-evaluator David Plude attended the Evaluators Workshop in Rhode Island in September 2009. Anderson is also working closely with Deans, who is the Center contact for the Decadal Review Working Group, to carry forward COSEE Alaska accomplishments as part of this national review. Sigman represented COSEE Alaska at the Best Practices in Professional Development Workshop in Rhode Island in September 2009. McCammon, Sigman and Barnhardt all attended the COSEE Network meeting in May 2010 in Seattle, Washington.

Activities and Key Outcomes:

- ***Activity Set 1: Link scientists with educators via an expanded Communicating Ocean Sciences Workshop and additions to the Alaska Marine Science Symposium.*** The 2010 Alaska Marine Science Symposium (AMSS), a free symposium held annually in Anchorage, attracted more than 750 marine scientists and educators from the U.S., Canada, and Russia to share ocean research ongoing in Alaska's seas. COSEE Alaska, partnering with the North Pacific Research Board and the Alaska Ocean Observing System, held the fourth annual Communicating Ocean Science Workshop (COSW) on Monday, January 18, 2010, which drew scientists, graduate students, community members and media. The COSW was followed by a formal SEANET luncheon meeting (see Activity 2.)

As part of the COSW, invited speakers shared experiences and highlighted "best practices" of national, regional and local ocean education programs, as summarized in the evaluation report, "Communicating Ocean Sciences Workshop at the AMSS" (Appendix F). The 2010 COS agenda (Appendix G) included scientists sharing experiences with new media, the use of concept maps, and a scientist's experience partnering with an elementary teacher from a remote island in the Bering Sea in a year-long activity bringing real-time ocean research into the classroom and curriculum. Other speakers included an Alaska Native sharing guidelines and best practices for

scientists sharing research with Alaska Native communities, and the COS/COSIA courses developed by COSEE California.

To showcase best practices in outreach and broader impacts with all Symposium participants, COSEE co-sponsored luncheon presentations at the 2010 conference. The first luncheon featured National Ocean Science Bowl competitions between local high school students and teams of academic and NOAA scientists. Other speakers included Dr. Larry Mayer with a popular talk about mapping the Arctic seafloor. Mike Beck from The Nature Conservancy discussed marine protected areas and coastal and marine spatial planning and Charlotte Vick from Deep Search Foundation encouraged scientists to share their research on the new GOOGLE Ocean platform.

In the evaluation report for these activities, (Appendix F), Dr. Anderson writes that attendance for the Communicating Ocean Sciences Workshop was nearly 50% higher than previous years. Approximately 120 scientists, students, and informal science practitioners gathered in Anchorage to hear about efforts to bring ocean science understanding to the public. Findings from the event show that COSEE Alaska effectively identifies areas of interest and need for the audience and provides programming that is useful and likely to be used. All the sessions were interesting to the participants, but the Pribilof Islands-Fur Seal research, involving an ocean scientist, a teacher and Alaska Native students was most captivating and compelling to the audience. As noted in previous reports, the COSW is an education and outreach model that ought to be widely shared with the COSEE Network. Among survey respondents, 81% rate having educators and scientists collaborate in this manner as having “Vast” value (the highest rating option possible).

Following the COS Workshop, those in attendance discussed the SEANET organization as an opportunity to interact and to engage with other ocean science education activities. Among the things discussed was extending the COS Workshop to include more educator-oriented sessions over the weekend prior to AMSS. SEANET members will take the lead in making this happen in 2011. SEANET members were also enlisted to host the National Marine Educators Association Conference in 2012. The NMEA conference is one of COSEE Alaska’s signature activities.

- **Activity Set 2: Develop SEANET: a network of scientists, students, and community members in Alaska.** SEANET was formally launched at the Communicating Ocean Science workshop in January 2009, but the need for such a network and the functions it could fulfill were discussed at workshops in 2008 and 2007. This core group includes representatives of more than 80 organizations and agency units, including the major marine research institutions in Alaska as well as a number of universities and consultants outside of Alaska (including several in Russia and Canada) who conduct research within the region, state and federal agencies that employ both researchers and education/outreach specialists, Alaska Native organizations and communities involved in natural resource management, and non-profit organizations that provide informal marine education to Alaska communities, schools, and visitors.

During our second year of funding, we developed a governance document for SEANET (Appendix H) and organized an Interim Steering Group, which included representatives from the ocean science community, informal and formal education institutions, media outreach specialists, students and community members. This group met by audio-conference in December, 2010 (Appendix I), to provide input on the newly established Alaska Marine Literacy Award and to help plan an organizational meeting that was held on January 18, 2010, the first day of the Alaska Marine Science Symposium, in Anchorage. The meeting was attended by approximately 100 people (list of registered attendees in Appendix J). Additional nominations to the Steering

Committee were solicited. All of the members of the Interim Steering Committee chose to continue and the final SEANET Steering Committee membership is listed in Appendix K. COSEE Alaska also began providing communication support and resources to a broad network. In October of 2009, more than 300 scientists, educators, and science communicators were contacted via email to become members of the SEANET listserv and encouraged to join a SEANET social networking website, <http://oceanseanet.ning.com>. Both the listserv and networking site have been advertised at education and science conferences and on other listservs for Alaska scientists and educators. The SEANET listserv has grown to 350 members and membership in the networking site has grown to 160 members.

COSEE Alaska sends out a mailing to the listserv and networking group approximately every two weeks, highlighting recent science news stories and resources for communicating and teaching about marine literacy, Alaska ocean climate change, and Alaska Native knowledge related to climate change. Postings have included:

- 53 blog items – science new stories, science education news stories, requests to pilot lesson plans, and science outreach opportunities,
- 31 featured resources – reports, books, web pages, lesson plans, and new COSEE Alaska publications, and
- Calendar information for numerous conferences, workshops, and science outreach events and opportunities.

The items posted to the networking site are archived on the COSEE Alaska website and a link is provided on the COSEE Alaska website to join the networking site.

The mail program used to send out notices to the listserv provides statistics about the percentage of each mailing that is opened, which ranges from 24 – 35% of the approximately 350 emails sent out in 8 mailings. Google Analytics was used for tracking visits to the networking site beginning November 23 2009, which missed the initial traffic when the listserv and networking site were launched in late October. Traffic to the networking site between November 23, 2009, and May 1, 2010, shows a distinct pattern of peaks of visitors following a mass email to the members about new postings and a similar email to the listserv. Google Analytics statistics show:

- Daily peaks of 60 and 80 unique visitors following a message about new postings;
- 2,070 visits (1,213 of them unique visitors) to 1,226 pages with a total of 7,500 page views;
- An average viewing of 3.6 pages/visit with 2.56 minutes spent;
- Referrals to the networking site from the listserv, the COSEE Alaska website, and the COSEE network website;
- A distribution of visitors from 60 countries (85% of the total visits from the U.S.), 48 states (49% of the total visits from Alaska), and 30 Alaska communities (29% of total visits from Anchorage);
- The most visits to the networking site to the homepage and the members page followed by specific blog stories with the most viewed science news stories about the mixed effects of ocean acidification on marine invertebrates, the breaking news story about emails stolen from climate change scientists, and the implications about sea ice melt for ocean acidification; and
- As of May 1, 2010, two-thirds of the members in the online networking group are from Alaska and one-third from 19 other states (including four members from three other COSEEs) and two foreign countries (Canada and the UK). Within Alaska, most members are in Anchorage (32), Fairbanks (13), and Homer (13). Outside Alaska, most

members are from Washington (8) and California (7). The group includes a mix of scientists, educators, journalists, and ocean conservation activists.

The networking site was open to members of the listserv and anyone else on the web until February 2010, when privacy issues relating to email addresses and undesired spamming resulted in a decision to close the site to members only. The listserv members continue to receive information about new postings and direct links to many of the featured blog stories and resources, although the response is not being tracked.

The SEANET Steering Committee has agreed to be the Planning Committee for the 2012 NMEA Conference in Anchorage with the leadership of the Northwest Aquatic and Marine Educators (NAME, the hosting chapter of NMEA) and is also engaged in planning for a statewide marine education and outreach conference in January, 2011, as part of an expanded COSW.

- **Activity Set 3: Education & outreach tools for scientists.** COSEE Alaska plays a unique role in facilitating ocean and climate change science outreach by ocean scientists through its partnership with the University of Alaska Fairbanks/School of Fisheries and Ocean Science (UAF/SFOS) and partnerships with other major research organizations. Through the efforts of the COSEE Alaska team at SFOS, PI Michael Castellini and Ruth Post, we completed a first draft of a faculty survey of SFOS scientists to assess their awareness of and need for COSEE Alaska resources and programs. This involved both in-person interviews by Post with select SFOS faculty, and further analysis of those findings relative to a “broadcast” method of interviews. Typical responses to SFOS scientist survey on outreach included:
 - I would like to do this, but don’t know how.
 - I’m interested but I need time and money.
 - I have a grant (e.g., NPRB) that requires that I do it
 - I’m interested, don’t have a grant, but will be glad to help.
 - I’m new to Alaska/institution/communities so don’t know how to contact people.
 - I’m middle career and want to be involved but don’t know how to contact people, get help.
 - I’m interested but have so much to do to get tenure.

The draft survey helped fine-tune the larger COSEE survey that was conducted during the AMSS meeting in January, 2010.

In April 2010, COSEE PIs and staff put on a seminar for UAF faculty, graduate students and staff at the UAF SFOS to review broader impacts requirements and describe how COSEE Alaska could provide support to scientists in developing proposals and finding education and outreach partners in Alaska communities. We also toured the University of Alaska Museum of the North and discussed potential collaborations, including their role in the Spring 2011 COSIA course.

COS/COSIA Course: Dr. Castellini also organized a site visit and tour of SFOS-Fairbanks-COSEE Alaska operations for Craig Strang, COSEE California, as part of our efforts to bring the COSIA course to UAF SFOS to teach research graduate students how to present science to

informal audiences, interwoven with Alaska themes and traditional knowledge. The class syllabus and curriculum review forms have been submitted for an August 2010 approval and review by UAF Academics. COSEE Alaska and SFOS are partnering with the UAF Museum of the North and the UAF Department of Wildlife and Fisheries and their NSF-funded GK-12 program, which has a focus on climate change, to instruct a test graduate-level course for the GK-12 students from several departments and students from SFOS in both Fairbanks and Juneau. The informal education partner in Juneau will be the State Museum, which has a NOAA Science-on-a-Sphere exhibit. Instruction in pedagogy is consistent for both the COS/COSIA and GK-12 programs as is the emphasis on communication of climate change science for COSEE Alaska and the Museum's GK-12 program. COSEE Alaska instructors, including PIs from COSEE's other informal education partner, the Alaska SeaLife Center, will contribute the ocean literacy context and ocean science content.

Broader Impacts Support: Dr. Castellini, who has been a member of the acclaimed NSF-funded climate change outreach program "Polar Palooza" since its creation, has promoted COSEE Alaska nationally and internationally through his website <http://www.sfos.uaf.edu/directory/faculty/castellini/>

To reach other ocean scientists beyond the UAF campus, COSEE Alaska was listed as a resource for scientists in the North Pacific Research Board (NPRB) guidelines about best practices for the outreach and education required in grant applications during the 2010 request for proposals process (see http://www.nprb.org/proposals/2010rfp_docs/2010_RFP-released_2Oct09.pdf)

Throughout the year, COSEE Alaska PIs and staff responded to a variety of requests from scientists and science outreach specialists for assistance with the development of broader impacts and community involvement activities for grant applications. We also facilitated opportunities for scientists to participate in interviews for videos and podcasts.

COSEE Alaska also acted as a catalyst to develop broader geographic partnerships among three collaborative projects based in Anchorage, Cordova, and Sitka. A Cordova-based partnership involving science and education organizations in Prince William Sound focused on developing online environmental data applications and K-12 curriculum for schools throughout the Copper River watershed. An Anchorage-based partnership, headed up by Alaska Geographic, the cooperating organization for education and outreach by four federal land management agencies, and ESRI, is developing a youth and community-based citizen monitoring program with a common online GIS map base and forum for communities in the Gulf of Alaska. A Sitka-based partnership of scientists and educators focused on a planning grant proposal to NSF for a Climate Change Education Center for Alaska coastal communities in Southeast Alaska.

COSEE Alaska facilitated a discussion among the three groups to encourage partnerships over a broader geographic area, which would build on their respective interests and capacities. UAS scientist Jan Straley characterized the result in an email to COSEE Alaska P.I. Michael Castellini as follows:

"We did a teleconference with Marilyn (Sigman) and prospective partners a few months ago and we are partnering with one of the groups and the others are prospective partners to be brought in with supplemental funds if we get funded. This was prior to us bringing Jeremy (Mathis) onboard. It was great for Marilyn to bring all the parties together who are thinking along the same lines for the Gulf of Alaska. Beyond this current outreach proposal I think the meeting helped forge partnerships."

Regional Resource Directory: Our regional directory of scientists, educators, and community members engaged in communicating about research in Alaska's seas to diverse and public audiences will draw on a database compiled during Years One and Two, along with the SEANET listserv and networking groups and attendees to the Alaska Marine Science Symposium. We planned to collect information about scientists during the 2010 Symposium; however, the need to survey scientists for evaluation purposes for the Decadal Review took precedence. An informal survey of the needs of informal educators for professional development identified 35 informal educators (many of whom represented informal education organizations or institutions) who wanted to be listed in the directory.

The regional directory will be a significant tool for providing meaningful connections between scientists and communities. For example, the Alaska Sea Grant program has marine advisory agents in ten Alaska coastal communities. These agents often provide community and classroom presentations about research happening in the local area, but do so now on an opportunistic basis when they become aware that scientists will be traveling to field sites near their community. The new COSEE Alaska directory will provide guidance and contact information for scientists for specific communities to set up outreach events and a potential list of scientific presenters for community educators. In addition, the directory will provide guidance about protocols for visiting and sharing research plans and results with Alaska Native villages, which often rely on subsistence resources in the area of study.

We have posted the directory entry form on our website, and are recruiting entries through mailings to the SEANET listserv and networking group, a news story and downloadable form on the COSEE Alaska directory, and with a direct email to the 35 informal educators who expressed prior interest. We will be recruiting teachers in the fall of 2010, and will also feature the entry form on the 2011 Alaska Marine Science Symposium website and email reminder system. Alaska Sea Grant is developing an online searchable database for the directory and we plan to publish a hard-copy version before the Alaska Marine Science Symposium, which will be included in the conference packet for more than 700 conference registrants. The directory will also be a prominent link on the websites both of the Alaska Ocean Observing System and the North Pacific Research Board and will be listed in NPRB's annual request for proposals, and on the websites of other COSEE partners and research organizations.

- *Activity Set 4: Enhance and develop ocean science/ocean climate change educational resources*. Included in the COSEE Alaska scope of work for Years One and Two was an initiative to help school districts in Alaska organize local and regional science fairs around themes related to local knowledge of oceans, fisheries and marine environments.

Ocean Science Fairs and Projects. COSEE Alaska's ocean science fair initiative has been coordinated through the COSEE Alaska team at the Center for Cross-Cultural Studies (CXCS)/Alaska Native Knowledge Network (ANKN) housed at the University of Alaska Fairbanks. The first pilot round of science fairs during Year One was initiated through a statewide planning workshop with teachers, which was held in Anchorage October 10-11, 2008. A second workshop for Year Two participants was held on January 22, 2010 at the COSEE offices in Anchorage (see attached agenda Appendix L)

A series of local and regional science fairs incorporating an ocean science theme were held by participating school districts across the state, culminating in the top projects entering the Alaska

State Science Fair in Anchorage March 26–27, 2010. Financial support was provided by the CXCS COSEE office to cover the costs of one student and one teacher from each participating district to attend the Alaska State Science and Engineering Fair in Anchorage. In addition, the State Science Fair included the participation of some rural students through digital media and the internet – cyberfairs – (using SKYPE), to offset the burden of travel costs. Guidelines and resources for the science fairs were posted on the web at <http://ankn.uaf.edu/Curriculum/COSEE/> and published in a COSEE Science Fair Handbook posted on (<http://ankn.uaf.edu/Curriculum/COSEE/COSEEBook.pdf>) so that teachers and students could obtain detailed information on what was needed to host a successful local COSEE Science Fair and participate in the State Science Fair. Information was also provided on the web site for helping students choose and develop exciting science fair projects.

We again contracted with retired teacher Alan Dick, along with Inupiaq graduate student Wilma Osborne in Nome, to assist in organizing the COSEE Science Fairs. Their services were made available directly to school districts and teachers, including helping participating school districts to sponsor a local or regional science fair, providing workshops for participating teachers, developing ideas for ocean-oriented science fair projects, preparing video samples of exemplary science fair projects, and organizing/implementing an ocean science theme for the annual Alaska State Science Fair. Mr. Dick has also been available to assist schools in the development and implementation of ocean- and marine-related curriculum, drawing upon the science projects developed for the science fairs. The following science fairs were held this past year:

- Unalaska Science Fair (Unalaska)
- Lower Yukon School District Science Fair (Emmonak)
- State Ocean Science Bowl (Seward)
- North Slope Borough SD Science Fair (Barrow)
- Bering Strait School District Science Fair (Unalakleet)
- Alaska State Science Fair (Anchorage)
- Southeast Alaska Science Fair (Juneau)
- Kuspuk SD Science Fair (Sleetmute)
- Kodiak Island Borough SD Science Fair (Kodiak)

More than 50 projects were judged at the statewide Science and Engineering Fair using the two types of criteria (western science and cultural relevance/traditional knowledge), a significant increase over the number of projects judged in 2009. This resulted in ties and special awards. COSEE Alaska gave out \$675 in 15 awards to 18 individual students and student team members. The first place high school project was by a student in Barrow with the project “How Will Global Warming Affect Stored Food in Ice Cellars?” The first place middle school award went to a project on corrosion of boat bottoms by a student in Unalaska (“Whatever Floats Your Boat”) and the first place elementary school award went to a student from Anchorage (“Rain Forest”). An Inspirational Teacher award was given for the first time, going to Raphia Maglanio from Mountain Village.

Other Resources and Content: Within the broad thematic focus of ocean climate change and the regional focus on Alaska and the Arctic, COSEE Alaska has set priorities for organizing and developing educational resources in four areas:

- Sea ice dynamics and implications to marine ecosystems;
- Accelerated coastal erosion (related to diminished ice);
- Hydrologic changes that will affect nearshore salinity regimes and ocean current dynamics; and

- Ocean acidification.

We use our COSEE website and postings to the SEANET listserv and social networking website to highlight high-quality education and outreach resources for these topics. We are currently reviewing available resources and existing science outreach programs on these topics to guide educators to resources with accurate information, engaging formats, and visuals that illustrate dynamic processes that often require illustration over long time scales. We are also reviewing resources that present Alaska Native perspectives on climate change in partnership with the Alaska Native Knowledge Network.

Ocean Observing Resources: COSEE Alaska partnered with the Alaska Ocean Observing System (AOOS) to facilitate science outreach using the AOOS Prince William Sound Field Experiment during July and August 2009. The project involved more than a dozen scientists from the University of Alaska, Prince William Sound Science Center and Oil Spill Recovery Institute, NASA's Jet Propulsion Lab, and four universities in California, Maine, and Texas and field tested AOOS models for wind, waves, weather, and ocean circulation. COSEE Alaska staff assisted the other partners in the use of both standard and innovative outreach strategies based on a theme of "Sound Predictions 2009." The communication objectives were to: 1) raise awareness that the experiment was taking place and generating "real-time" data that was being compared to the model forecast and 2) increase stakeholder and public understanding about the importance of an accurate observing system in terms of developing specific applications of the data to meet stakeholder needs.

During the field experiment, we partnered with COSEE Networked Ocean Systems (COSEE NOW) to develop and broadcast two Ocean Gazing podcasts based on interviews with scientists and Alaska community members. Publicity emphasized the timing of the experiment, which occurred near the 20th anniversary of the *Exxon Valdez* oil spill. News about the experiment was provided online and through press releases, newsletters, brochures, and newspaper inserts distributed free to ferry and cruise ship passengers. In addition, community gatherings were held in Valdez and Cordova, Alaska. Web blog entries and photos were posted daily, and a NASA Jet Propulsion Lab data portal provided opportunities for interactive comparisons of the predicted and actual drifter trajectories.

COSEE Alaska also partnered with the Prince William Sound Science Center to develop middle school lesson plans to teach science concepts illustrated by the field experiment and employing Alaska ocean observing data. Drifters and gliders were engaging "hooks" for inquiry-based lessons but access to data in formats usable by teachers and students is proving to be challenging. The lesson plans are in draft form and have been piloted by PWSSC in local schools. The target date for availability online is July 15 2010 for inclusion in a session at the National Marine Educators Association annual conference, which will also feature real-time data and oil spill related ocean observing activities developed by other COSEEs and ocean observing regional associations.

Virtual field trips. The Alaska SeaLife Center has taken the lead in creating virtual field trips for COSEE Alaska. Two virtual field trip programs are being developed, one on the Bering Sea with Michelle Ridgway for the 2010/2011 school year, and one on Barrow sea ice and whale hunting for 2011/2012 school year. Two formats are anticipated: a 50-minute, distance-delivered session with educator facilitation, and a shorter stand-alone version, which could include ASLC scientist interviews and captive animal footage. We made a preliminary trip to Barrow, Alaska in February, to develop contacts as well as possible content for an Arctic field trip, which will

include lessons regarding the landscape, animals and peoples of the Arctic. We plan to have this virtual field trip tested and operational by summer 2011. Currently, the ASLC staff is putting the finishing touches on a virtual field trip entitled “Beringian Gastroclods: An Accidental Discovery about Climate Change,” to debut in October of 2010. The ASLC also has an Oceans Today kiosk, and COSEE Alaska will be providing content for both regional and national audiences.

- **Activity Set 5: New techniques for education and outreach.** COSEE Alaska continued to identify gaps in teacher professional development that could be filled with ocean and ocean climate change science content. Marilyn Sigman attended the national COSEE workshop on best practices in professional development in October 2009, and has worked on incorporating as many of these practices as possible into the design of workshops involving multiple sponsoring partners. In particular, she has focused COSEE Alaska efforts on the meaningful involvement of scientists in addition to the incorporation of ocean and climate change literacy content in the developing workshops.

The first opportunity was to add content and instruction to a rural teacher workshop focused on the Salmon-in-the-Classroom program, which combines rearing salmon in classroom aquaria and providing teachers with resources to teach about the salmon life cycle and related science concepts. COSEE Alaska and Alaska Sea Grant became partners with the Cooperative Extension Service’s 4-H Fisheries, Natural Resource and Youth Development Program, the U.S. Fish and Wildlife Service, and the Alaska Department of Fish and Game, who have been the primary sponsors of the program for 18 years. COSEE Alaska was able to “add value” by:

- Providing marine science content and an introduction to relevant lesson plans and units from the *Alaska Seas and Rivers* curriculum;
- Facilitating the involvement of three scientists;
- Facilitating the showcasing of a scientist-teacher-student partnership project involving drifters to study nearshore currents that influenced juvenile salmon movements; and
- Facilitating the identification of opportunities for teachers to partner with scientists during the school year and time to plan the logistics of the partnership.

Eighteen teachers and one school district science curriculum coordinator from 18 different rural Alaska communities participated in the three-day workshop held in Fairbanks in October 2009. A report on the workshop by the U.S. Fish and Wildlife Service, the course agenda, and a list of participants is appended (Appendix M). An evaluation of this session in the form of a short survey of participants (Appendix N) resulted in the following findings:

- a. 35% of participants rated the Alaska Seas and Rivers materials as “excellent” in terms of “relevance to raising salmon in the classroom,” 35% rated them as “very good.” Individual units were rated as excellent or very good in relevance by 75% of the participants.
- b. Content provided by COSEE staff on ocean climate change and integrating Alaska Native knowledge with science and ocean science fairs was rated as “excellent” in terms of “the extent to which participants increased their knowledge, ideas, and/or skills” by 53% and “very good” by (41%).
- c. Scientist presentations were also rated in terms of “the extent to which participant increased their knowledge, ideas, and/or skills.” “Excellent” ratings ranged from 47 – 53% and “very good” ratings ranged from 29–47%. The combination of the two ratings for each scientist ranged from 82-94%.

COSEE Alaska is sponsoring or co-sponsoring the following teacher professional development workshops during Year 3:

- A second “Salmon-in-the-Classroom” Alaska rural teacher workshop in September, 2010;
- The ASLC annual teacher workshop for Kenai Peninsula School District teachers in October, 2010 on the theme “Go with the Flow: water from ice to ocean;”
- An “Ocean and Climate Change Science” workshop for Anchorage School District teachers in partnership with ASLC, the U.S. Fish and Wildlife Service, and Alaska Sea Grant.

Climate Change Curriculum Framework: COSEE Alaska reviewed the gaps between the “essential principles of science” identified in the Ocean Literacy Principles and the Climate Change Literacy Principles and the Alaska state science standards. The review showed that ocean science content was particularly lacking but climate change standards were included at the high school level. Accordingly, COSEE Alaska developed a curriculum framework which correlated national literacy principles with Alaska state science standards and outlined an approach for teaching the relevant concepts with a focus on “big ideas” and topics relevant to the Alaska marine and polar environments (Appendix O). The approach incorporates the use of the concept mapping tool developed by COSEE OS to promote and demonstrate strategies for the type of systems thinking that is requisite to understanding aspects of climate change and implications at regional and global scales.

COSEE Alaska has become a partner in the development of an Alaska Environmental Literacy Plan, which will be required to apply for “Leave No Child Inside” funding in legislation pending in Congress. Marilyn Sigman serves on the Working Group to develop the state plan and the Standards and Correlations Committee. The “gap analysis” for marine and climate change literacy will be incorporated into the draft plan along with specific recommendations about changes to Alaska standards to improve this content consistent with age-appropriate scaffolding of concepts. The effort in Alaska is led by the Alaska Department of Fish and Game, the Alaska Department of Education, and the Alaska Natural Resources and Outdoor Education Association, who are assembling a broad coalition of supporters from schools, communities, and the business sector.

Informal Educators Needs Assessment: COSEE Alaska sent out a survey to informal educators to assess their needs for professional development in marine and climate sciences. Forty-four informal educators with programs in 16 different communities responded to the survey and 40 indicated a need for professional development. Interest in opportunities for training in best practices for informal science education was expressed by 39 of the 40 respondents and for climate change education by all 40 respondents. When asked to rank 12 different possible topics, the most highly-ranked were:

1) outdoor or field-based design for learning, 2) pedagogy, 3) instructional strategies for diverse audiences, 4) citizen science/participatory research, 5) age-appropriate instructional strategies, and 6) evaluation methods to assess whether learning objectives have been met.

When asked to rank 12 desired marine and climate science content topics, the most highly-ranked were: 1) climate science relevant to Alaska marine ecosystems, 2) marine and climate science related to global climate change, 3) how people learn, 4) climate change effects on Alaska ocean current patterns, 5) climate literacy, and 6) Arctic sea ice dynamics and feedbacks to global climate. When asked how many volunteers or staff required the training, the answers varied from

1-25 volunteers and from 1-10 staff. Twelve out of 41 responded that they had attended the annual COS workshop once, 8 had attended more than once, and 21 had not attended. Reasons for not attending were varied and included lack of knowledge about the workshop, lack of relevancy of ocean education in general to their educational programming, schedule conflicts at that time of year, and the expense of travel, especially for a half-day conference. The results of this survey help inform COSEE Alaska efforts in developing sessions in the expanded COSW and statewide marine science education and outreach conference being planned for January 2011.

Formal Educators Needs Assessment: COSEE Alaska also sent out a needs assessment survey to K-12 classroom teachers to discover the current landscape of how and what climate change topics are being addressed by educators, and what needs exist for marine science and climate change education curriculum, resources and professional development. The survey was sent to more than 500 teachers and received 165 responses. Results from the online survey show that:

- Many Alaska teachers currently are teaching about climate change and the marine environment. The marine environment is addressed as a specific course or embedded in other units for more than half the teachers responding to the survey. In contrast only 2% identify climate change as a stand-alone course, while 30% say it is included in other content courses.
 - When teaching about either topic, teachers use a variety of strategies—most frequently relying on classroom discussions about community concerns (54%) and curriculum connections (59%).
 - Teachers invite guest speakers, including scientists and local elders, into the classroom to support their instruction on the topics. They use Alaska-specific lessons that align with state standards (61%), address critical issues (54%), and rely on “data” (46%) from research. Teachers also indicate a strong interest in having field trips with scientists to support their instruction.
 - If teachers do not teach about marine environments or climate change, the typical reason given is that topics are not in the curriculum, and there is neither time nor resources to make it happen.
- *Activity Set 6: Communicate Alaska’s ocean science/ocean climate change knowledge to the nation and the world.* More than one million visitors travel to Alaska each year, drawn by the lure of glaciers, wildlife, fishing, hunting, hiking and camping. The majority choose to travel by cruise ship or cruise/tour packages, with others seeking adventure in the far north on their own or as part of small, organized ecotourism adventures. They experience climate change firsthand as Alaskans are living with it, and seek information at informal learning centers, museums, aquariums and other sites of free-choice learning.

The COSEE Alaska SeaLife Center team, led by COSEE PI Nikki Nelson and Distance Learning Expert Laurie Stuart with designer Laura Tauke, has been developing a prototype educational placemat to be used by thousands of tourists on day cruises out of Seward and into Kenai Fjords National Park that will highlight science, cultures and climate changes in various regions of Alaska. These educational tools are being pilot tested in Resurrection Bay and the Kenai Fjords National Park this summer before use throughout Alaska in the summer of 2011. We also continue to explore venues for reaching passengers on the major cruise lines that visit Alaska.

Ocean Literacy Award: COSEE Alaska sponsored the first annual Alaska Ocean Leadership Award for Ocean Literacy given to the Kenai Fjords Tours Marine Science Explorer Program at the Alaska SeaLife Centers' Ocean Gala, held on the eve of the Alaska Marine Science Center and attracting ocean scientists who mingled with Alaska leaders at the black-tie event. As part of CIRI Alaska Tourism, Kenai Fjords Tours has provided unique vessel-based programs for over 36,000 students and teachers since 1995. The Ocean Literacy Award goes to an individual, team or institution that has made a breakthrough in promoting ocean literacy in Alaska among a segment of the general population via formal or informal education, outreach or other communications.

- *Activity Set 7: Establishing an Ocean Climate Change web portal and developing and disseminating Alaska-specific multimedia resources.* *Website:* COSEE Alaska launched its website in early 2009, and continues to link new resources and build out the site as well as participate in the national working group to shape the COSEE Network's overall web presence. COSEE OS has offered support to archive and provide access to accumulating content in the format of concepts and associated assets.

At the request of agency and organization partners, we created a web page specifically on the topic of ocean acidification in Alaska and other high-latitude waters, which will be the first concept assets we will export to the COSEE OS system. Links are developed and maintained among the COSEE Alaska website, SEANET listserv postings, and postings to the SEANET social networking website

"Faces of Climate Change" Videos. COSEE Alaska, together with the Alaska Marine Conservation Council, which represents small fishing communities, and the Alaska Sea Grant Program videotaped a series of interviews of ocean scientists, Alaska Natives and coastal community members sharing western science and traditional knowledge about ocean climate change in Alaska seas. The videos were taped at the Alaska Marine Science Symposium and the Alaska Forum on the Environment, Alaska's largest environmental conference, which had a full day of presentations about the evidence of climate change, research, adaptation, and mitigation strategies.

Three short videos in the *Faces of Climate Change* series – *Climate Change in Alaska's Seas*, *Disappearing Sea Ice*, and *Life on the Ice* – are nearing completion and will soon air on the COSEE Alaska and partner websites and will be promoted as a resource for teachers and informal educators.

Distance Learning. The Alaska SeaLife Center has completed field testing their new secondary level climate change curriculum both via distance learning as well as outreach trips. The curriculum will be offered through the Alaska SeaLife Center in the fall of 2010 nationwide as part of our regular distance education program offerings.

Appendix A: COSEE Alaska Year Two Annual Report - COSEE Alaska Activity Set Details October 28, 2008

	Year 1 Sept 2008-Sept 2009	Year 2 Sept 2009-Sept 2010	Year 3 Sept 2010-Sept 2011	Year 4 Sept 2011-Sept 2012	Year 5 Sept 2012-Sept 2013
COSEE Alaska	Advisory Board meeting <ul style="list-style-type: none"> ○ Notify Board ○ Set new dates for 2009 (Doodle) ○ Update membership 	Advisory Board meeting (date to be determined)	Advisory Board meeting (date to be determined)	Advisory Board meeting (date to be determined)	Advisory Board meeting (date to be determined)
COSEE Council	Monthly check-in calls Twice yearly meetings <ul style="list-style-type: none"> • NMEA meeting July • Ocean Hall Nov 	Monthly check-in calls Twice yearly meetings <ul style="list-style-type: none"> • NMEA meeting • TBD 	Monthly check-in calls Twice yearly meetings <ul style="list-style-type: none"> • NMEA meeting • TBD 	Monthly check-in calls Twice yearly meetings <ul style="list-style-type: none"> • NMEA meeting • TBD 	Monthly check-in calls Twice yearly meetings <ul style="list-style-type: none"> • NMEA meeting • TBD
COSEE Network	Yearly PI retreat in spring <ul style="list-style-type: none"> • South Carolina Contribute to COSEE.NET	Yearly PI retreat in spring Contribute to COSEE.NET	Yearly PI retreat in spring Contribute to COSEE.NET	Yearly PI retreat in spring Contribute to COSEE.NET	Yearly PI retreat in spring Contribute to COSEE.NET

COSEE Alaska Activity Set Details October 28, 2008
Activity Set 1 AMSS & COS

COSEE Alaska	Year 1 Sept 2008-Sept 2009	Year 2 Sept 2009-Sept 2010	Year 3 Sept 2010-Sept 2011	Year 4 Sept 2011-Sept 2012	Year 5 Sept 2012-Sept 2013
Activity Set 1	<p>Alaska Marine Science (AMS) Symposium</p> <p>Explore ways to include students in AMS events</p> <p>Incorporate Best of EO (Activity 3)</p> <p>EO Luncheon speakers</p> <ul style="list-style-type: none"> o Communicating Ocean Science/Informal Science Craig Strang to give presentation o NOSB students o Other? <p>COS Workshop 1/19/09 8 am to 1:30 pm w/lunch</p>	<p>Expand AMS Symposium</p> <p>Include students in AMSS</p> <ul style="list-style-type: none"> o Ocean Science Fair student winners o Sunday teacher workshop on Ocean Science Fairs with follow-up project for CEC o Mini “how-to” sessions for scientists on giving better talks, posters, powerpoints, o Solicit scientists from SEANET and others to serve as judges for community Ocean Science Fairs? o Public evening event? <p>Planning Committee for national conference in 2012</p>	<p>AMS Symposium</p> <p>Add student mentorships</p> <ul style="list-style-type: none"> o Ocean science fair winners come to AMSS for next round of judging; go on to State Science and Engineering fair o Planning Committee for national conference in 2012 	<p>Co-host Ocean Science Education Conference (OSEC) Summer 2012</p> <p>Host National Marine Educators Association (NMEA)national conference in summer 2012 with Northwest and Aquatic Marine Educators (NAME) –regional chapter of NMEA</p> <p>Tie in with teacher workshop in Seward summer 2012 (Activity 5)</p>	<p>Host International Pacific Marine Educators meeting?</p> <p>Link with teacher workshop in Barrow in summer 2013 (Activity 5)</p>

COSEE Alaska Activity Set Details October 28, 2008
Activity Set 2 SEANET

COSEE Alaska	Year 1 Sept 2008-Sept 2009	Year 2 Sept 2009-Sept 2010	Year 3 Sept 2010-Sept 2011	Year 4 Sept 2011-Sept 2012	Year 5 Sept 2012-Sept 2013
Activity Set 2	Establish SEANET <ul style="list-style-type: none"> ○ Create listserv from COS participants ○ Formalize as NMEA chapter? ○ Create steering committee at AMS 2009 – dinner mtg ○ Strong links with <ul style="list-style-type: none"> – ARCUS, – Alaska Science Education Clearinghouse (GI)? – Alaska Native Science Education Council? – Alaska Science Consortium – Alaska Science Teachers Association – Northwest Aquatic and Marine Educators Association 	SEANET meets quarterly <ul style="list-style-type: none"> ○ Meet quarterly ○ Identify scientists to mentor students ○ Start development of regional directory ○ Plan NMEA 2012 conference 	SEANET <ul style="list-style-type: none"> ○ meet quarterly ○ Scientists and student mentors for other students ○ Publish development of regional directory ○ Plan NMEA 2012 conference 	SEANET <ul style="list-style-type: none"> ○ Meet quarterly ○ Host NMEA 2012 conference ○ Plan international marine educators conference 	SEANET <ul style="list-style-type: none"> ○ Meet quarterly ○ Host international marine educators conference

COSEE Alaska Activity Set Details October 28, 2008
Activity 3 E&O Guidelines & Enrichment for Scientists

COSEE Alaska	Year 1 Sept 2008-Sept 2009	Year 2 Sept 2009-Sept 2010	Year 3 Sept 2010-Sept 2011	Year 4 Sept 2011-Sept 2012	Year 5 Sept 2012-Sept 2013
Activity Set 3	<p>Identify criteria for excellent education and outreach (E&O)</p> <p>SEANET steering committee & COSEE staff & graduate student establish criteria</p> <p>Identify best practices</p> <p>Awards for Best E&O</p> <ul style="list-style-type: none"> - Dave Atkinson, GI, coastal erosion, storms - Heidi Hertel, Nome, video conferences to villages - Hajo Eicken Sea ice observations & LTK 	<p>Showcase best E&O scientists at AMS</p> <p>Showcase during lunches or in each plenary session</p> <p>Develop Communicating Ocean Science course at UAF/UAA</p> <p>Create interactive regional E&O guide on website</p>	<p>Develop and pilot E&O interactive workshops at AMS, other?</p> <p>Offer Communicating Ocean Science course at UAF/UAA</p> <p>COMPASS – hold workshops</p>	<p>Launch regional E&O guidelines and interactive directory</p> <p>Update E&O Regional directory on website and publish – distribute at NMEA 2012</p>	<p>Publish E&O guidelines, directory, and project report</p> <p>Distribute online and at science education conferences (Listservs, NSTA, AFE, AMSS, etc.)</p>

COSEE Alaska Activity Set Details October 28, 2008
Activity Set 4 Ocean Science Fairs & Virtual Field Trips

COSEE Alaska	Year 1 Sept 2008-Sept 2009	Year 2 Sept 2009-Sept 2010	Year 3 Sept 2010-Sept 2011	Year 4 Sept 2011-Sept 2012	Year 5 Sept 2012-Sept 2013
Activity Set 4	<p>Launch Ocean Science Fairs with ocean climate change theme</p> <p>Hosted Ocean Fair meeting for statewide school districts – Oct 10-11</p> <p>Host pilot Ocean Science Fairs in spring in ?? communities</p> <p>Establish scientist in residence program for each community.</p> <p>Solicit 2 sets of judges: ○ Cultural ○ Science</p> <p>Link with state science standards; Ocean Literacy & Climate Literacy principles</p>	<p>Expand Ocean Science Fairs spring 2009</p> <p>Alaska Native PhD student involved in ocean science fairs in communities</p> <p>Develop handbook of activities of ocean science fairs; web based</p> <p>Feature ocean science fairs in teacher workshops during school year and summer workshop (Activity 5)</p> <p>Winning students compete at AMSS</p> <p>Media-rich projects encouraged – podcasts, vodcasts, kids posting observations on COSEE Alaska web (Activity 7)</p>	<p>Distribute Ocean Science Fair projects to all Alaska schools</p> <p>Distribute handbook/DVD of activities of ocean science fairs</p> <p>Hold teacher workshops about Ocean Science Fairs (activity 5)</p> <p>Expand Ocean Science Fairs to more communities</p> <p>Link with Imaginarium & others to take Ocean Science Fairs statewide</p>	<p>Evaluate Ocean Science Fairs</p> <p>Showcase Ocean Science Fairs at NMEA 2012</p>	<p>Report on Ocean Science Fairs</p> <p>Distribute Handbook and DVDs</p>

Activity Set 4 Cont'd	<p>Launch Ocean Science Fairs with ocean climate change theme</p> <p>Hosted Ocean Fair meeting for statewide school districts – Oct 10-11</p> <p>Host pilot Ocean Science Fairs in spring in ?? communities</p> <p>Establish scientist in residence program for each community.</p> <p>Solicit 2 sets of judges:</p> <ul style="list-style-type: none"> ○ Cultural ○ Science <p>Link with state science standards; Ocean Literacy & Climate Literacy principles</p>		<p>Distribute Ocean Science Fair projects to all Alaska schools</p> <p>Distribute handbook/DVD of activities of ocean science fairs</p> <p>Hold teacher workshops about Ocean Science Fairs (activity 5)</p> <p>Expand Ocean Science Fairs to more communities</p> <p>Link with Imaginarium & others to take Ocean Science Fairs statewide</p>	<p>Evaluate Ocean Science Fairs</p> <p>Showcase Ocean Science Fairs at NMEA 2012</p>	<p>Report on Ocean Science Fairs</p> <p>Distribute Handbook and DVDs</p>
	<p>Develop content for ocean climate change virtual field trips</p> <ul style="list-style-type: none"> ○ Review existing virtual worlds and distance learning programs ○ Explore bandwidth issue for remote 	<p>Offer first virtual field trip</p> <p>Pilot test with teachers during teacher workshop</p> <p>Revise & launch</p> <p>Begin development of</p>	<p>Add new virtual field trip</p> <p>Pilot test 2nd virtual field trip during teacher workshop</p> <p>Revise & launch</p>	<p>Add new virtual field trip</p> <p>Pilot test 3rd virtual field trip during teacher workshop</p> <p>Revise & launch</p> <p>Begin development of</p>	<p>Add new virtual field trip</p> <p>Pilot test 4th virtual field trip during teacher workshop</p> <p>Revise & launch</p> <p>Evaluate</p>

	communities <ul style="list-style-type: none"> ○ Establish development team with SEANET steering committee, COSEE staff and ASLC distance learning team ○ Possible equipment donation from GCI or ASLC 	second virtual field trip	Begin development of third virtual field trip	fourth virtual field trip	
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COSEE Alaska Activity Set Details October 28, 2008
Activity Set 5 Teacher Workshops

COSEE Alaska	Year 1 Sept 2008-Sept 2009	Year 2 Sept 2009-Sept 2010	Year 3 Sept 2010-Sept 2011	Year 4 Sept 2011-Sept 2012	Year 5 Sept 2012-Sept 2013
Activity Set 5	<p>Identify teacher professional development gaps in ocean climate change</p> <p>SEANET steering committee & COSEE staff & grad student do gap analysis</p> <p>Start planning teacher workshop to be held in Seward in 2010 – incorporate Ocean Science Fairs; real-time data& LTK on climate change</p> <p>Explore link with ASD Academy to reach Anchorage teachers</p>	Hold workshop in Seward Summer 2010	Hold workshop in Barrow summer 2011	Expand Seward workshop Summer 2012; tie-in with NMEA conference as a pre, or post conference workshop and field experience	Expand Barrow workshop summer 2013; tie-in with International Pacific Marine Educators conference

COSEE Alaska Activity Set Details October 28, 2008
Activity Set 6 Reaching Public Audiences via videos, publications

COSEE Alaska	Year 1 Sept 2008-Sept 2009	Year 2 Sept 2009-Sept 2010	Year 3 Sept 2010-Sept 2011	Year 4 Sept 2011-Sept 2012	Year 5 Sept 2012-Sept 2013
Activity Set 6	<p>Develop key messages for tourists, cruise ships & other informal audiences</p> <p>Explore best ways to reach cruisers w/Binkley and Bustamente/Advisory Board</p> <p>Explore hosting “Train the Cruise Ship Naturalists”</p> <p>Create short videos about importance of Alaska’s seas</p> <p>Develop ideas for popular publication about Alaska’s oceans & impacts of climate change</p>	<p>Explore pilot testing Seasons of the Sea kiosks in ASLC and on cruise ships</p> <p>Develop 2-3 minute videos on Alaska’s seas & impacts of climate change for Ocean Hall Kiosks</p> <p>Write design and publish publication</p>	Distribute publications & videos	Refine publications and videos and deliver to tourism audiences	Explore expanded publications and new media for delivering key messages

COSEE Alaska Activity Set Details October 28, 2008
Activity Set 7 Web & Multimedia

COSEE Alaska	Year 1 Sept 2008-Sept 2009	Year 2 Sept 2009-Sept 2010	Year 3 Sept 2010-Sept 2011	Year 4 Sept 2011-Sept 2012	Year 5 Sept 2012-Sept 2013
Activity Set 7	<p>Launch COSEE Website</p> <p>Participate in COSEE.NET web group</p> <p>www.coseealaska.net hosted by COSEE.NET</p>	<p>Develop COSEE Arctic Ocean Climate Change web portal & multimedia materials</p> <p>Kids from coastal communities sending in real-time observations and blobs re: coastal climate change in their region</p> <p>Explore social networking with kids, scientists & educators</p>	<p>Expand COSEE Arctic Ocean Climate Change web portal</p>	<p>Add multimedia materials to COSEE Arctic Ocean Climate Change web portal</p>	<p>Post COSEE Alaska web products on COSEE Arctic Ocean Climate Change web portal</p>

**COSEE Alaska Activity Set Details October 28, 2008
Evaluation**

COSEE Alaska	Year 1 Sept 2008-Sept 2009	Year 2 Sept 2009-Sept 2010	Year 3 Sept 2010-Sept 2011	Year 4 Sept 2011-Sept 2012	Year 5 Sept 2012-Sept 2013
Evaluation	Phone Contact form Formative/baseline evaluation		Midterm Evaluation		Final evaluation report, journal articles, project report

Appendix B: COSEE Alaska Year Two Annual Report

Research	Formal Education Interests	State and Federal Interests	Informal Education Interests	Private Sector Interests
Mead Treadwell Chair, U.S. Arctic Research Commission meadwell@alaska.net	Larry LeDoux, Commissioner, Alaska Department of Education Larry.ledoux@alaska.gov	Amy Holman National Oceanic and Atmospheric Association Amy.Holman@noaa.gov	Ian Dutton Executive Director, Alaska SeaLife Center land@alaskasealife.org	John Binkley Executive Director, Alaska Cruise Association Jbinkley@alaska.net
Denis Wiesenburg Dean, School of Fisheries and Ocean Sciences, UAF weisenburg@sfos.uaf.edu	John Pugh Chancellor, University of Alaska Southeast John.pugh@uas.alaska.edu	Bob Winfrey Science Advisor, Alaska Region, National Park Service Robert_Winfree@nps.gov	Charles Money Executive Director, Alaska Geographic Association cmoney@alaskageographic.org	Cam Toohey Alaska Manager, Shell Exploration & Production Company Cam.toohey@shell.com
Clarence Pautzke Executive Director, North Pacific Research Board cpautzke@nprb.org	Enid Silverstein Curriculum Director, Anchorage School District Silverstein_enid@asdk12.org	Ellen Lance U.S. Fish and Wildlife Service Ellen_Lance@fws.gov	Patricia Partnow Vice-President, Alaska Native Heritage Center ppartnow@alaska.com	Karen Gillis Bering Sea Fishermen's Association karen.gillis@bsfaa.org
Richard Glenn Barrow Arctic Science Commission rglenn@asrc.com	Joanna Wassilie Bering Straits Jwassillie1@yahoo.com	Commissioner Larry Hartig, Department of Environmental Conservation Larry.hartig@alaska.gov		Margaret Williams World Wildlife Fund Margaret.williams@wwfus.org
Douglas DeMaster Director, NOAA Alaska Fisheries Science Center Douglas.demaster@noaa.gov	Peggy Cowan Superintendent, North Slope Borough School District Peggy_cowan@nsbsd.org	Commissioner Denby Lloyd, Alaska Department of Fish and Game Dfg.commissioner@alaska.gov		
Larry Hinzman Director, International Arctic Research Center lhinzman@iarc.uaf.edu				

Appendix C: COSEE Alaska Year Two Annual Report
Alaska COSEE Advisory Meeting Notes

October 5, 2009
10 am – 3 pm
Anchorage, Alaska

Advisory Board members in attendance: Larry LeDoux, Denis Wiesenburg, Clarence Pautzke, John Pugh (phone), Joanna Wassilie (phone), Amy Holman, Tara Reimer Jones, Cam Toohey, Elena Sparrow for Larry Hinzman (phone), Ellen Lance

Project Principal Investigators & Collaborators: Molly McCammon, Ray Barnhart, Michael Castellini (by phone), Paula Cullenberg, Texas Gail Raymond, Nicole Nelson, Andrea Anderson & Dave Plude, Project Evaluators, David Christie, Sea Grant

Staff: Nora Deans, COSEE Alaska Director; Marilyn Sigman, COSEE Alaska Program Manager; Laurie Stuart, Distance Learning ASLC

Invited guest speakers: Don Elthon, National Science Foundation Ocean Sciences Education Program Officer (phone)

Discussion Highlights:

Update on National COSEE Activities:

1. Don Elthon, NSF Program Manager, stated that he was very impressed with our two-year work plan and hoped that we could accomplish everything. He stated that we have broad license to shift priorities, abolish those not working and come back for consent, and key role of Advisory Board is to offer guidance so we achieve excellence.
2. Don Elthon urged the Advisory Council to keep looking for ways to help COSEE Alaska make progress on its work plans, which he indicated are impressive and ambitious, and to help COSEE achieve its goals of higher impacts on ocean scientists and excellence.
3. Elthon outlined Decadal Review and Community “Futures” meeting. He urged us to identify our best practices and promote them nationally. The national COSEE program is nearly 8 years old, and NSF will be conducting a program review in fall 2011 to determine if 1) COSEE has been successful; 2) is there a plan for the next decade; and 3) what changes should be made.
4. Denis Wiesenberg suggested that we identify our signature programs, those that are unique to COSEE Alaska and focus on a few, so that by Year 3 when we are up for review we have a solid program. Clarence Pautzke agreed that we should make sure we focus on programs that are hitting on all cylinders from an evaluation standpoint, from NSF’s point of view.

5. Larry LeDoux asked for an update since last meeting, specifically if we had contacted someone at UAA to be on the Advisory Council. He also suggested that we seek internships and write a letter to the Governor urging creation of a mini-grant program similar to one formerly run by Alaska Science and Technology Foundation.

Report on COSEE Network Evaluation Meeting

Andi Anderson reported on the national Network Evaluation Meeting and the current emphasis on the national program Decadal Review and Return on Investment. Discussion with Advisory Council focused on “Outputs and Outcomes” and how the council can help us determine if the Year 2 Work Plan is the most effective and can be measured.

- Don Elthon noted that the role of evaluator is to help shape the program as we go along with data that would suggest we need to shift priorities to achieve goals, and abandon those not working. We have broad license to shift priorities and check in with NSF for change in scope. Encourages us to pursue a path to excellent results.
- John Pugh: important to gather baseline data so can document changes in teaching of science.
- Joanna Wassalie expressed interest in how we will evaluate traditional knowledge and impacts on Alaska Natives, and how we will ensure rural communities participate.
- Larry LeDoux noted we have to be prepared to make major adjustments since it's been some time since we wrote the proposal and data may suggest new directions. It's important that we follow the Advisory Council's recommendations; not just a committee because NSF says we have to have one.
- Anderson discussed the challenges in evaluation impacts on ocean scientists AND on education and transfer to classroom; emphasis on engaging ocean scientists, which is unique to COSEE.

Review Year 2 Work Plan

Marilyn Sigman described some highlights of the COSEE-sponsored Best Practices Workshop she recently attended.

Nora Deans reviewed the Year 2 Work Plan in detail, summarizing each activity's grant commitments and Year 2 tasks, which the Advisory Council discussed.

Overall discussion:

1. LeDoux suggested we use the GLOBE framework, has 15 ocean projects (not in Alaska).
2. LeDoux stated that research shows that short one-day in-service experiences don't have much impact, and Texas Gail Raymond reiterated that it is critical to support staff development throughout the year, regardless of length of time of workshop. Statewide educators have stopped "shotgun" in-service and are now basing staff development on needs for broader student impact. Sometimes the people who take the workshops are those who need it the least.
3. Grade level with greatest impact on student to go into science is 3rd grade but most elementary teachers do not have a background in science
4. Discussion about UAF SFOS requiring service.
5. Dave Christie queried about video conference effectiveness, which seems to be most effective in rural schools, where it is used extensively in Alaska.
6. John Pugh stated that teacher research experiences have life-changing impacts on teachers.
7. Joanna Wassilie: engaging undergraduates in research a great resource, supported by Chancellor.
8. Elementary teachers with science backgrounds are rare, but those that do engage young students in science; important to link teachers in classrooms around the state with scientists – scientists like Dr. Lee Cooper and Dr. Andrew Trites. Reach classrooms through "cyber-enabled" discoveries and personalities.
9. Want to reach scientists in agencies as well, not just academia; schools near universities really benefit so important to reach out to other sources of scientists for other areas. AK Native Science and Engineering Program is attracting young people across the state; use the model for ocean sciences.

Activity Set 1: Link scientists and educators via an expanded Communicating Ocean Science (COS) Workshop, additions to the Alaska Marine Science Symposium (AMSS), and a statewide ocean education conference.

- LeDoux suggested we invite an Alaska Native elder to speak and invite young people, such as high school students. Mentorship? Raymond offered to help.

Activity Set 2: Develop SEANET: a network of scientists, educators, students, and community members in Alaska.

- Advisory Council suggested including youth, with COSEE acting as a catalyst to bring groups together.

Activity Set 3. Develop new education and outreach tools for scientists

- Mike Castellini explained the process for the UAF School of Fisheries and Ocean Science to bring the semester-long Communicating Ocean Science/COSIA courses to the university as a pilot course prior to adoption. Craig Strang will speak about the course during the COS workshop at the AMSS, and meet with Mike and other faculty in Fairbanks in January.
- Council members wondered if there would be an opportunity to offer a mini-version of the course for agency staff.
- Castellini and Ruth Post have developed a survey of UAF scientists to find out who is interested in working with COSEE Alaska and determining their outreach needs.
- Amy Holman brought up the Hollings scholarships and possibility of getting scholars to work with us to contribute their skills.
- Larry La Doux suggested the idea of mini-grants, similar to the former Alaska Science & Technology Foundation.
- Clarence Pautzke queried Denis Wiesenberg about priorities for outreach for faculty, and if it falls under “service,” but he indicated that faculty are not promoted or offered tenure based on service except for Marine Advisory Program agents. Barnhardt indicated that UAF GI faculty have a strong service requirement and are encouraged to contact at least one school and one teacher as part of their EO and noted that schools near universities really benefit.
- Larry LeDoux suggested applying the model of ANSEP for Ocean Sciences
- Denis Wiesenberg indicated that the UA President, Mark Hamilton is very interested in funding for the university to participate in K-12 education.
- Andi Anderson brought up the importance of helping scientists co-author articles about outreach activities in peer-reviewed journal, such as Current: The Journal of Marine Education, Marine Technology Service, etc.

Activity Set 4. Enhance and develop ocean science/ocean climate change educational resources.

- **Ocean Science Fairs:** Ray Barnhardt gave an update on the Ocean Science Fairs, and the addition of Wilma Osbourne, who is working on her PhD in Indigenous Studies at UAF. She’ll be working with Bering Strait and the North Slope schools.
- Science culture camps are also an opportunity for sharing ocean science.
- Barnhardt also noted that he, Alan Dick, Osbourne and Marilyn Sigman would be putting on workshops at the Alaska Science Teachers meeting in Juneau in October, and that several publications are coming out of these efforts, including one with supplemental NSF funding to COSEE Alaska, focusing on traditional knowledge and perspectives on changing climates.
- Discussion focused on school participation in ocean science fairs, with more coming from around the state than Anchorage, and difficulties for teachers due to curriculum restraints. Small schools are getting smaller, and it’s difficult to find teachers who will stay in rural districts and to find elementary teachers with science backgrounds.

- Suggestion to match up scientist with students and communities as judges and mentors; also, students at secondary level really want to do research, which is where the university could really help with mentorships, etc.
- USFWS – program to give 8 hours connecting kids with nature.

Activity Set 5. Demonstrate new techniques and resources in teacher professional development opportunities.

- Discussion focused on K-12 staff development and opportunities to link with the Anchorage School Districts Academy and the Department of Education, which brings in several hundred teachers from all over the state.
- Raymond talked about Facebook “Science in Alaska” which she started.
- NOAA’s Teacher At Sea program also another potential partnership; put more Alaska teachers on board.

Activity Set 6. Communicate Alaska’s ocean science/ocean climate change knowledge to the nation and the world.

- Amy Holman shared details about the partnership between NOAA and University of Miami with Royal Caribbean “Explore the Seas” lab on board ship, with 300 scientists participating over the seven years as a great example of our potential partnership with cruise ships in Alaska.
- John Pugh shared that Mendenhall Glacier is a big attraction in Southeast Alaska for cruise ship passengers, and suggested partnering with the Forest Service (Rick Edwards, climate change focus). He also suggested linking with the Islands and Oceans Center in Homer, and the ferry system.
- Laurie Stuart shared that the Alaska SeaLife Center will be exhibiting the Ocean Today Kiosk, which distributes both regional and national stories, and they are seeking funding for a Magic Planet exhibit.
- Stuart also shared that Kenai Fjords Tours in Resurrection Bay includes researchers on board who split time observing and sharing science with passengers, and we might explore partnering with them to reach life-long learners.
- She also shared that they are retooling their SEATRAN program to SEATREK for people driving down to Seward, and we might engage scientists to share stories.
- Denis Wiesenberger shared about the new ice-strengthened research vessel that will be built over the next three years and COSEE Alaska could work with scientists to help interpret data beaming directly into classrooms, and develop other outreach opportunities.

Activity Set 7. Establish an Ocean Climate Change web portal and develop and disseminate Alaska-specific multi-media resources.

- Discussion focused on creating resources and linking with other COSEEs, including COSEE Ocean Systems.

Advisory Council Work Groups

All would work on collaborations and partnerships, which Amy Holman offered to coordinate.

1. Evaluation:

- a. Larry LeDoux, Alaska Department of Education
- b. Texas Gail Raymond, Anchorage School District
- c. Alexis Hill, ISER, UAA

2. Formal & Informal Education (combined):

- a. Ian Dutton, Alaska SeaLife Center
- b. Imaginarium (TBD)

3. Tourism

- a. John Binkley, Alaska Cruise Ship Association
- b. Ian Dutton, Alaska SeaLife Center

4. Academic Science Community

- a. John Pugh, UAS
- b. 3 Deans of Education from UAF, UAA, APU
- c. Clarence Pautzke, NPRB
- d. Denis Wiesenbergs, UAF

Follow-up:

- 1. Activate above working groups**
- 2. Add Advisory Council members from UAA, APU, US Forest Service and ISER**
- 3. Draft our 3-5 year plan and present at the next meeting.**
- 4. Identify and focus on our “signature programs” of excellence.**
- 5. Write a letter to the Governor about revival of mini-grant program for teachers and students to engage in research.**

Overall:

- 6. Increase emphasis on working with rural communities and school districts.**

- 7. Give preference to opportunities that will engage teachers and students in research.**
- 8. Work with professional K-12 educators to develop effective professional development for teachers and evaluation measures.**

Potential opportunities identified by Advisory Council members:

- COS/COSIA course distance-delivered to multiple locations; mini-version to train agency scientists.
- NOAA Hollings scholars could assist with COSEE Alaska projects.
- UA could pursue use of university service requirements as incentive of scientists' education and outreach.
- Scientist mentors are needed to mentor teachers and students for science fair projects and for judging in Anchorage and rural communities (USFWS "give 8" program may be a source of volunteers).
- ASLC is developing Sea Trek and an Oceans Today kiosk and COSEE AK could collaborate.
- Mendenhall Glacier Visitor Center and USFS climate change programming (contact Ric Edwards) is a partnership opportunity.
- K-12 science standards are being revised at the state and national levels and COSEE should track.
- Citizen science programs (e.g., GLOBE, Cruise-with-a-Purpose and other cruise ship programs)

Appendix D: COSEE Alaska Partnerships and Collaborations

CURRENT PARTNERS

Project or Activity	External Partners and <i>individual COSEE Alaska partners</i>
COSIA Course	COSEE California - Craig Strang
	UAF Museum of the North
	<i>UAF SFOS + Center for Cross-cultural Education</i>
Podcasts	COSEE NOW - Ari Daniel Shapiro
	2010 Scientists: Tom Weingartner (<i>UAF SFOS</i>),
	Phyllis Stabeno (NOAA/PMEL)
	Hajo Eichens (UAF Geophysical Institute)
	Traditional Knowledge: Vera Metcalfe (AEWC)
	2009: <i>AOOS</i> + other institutions for PWS Field Exp.
Concept Mapping & Info Management	COSEE-OS - Annette DeCharon + other staff
High School Framework for cc + ocean teacher needs assessment	UAF IARC/Geography Dept. - Sid Stephens
	"
Alaska Environmental Literacy Plan	Working Group
	ADFG - Kristen Romanoff
	ADOE - Woody Woodgate
	U.S. Fish & Wildlife Service - Laurel Devaney
	NPS - Adia Cotter
	Campbell Creek Science Center - Jim Sumner
	Friends of Creamers Field -
	<i>Alaska Native Knowledge Network</i> - Sean Topkok
	The number of partners will be expanded significantly.
Lesson Plans	<i>AOOS</i>
	Prince William Sound Science Center:
	Lindsay Butters, Scott Pegau
	JPL - Yi Chao
	<i>UAF SFOS</i> - Seth Danielson, Tom Weingartner
Professional Development for Teachers	
Seas and Rivers Workshops	<i>Alaska Sea Grant</i>
CC - Traditional Knowledge & Western Sci/Geo	Alaska Staff Development Network, <i>Anchorage SD</i>
	WGBH Boston
	Alaska Native Science Commission
	<i>Alaska Native Knowledge Network</i>
Bering Sea Teacher Workshop	ARCUS - Janet Warburton, Kristen Timm
	NPRB - Nora Deans
Salmon-in-the-Classroom Program	<i>Sea Grant</i> - financial support
	Cooperative Extension - Peter Stortz
	ADFG - Permitting Division
	U.S. Fish and Wildlife Service - Laurel Devaney
	Yukon River Fisheries Development Association
	Tanana Chiefs Corporation
	2009 Scientists: Martha Kopplin (IARC)
	Seth Danielson (<i>SFOS</i>)

	Mark Wipfli (UAF Dept. of Fisheries)
POTENTIAL PARTNERSHIPS	
Project or Activity	External Partner or Individual COSEE partner
Geocaching School Project	<i>Anchorage SD</i> - Texas Gail Raymond, Judy Onslow
	The Imaginarium/Anch. Museum - Dick Emanuel
	NPS Regional Office - Elizabeth Wasserman
Statewide Marine Education	NPRB
and Outreach Conference	ARCUS
NMEA Conference	NOAA Fisheries (Seattle)
	NAME
	Alaska Natural Resources & Outdoor Education Assoc.
	NSTA
	Other sponsors of the AMSS
Climate Change Messaging	COSEE Pacific Partnerships/AZA
in Informal Ed. Settings	COSEE California - Catherine Halverson
	ASLC + 8 aquaria
Prof.Dev. for Informal Educators	COSEE California - Catherine Halverson
Integration of Traditional Knowledge	Judy Lemus, COSEE Hawaii/California
STEM Partnership	Multiple partners statewide
	Leadership by Springboard/Juneau Econ. Dev.
	Paula Savikko
Events	
Ocean Fest, June	Ocean Conservancy (canceled for 2010)
World Ocean Day, June 14	Juneau School District - Linda Frame
	Discovery Southeast - Beth Wiegart
Chugach Regional Resource Council Gathering	CRRC - Hannah Eklund
Conferences - Displays	NPRB
	AOOS
	<i>Sea Grant</i> /Future Alaskans in Fish. & Mar. Sci. Network
	<i>UAF SFOS</i>

Appendix E: COSEE Alaska Partnerships and Collaborations

2010		Project	Requested
Peter	Stortz	Salmon-in-the-Classroom	Staff participation in planning & instruction,
		K-12 Program	for a teacher workshop
Beth	Wiegart	Participation in World	Speaker and financial support
		Ocean Day celebration	
RJ	Kopchak	Copper River Science	Staff participation on the planning team
		Ed. Applications Project	
Michelle	Ridgway	Bering Sea Canyons	Assistance with broader impact section of NSF
		Expeditions	grant and involvement with implementation
Lisa	Busch	AK. Coastal Communs.	Partnership in the proposal
		Clim. Change Ed. Ctr.	
Rebecca	Himshoot	Traveling school year	Letter of support for grant proposal to NOAA
		science camps	
Elizabeth	O'Connell	Podcasts on cc	Letter of support for NSF ISE proposal
		for NPS scientists	
Ann	Mayo-Kiely	Climate change citizen	Partnership in NOAA Env. Literacy grant
		science project	
Ray	Barnhart	Indigenous Knowledge	
		Clim. Change Ed. Center	
Frank	Rack	COSEE Polar Oceans	Letter of support for proposal to NSF
		Project proposal	
Judy	Lemus	COSEE California/	Partnership in proposal to NSF, co-chairing AGU
		Hawaii Project	session, co-sponsoring a conference
Laura	Murray	COSEE Coastal Trends	Partnership in the NSF proposal, commitment
		Project proposal	to manage a student summer res. Program

<u>Action Taken</u>
Pending
Pending
Pending
Facilitated contact with other
potential coastal group partners
Support provided; grant funding for
COSEE virtual field trip included
Facilitated contact with other
potential coastal group partners
Information and encouragement
provided
Letter provided with commitment
to help with dissemination
Facilitated a partnership with Alaska
Sea Grant and contact with other
potential coastal group partners
COSEE Alaska included as a potentially
affiliated group in NSF LOI
Letter provided
Partnership activities are being
pursued
COSEE Alaska commitment provided

Appendix F: Year Two Annual Report

COSEE Alaska
Communicating Ocean Science
Workshop 2010
Evaluation Report

David Plude and Andrea Anderson
SoundView Evaluation and Research

Summary

The Communicating Ocean Sciences Workshop, one of several pre-conference activities for the Alaska Marine Science Symposium, took place January 10, 2010. Attended by approximately 100 scientists, students, and informal science practitioners, the turnout was up almost 50% from the prior year. Five sessions on a variety of topics were evaluated at the end of the session, as was the SEANET meeting following the Workshop. About one-third of attendees actually completed the evaluation survey, and of those the majority were educators or program managers.

Findings from the event show that COSEE Alaska effectively identified areas of interest and need for the audience and provides programming that is useful and likely to be used. The Pribilof Islands-Fur Seal research, involving an ocean scientist, a teacher and Alaska Native students was most captivating and compelling to the audience. The presentation on COS/COSIA was equally interesting. Most difficult for the audience to imagine applying in their own professional setting was a presentation on connecting with Alaska Natives for scientific research. Since most survey respondents were educators, likely they were unable to visualize making a “research” connection.

Findings suggest a couple of recommended next steps. COSEE Alaska might consider doing a needs-assessment of scientists to determine topics of interest, an effective approach for evaluating impact, and a way to expand the COS Workshop to include scientist-specific, educator-specific, and scientist-educator interaction. A second issue facing COSEE Alaska is how to establish SEANET as a sustainable, independent organization. A third recommendation focuses on how to expand understanding, awareness and appreciation for Alaska Native traditional knowledge among educators and ocean scientists.

Introduction and Background

COSEE Alaska: People, Oceans and Climate Change is one of 12 Centers for Ocean Science Education Excellence in the United States. The core mission for these centers is to provide support for ocean scientists to communicate with the public and to increase ocean science awareness and literacy among the citizens. COSEE Alaska aims to “spotlight the Arctic, the wealth of ocean and climate change research currently underway in Alaska, as well as the richness of Alaska’s local and traditional knowledge inherent in its indigenous populations.” Toward that end, COSEE Alaska sponsored a Communicating Ocean Science workshop at the Alaska Marine Science Symposium (AMSS) in January, 2010.

AMSS welcomed 800 scientists, public officials, educators, and native peoples who study the Arctic. Monday of that week included a half-day day workshop, *Communicating Ocean Science (COS)*. As part of AMSS, approximately 100 scientists, students, and informal science practitioners gathered in Anchorage to hear about efforts to bring ocean science understanding to the public. (This attendance is up almost 50% from last year.)

The objectives of the COS workshop were:

1. To provide information about exemplary Education and Outreach (E&O) efforts by marine scientists in Alaska.
2. Introduction and update on COSEE-AK activities and future plans.
3. Inform participants about significant formal and informal science education efforts, especially as related to traditional peoples and traditional knowledge.
4. Provide information and insights into online and electronic tools for E&O.

The Sessions:

- George Matsumoto, a National Advisory Board member, described the COSEE Network. This session was intended to contextualize the Alaska COSEE center as one in a broad network that focuses on expanding partnerships among scientists, educators and the public around ocean science research.
- Informal Educators Teaching Informal Audiences by Craig Strang, was focused on sharing a COSEE California program called Communicating Ocean Sciences with Informal Audiences (COSIA). COSIA built on the approaches initially conceived for the formal audience Communicating Ocean Sciences (COS) course. (The COS course has no connection with the AMSS COS Workshop.) Of particular interest for the Alaska audience was the description of how Hawaii has integrated traditional knowledge in the program.
- The use of Concept Maps and Online Resources was presented by Annette deCharon, Director of the COSEE Ocean Systems Center. Ocean scientists have been trained to use concept mapping to design effective teaching approaches for educating about ocean sciences. Many of the COSEE centers have adopted the instructional model for use in the local practices.
- George Matsumoto gave another presentation about science Research and Social Media. Matsumoto framed his presentation with the fact that since 2007 email has increased 27% while social networking is up 150%. Individuals born after 1990 are considered “digital natives” and generally have high-level skills in working a wide range of media. To improve outreach to younger members of the community, scientists might consider gaining greater facility with a wide range of social media.
- Communicating in Alaskan Native Communities was the session conducted by Vera Kingeekuk Metcalf, a member of the US Arctic Research Commission. Ms. Metcalf talked about the core values of Alaska Natives and the nature of traditional knowledge that has assured survival for centuries. She noted a positive overlap with Western science and offered specific ideas for how native communities could be involved in both ocean science research and education.
- Andrew Trites, ocean scientist, and Tonia Kushin, educator, presented the session Education about Fur Seal Research in the Pribilof Islands. Scientists, hopeful of getting community buy-in for their northern fur seal research project, decided to engage the school and children in learning about the research. Online interactions, a student field trip to the Vancouver Aquarium, and mutual respect and commitment made this a very successful model of outreach and education.

A final activity took place during and after lunch. It was the SEANET update by Marilyn Sigman, which resulted in plans for COS Workshop expansion and a commitment to support the National Marine Education Association conference in 2012.

Methods

To evaluate the impact of the COS Workshop, participants were asked to complete a written survey in which they were questioned about their reactions to each of the topics. Specific questions addressed these dimensions:

- Prior knowledge of the topic
- Interest in the topic
- Usefulness of the topic
- Likelihood of the engaging with the topic in the future.

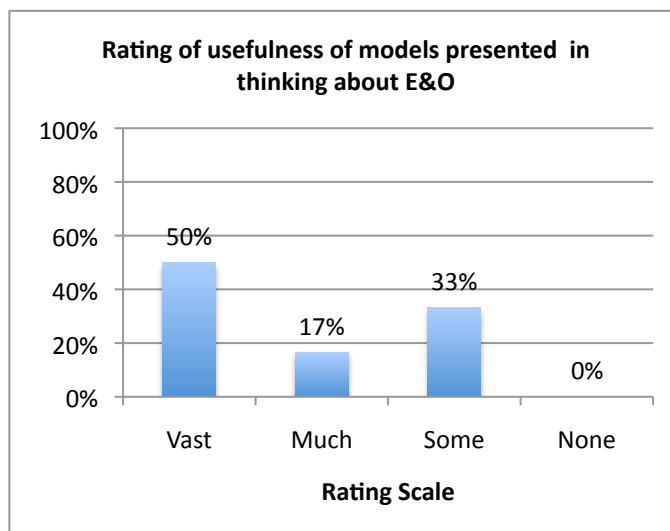
The rating scale used words to characterize how people felt, rather than a numerical rating scale. The options were to rate response to questions as “vast,” “much,” “some,” or “none.” 26 surveys were received and tabulated. (Approximately 32 % of those in attendance.)

Findings

1. Mixed results for the overall usefulness rating for the COS Workshop reflects of the diversity of professional among the participants.

Half the participants (50%) rated the COS Workshop usefulness as “vast,” while one-third rated (33%) the usefulness as “some.” The specific phrasing of the question was about the usefulness of the workshop in connecting Alaska research with Education & Outreach.

The phrasing may have been problematic for many of the respondents who identified themselves as educators, and this may account for the bimodal response. Only four of the 26 surveys were identified as researchers, while the rest were either educators or program directors

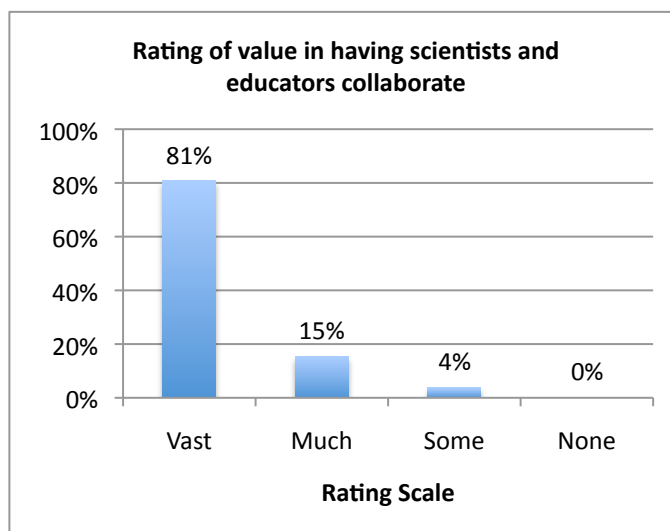


2. The opportunity for scientists and educators to interact is highly valued by all.

This Workshop is held at and during a major scientific conference. However educators are invited—encouraged—to attend. Educators significantly outnumber the scientists in responding to the survey. (There is evidence that the session is attended by significant numbers of scientists who decline to answer the surveys at the end of sessions).

Those who did respond overwhelmingly indicate that scientist and educator collaborations are positive.

- 81% rate collaboration value as “vast”
- 15% rate is as “much” value

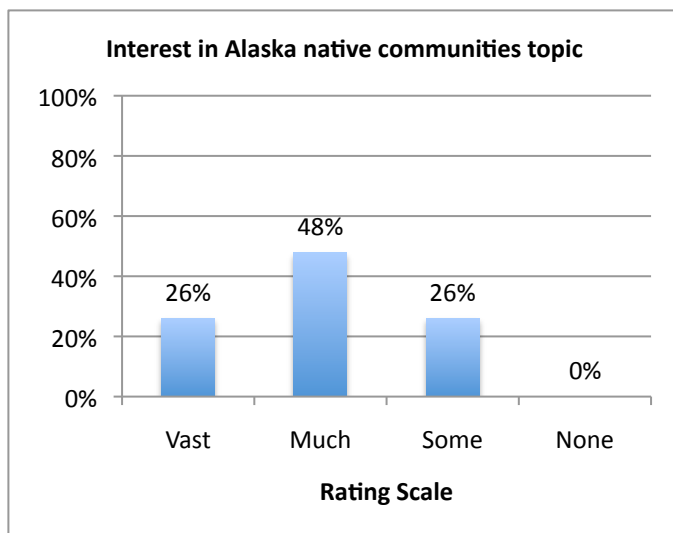
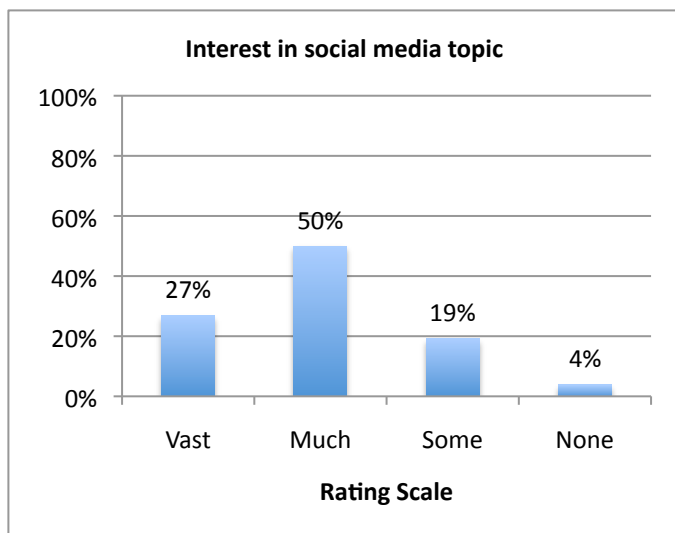
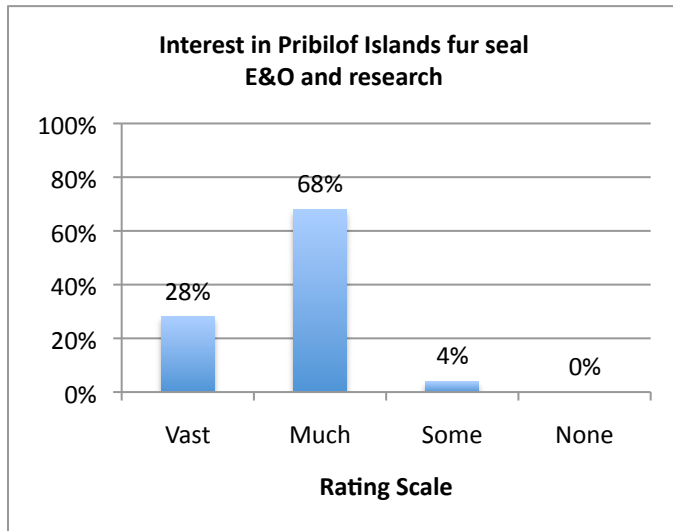


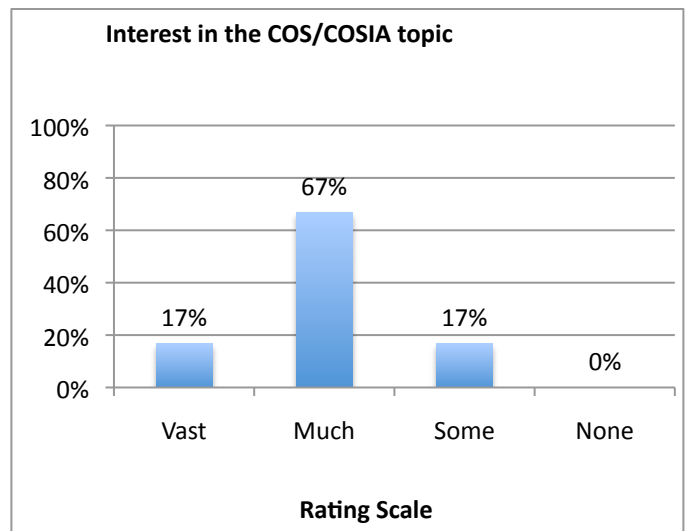
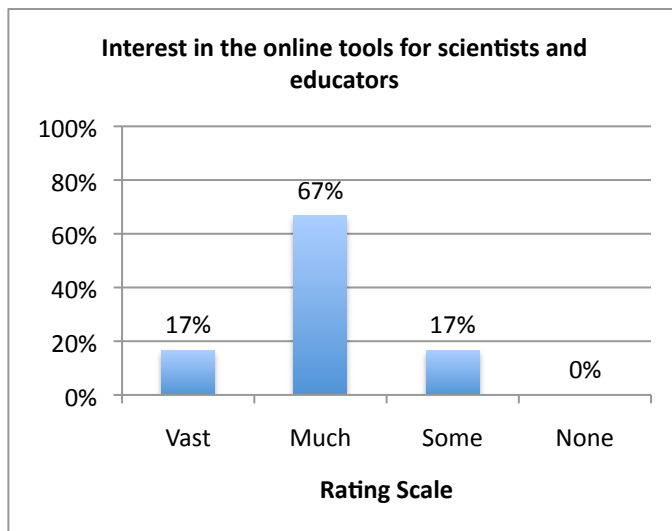
The question this finding raises is whether the scientists find collaboration with educators of value.

3. COSEE Alaska identified topics that were of high interest to participants;

More than one-fourth of the survey respondents rated their interest in three of the topics addressed in the Communicating Ocean Science workshop as “vast.” The following three topics received this rating, which was the highest rating option.

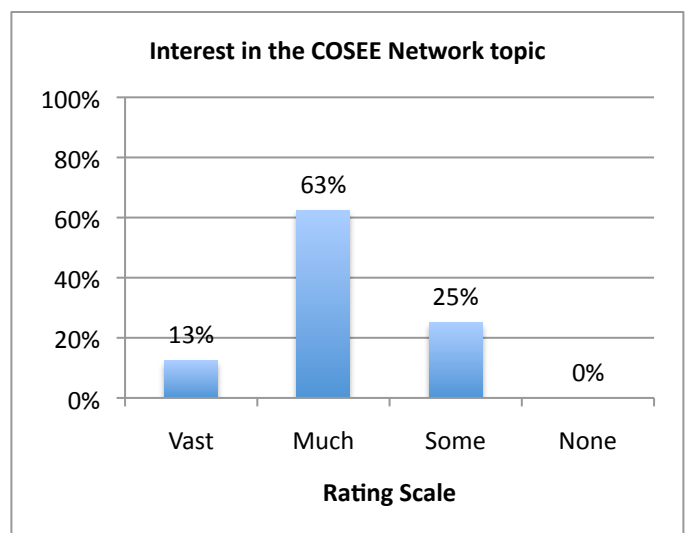
- Outreach and Education about Fur Seal Research in the Pribilof Islands
- Staying Connected by Keeping Current - ever-evolving social media to disseminate research news
- Research and Communication of Science in Alaska Native Communities





Overall the interest ratings were strong for each of the topics. Two-thirds of those who responded to the survey rated interest in the remaining three topics as “much” – the second highest rating option. Those topics were:

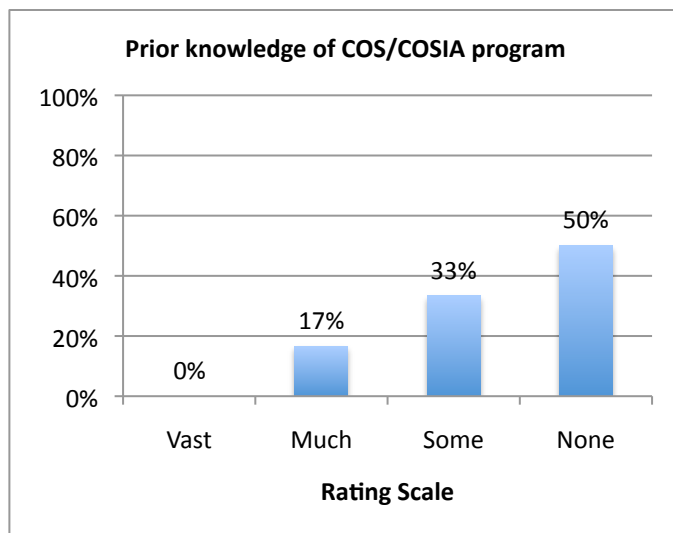
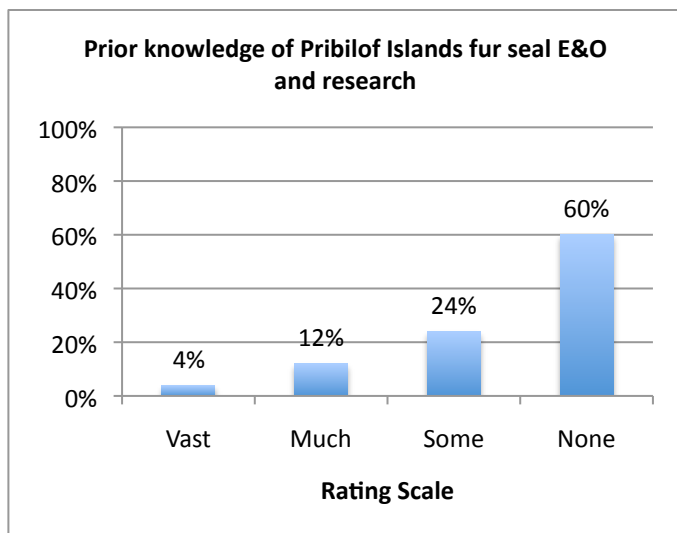
- Online Tools Help Get Scientists and Educators on the Same Page
- Communicating Ocean Sciences in Formal & Informal Education Environments - COS/COSIA course
- The Center for Ocean Sciences Education Excellence (COSEE) Network



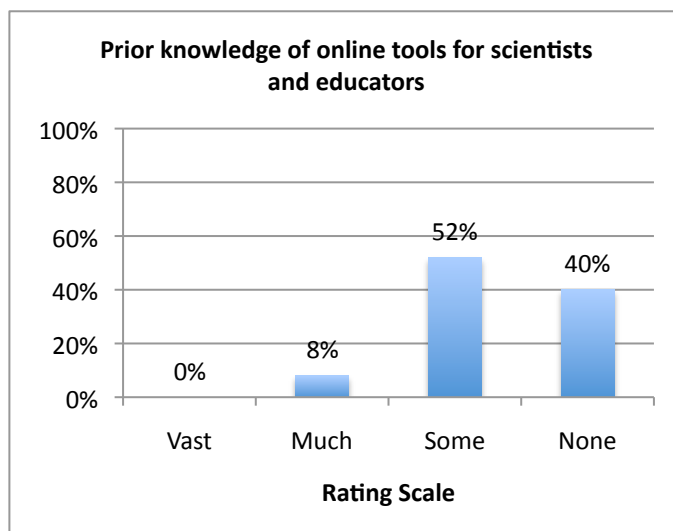
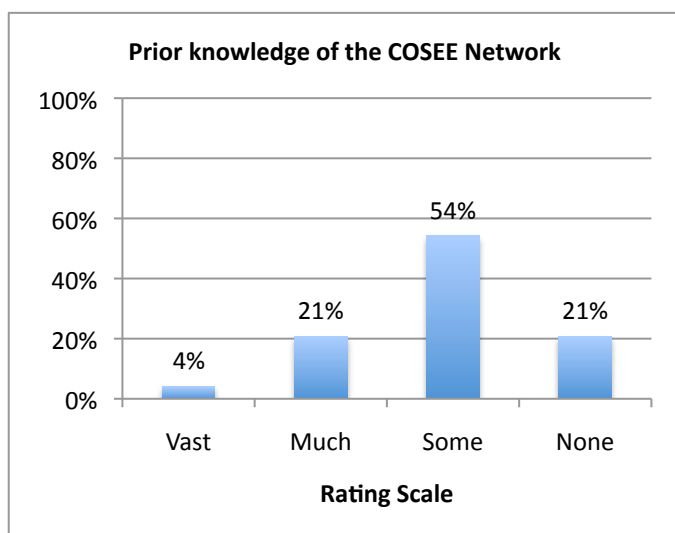
4. Prior knowledge of topics was minimal

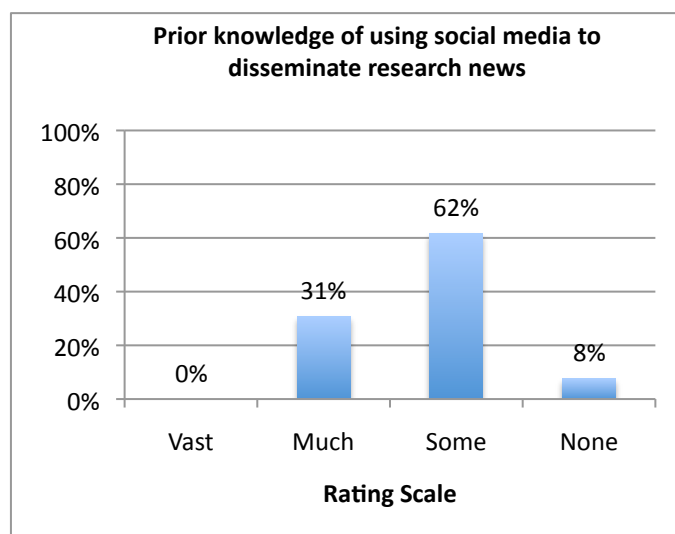
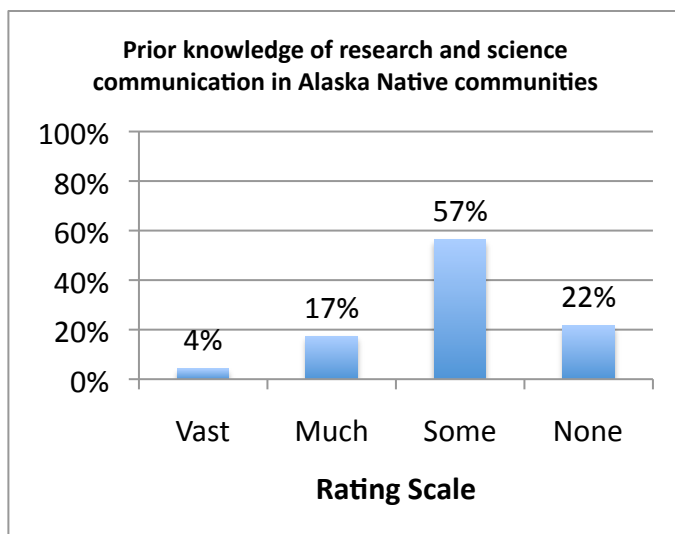
Participants in the workshop indicated modest to low prior knowledge for any of the topics presented at the Communicating Ocean Sciences Workshop. Likely this is why they interest ratings were so high.

- For two topics, the highest percentage of respondents indicated no prior knowledge.
 - 60% had not prior awareness of the Pribilof Islands fur seal program involving St. Paul School children
 - 50% had no prior knowledge of a signature COSEE network activity – the COS/COSIA programs for graduate and undergraduate scientists to learn teaching techniques



- With the other four topics participants had had some prior awareness, but at a modest or even minimal level.
 - More than half of participants had some knowledge and awareness of the COSEE Network, online tools and the types of research and science communication happening in Alaska Native communities.
 - 62% had some knowledge of using social media to disseminate research news — likely because people are familiar with social networking from their personal interactions





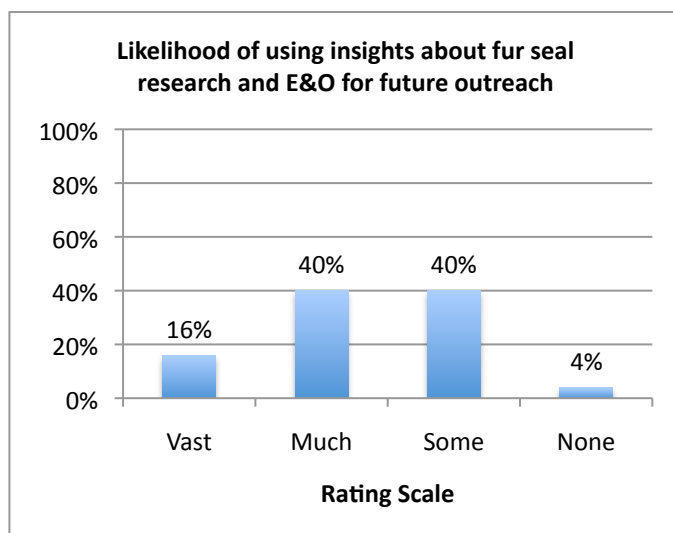
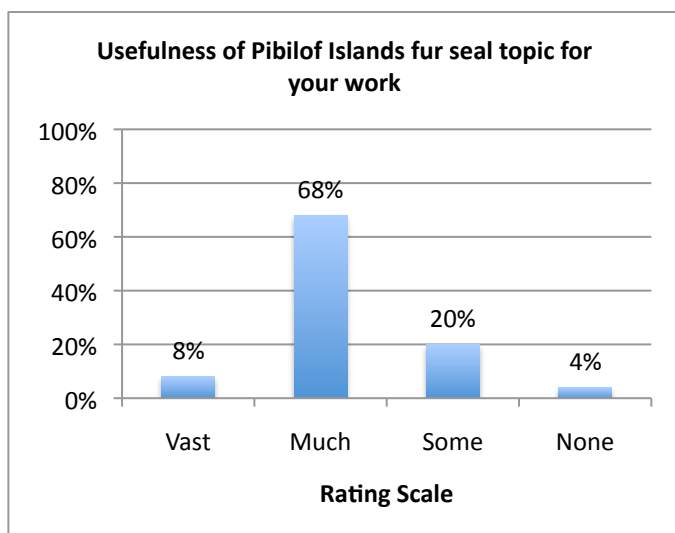
5. Most of the sessions were deemed useful by participants, and except for two topics more than half the participants are quite likely to use the insights or perspectives gained

Participants were interested but largely unaware of the content of topics selected for the Communicating Ocean Sciences Workshop. The next two questions answered by participants help illuminate whether the topics and the workshop actually offer a benefit. With essentially one exception, participants felt the presentations were useful.

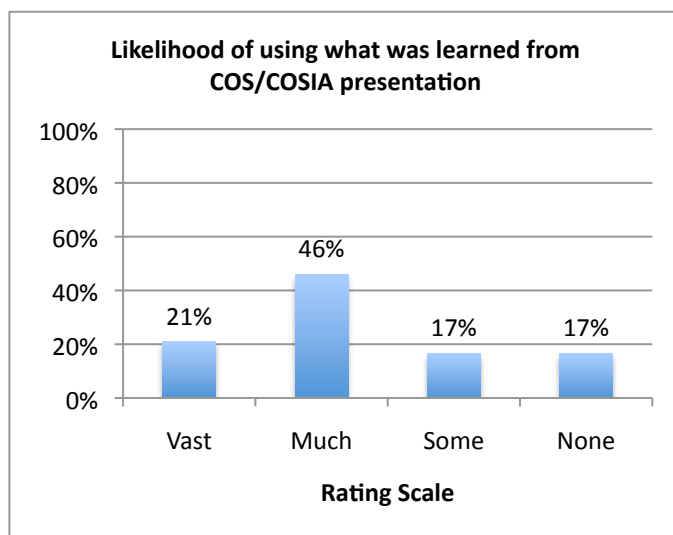
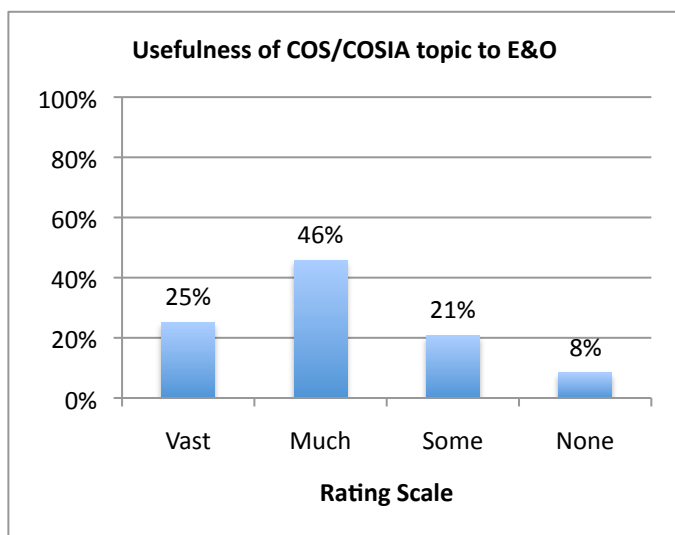
The two highest ranked topics reflect the interest participants have in unique and effective models for engaging scientists in education and outreach. Clearly the Pribilof Island fur seal project with students from St. Paul was unique and captivating, with participants beginning to imagine how the model might be expanded into their own work.

The COS and COSIA courses described by Craig Strang provided an image of how young scientists can learn about teaching practices that would be beneficial in working with Alaska Native populations. The positive reception by audience members is encouraging for the planned COSIA program at University of Alaska, Fairbanks.

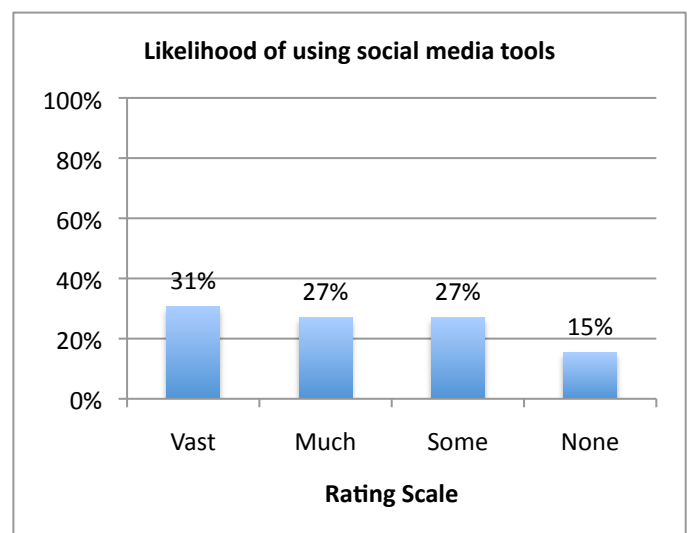
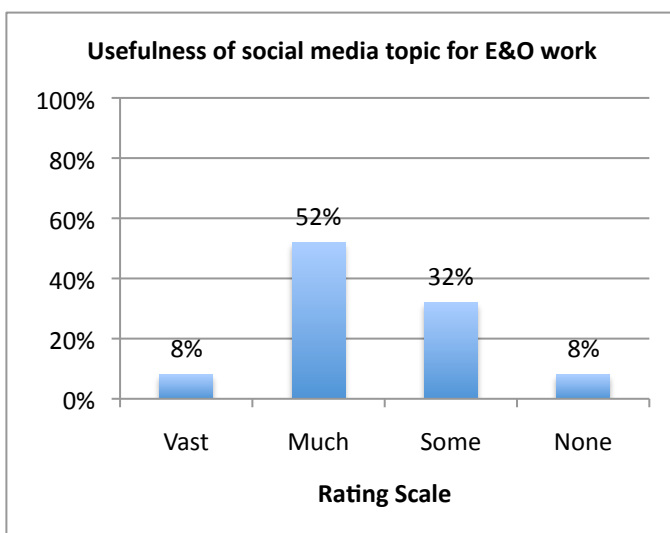
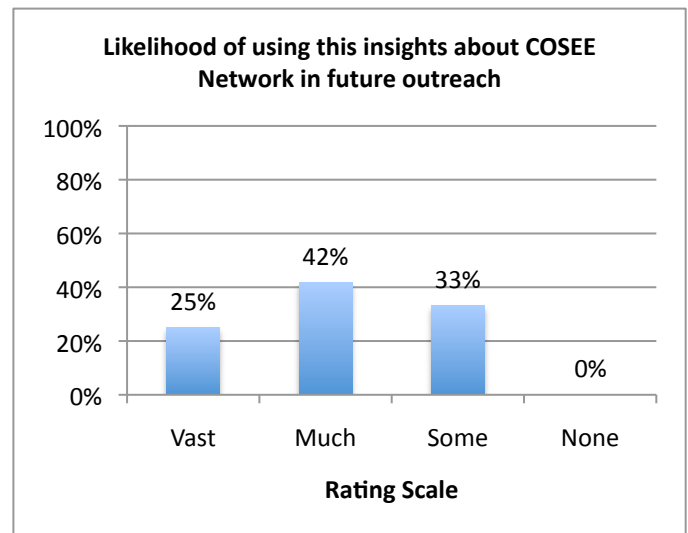
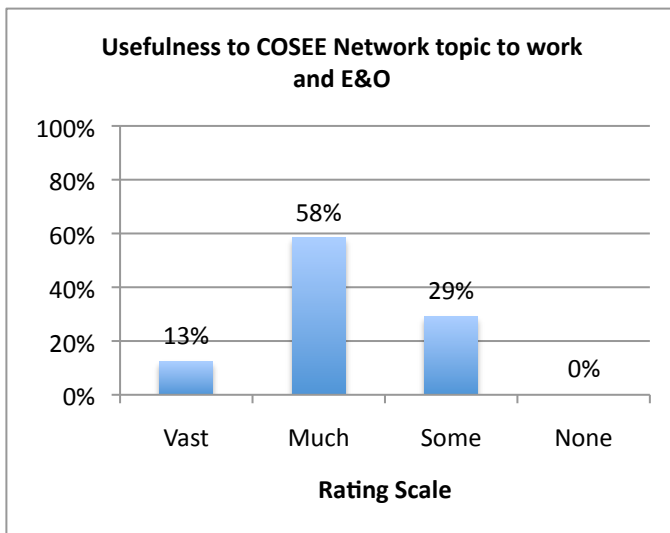
- The most useful presentation was the one on the Pribilof Islands fur seals—with 68% giving it a “much” rating and 8% giving a “vast” usefulness rating to the topic
- A total of 56% of the participants also suggested they are likely to use the insights about the Pribilof Islands education and outreach approach in their own work; with 16% rating their likely use as “vast” and 40% saying “much”



- The second highest rated topic for “usefulness” was the COS/COSIA presentation with a 25% “vastly” usefulness rating and a 46% “much” rating,
- The rating for likelihood of using what was learned was the highest for the COS/COSIA presentation. Two thirds (67%) rated their likelihood as “vast” or “much.”

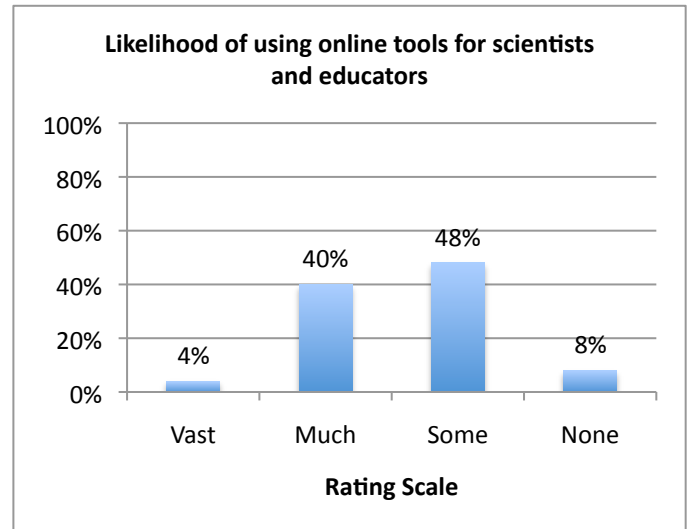
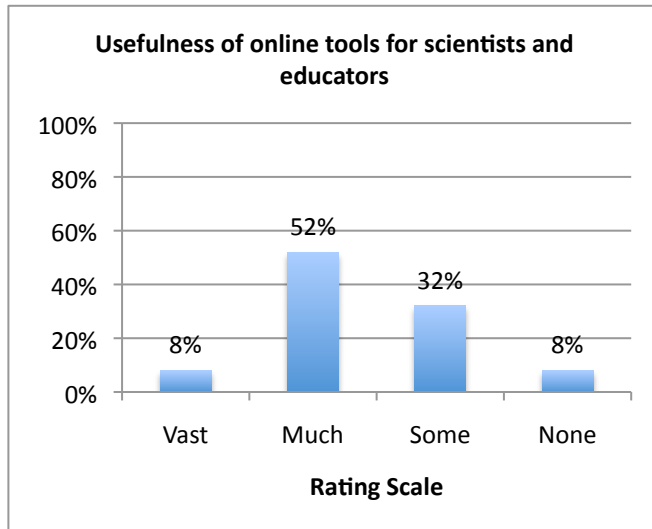


- More than half the participants gave the Social Media, COSEE Network, and Online Tools topics the second highest rating (i.e., “much” usefulness); however, the actual ratings about the likelihood of using the skills, content or insights gained were mixed. Again, this might reflect the fact that most of the respondents were educators.
 - 25% of the participants view the likelihood of using the Network as “vast” an upward shift from the 13% who rated the usefulness as “vast.”
 - 31% rated the likelihood of using social media tools as “vast” although 15% said there was no likelihood of using social media tools in the education and outreach efforts.



The online tools and concept mapping activity drew interest about its usefulness, but only a modest response about the likelihood of using it. Since this tool requires training for use it seems reasonable that participants might view it as useful, but unavailable.

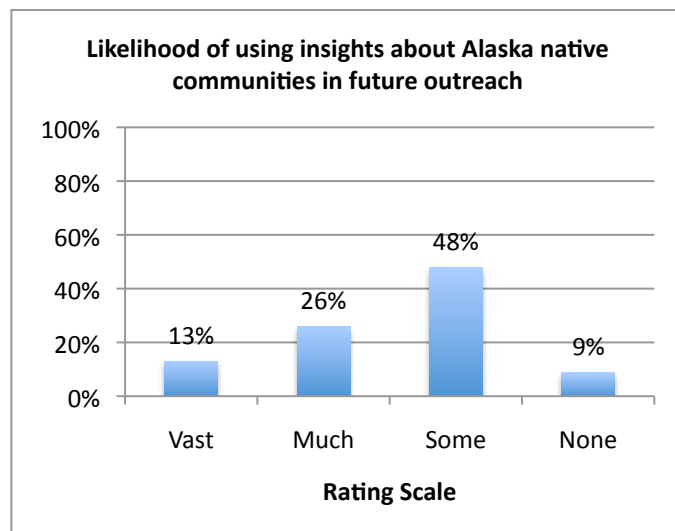
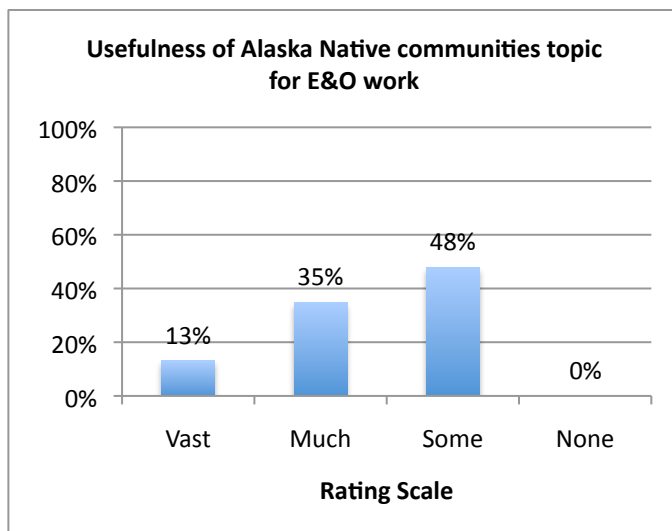
- 52% said the concept mapping and online tools had “much” usefulness
- 48% said they were “some” what likely to use these tools – more than both the “vast” and “much” responses put together.



The final session to report on is Communicating in Alaskan Native Communities by Vera Metcalf. The session by soft-spoken Metcalf was viewed as least useful and participants said they were only somewhat likely to use her insights in their own work.

- 48% rated the usefulness of the session as “some”
- 48% rated the likelihood of using the information as “some”

This particular finding is curious and possibly problematic. Alaska has a significant Native population who has real connections to and concerns about both ocean and climate change issues. The lack of perceived usefulness, among the strongly education-focused audience is notable. It raises many questions that COSEE Alaska might want to have answered. For instance, what did the non-responding scientists think about the session? Was this session more oriented to scientists and the educators found few ways to connect with the content?

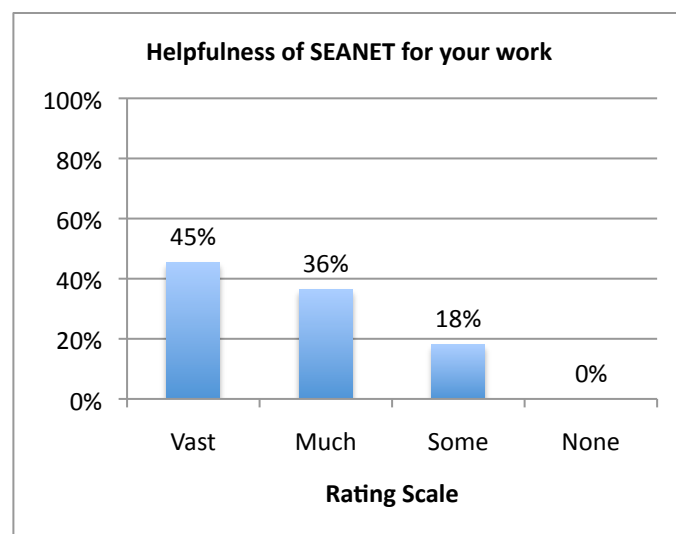


6. SEANET is gaining credibility as a mechanism for scientists-educator interaction

Following the COS Workshop those in attendance discussed the SEANET organization as an opportunity to interact and to engage with other ocean science education activities. Among the things discussed was extending the COS Workshop to include more educator-oriented sessions over the weekend prior to AMSS. SEANET members will take the lead in making this happen. SEANET members were also enlisted to host the National Marine Educators Association Conference in 2012. The conference is one of COSEE Alaska's signature activities.

Overall the participants view the helpfulness of SEANET for the work as a strong positive.

- 48% indicate its helpfulness as “vast”
- 36% rated it “much” in terms of helpfulness.



Conclusions

1. The workshop is a draw for educators, but there is lack of clarity about scientists' thoughts.

The difficulty in evaluating this activity as an effective program for scientists in learning about education and outreach is that few scientists respond to the survey. However, attendance at the session has grown in the last several years and the attendance sheet identifies a significant number of scientists. It appears they are choosing to come, like the content, but find surveys annoying.

2. The topic choices appear to meet the needs of educators and scientists.

Despite the fact that few scientists respond to the survey, their attendance at the sessions suggest that COSEE Alaska is making good choices in finding topics of interest. Some topics are readily applicable to the work conditions of the participants and they express a willingness to use the ideas generated from the workshops

3. SEANET appears to be making positive inroads as an organization for ocean scientists and educators.

Currently Alaska is a member of the Northwest Aquatic and Marine Educators Association, along with British Columbia, Washington and Oregon. Alaska is seeking to find a more localized organization that can serve the specific needs of Alaskans. Part of the impetus for forming SEANET was to capitalize on the foundational aspects of COSEE Alaska to launch this independent organization. It is hopeful that SEANET will continue as a sustainably organization after COSEE funding has disappeared.

Recommendations

1. COSEE Alaska might consider how to expand the participation and increase the interest of scientists in the COS Workshop.

Clearly this workshop serves the needs of educators, but the lack of scientists' response to surveys raises the question of whether this workshop serves as intended. One step may be to conduct a needs assessment of scientists regarding session topics. Another step might be to host a workshop for scientists separate from teachers. An overlapping workshop session might include some hands on interactions between scientists and teachers.

2. COSEE Alaska might consider a specific strategy to launch SEANET as an independent organization.

While SEANET is being formed it helps to have COSEE organize and facilitate meetings and online connections. However, if SEANET is to become a sustainable organization, COSEE would do well to consider how to make those steps happen in a proactive way.

3. COSEE Alaska might consider expanding the interactions between and among scientists, educators, and the Alaska Native population, perhaps going beyond the Science Fairs efforts.

The presentation by the representative from the Alaska Native community was viewed as “somewhat” useful by 48% of the participants, with 48% saying the likelihood of using the information was “some.” Approximately a quarter of the school population is Alaska Native. Appreciating, supporting and integrating traditional knowledge into current science instruction would be beneficial. Also ocean scientists might benefit from greater understanding of Alaska Natives’ traditional knowledge of Alaska’s ecosystems. Since many of the Arctic, Bering Sea and Gulf of Alaska scientists come from out of state, a targeted workshop for these scientists might expand their ability and interest in providing education and outreach among community members from (for example) the coastal villages.



Communicating Ocean Science Workshop & SEANET Organizational Meeting

January 18, 2010

8 a.m. to 1 pm

**Hotel Captain Cook Foredeck (Ballroom)
2010 Alaska Marine Science Symposium**

Hosted by

COSEE Alaska, North Pacific Research Board and Alaska Ocean Observing System

Nora L. Deans, Moderator

GOALS

Share programs, events, and strategies that communicate information about research in Alaska's oceans to national, regional and local audiences.

Coffee and a breakfast buffet will be available at the beginning of the meeting.

AGENDA

- | | |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 8 am - 8:15 am | Welcome, Introductions - Nora L. Deans, COSEE Alaska |
| 8:15 am - 8:45 am | The Center for Ocean Sciences Education Excellence (COSEE) Network
<i>George Matsumoto, Senior Education and Research Specialist, Monterey Bay Aquarium Research Institute</i> |
| 8:45 am - 9:15 am | Communicating Ocean Sciences in Formal and Informal Education Environments - the COS/COSIA course
<i>Craig Strang, Associate Director of Lawrence Hall of Science and Director, COSEE California</i> |
| 9:15 am - 9:45 am | Online Tools Help Get Scientists and Educators on the Same Page
<i>Annette deCharon, University of Maine, Director, COSEE Ocean Systems</i> |
| 9:45 am - 10:00 am | BREAK |
| 10 am - 10:30 am | Staying Connected by Keeping Current - use of ever-evolving social media to disseminate research news
<i>George Matsumoto</i> |

Appendix G: COSEE Alaska Year Two Annual Report

10:30 am - 11 am Research and Communication of Science in Alaska Native Communities

Vera Kingeekuk Metcalfe, Director, Eskimo Walrus Commission

11am - 11:45 am Outreach and Education about Fur Seal Research in the Pribilof Islands

Andrew Trites, Research Director, N. Pacific Universities Marine Mammal
Research Consortium

Tonia Kushin, Teacher, St. Paul School (invited, not confirmed)

12:00 pm - 1 pm SEANET Organizational Meeting -- LUNCH provided

1. Who is SEANET? Introductions of the Interim Steering Committee members
2. Process for Selecting a Standing SEANET Steering Committee
3. Status of listserve and networking site
4. Regional directory
5. Curriculum framework review and Alaska science literacy efforts
6. Planning for a National Marine Educators Conference in Alaska in 2012

Appendix H: COSEE Alaska Year Two Annual Report

Who is SEANET?

MISSION

The mission of SEANET is to promote Alaska ocean and climate change literacy through networking, communication, and collaboration

SEANET is a self-governed, informal **NET**work of **Scientists, Educators** and other people involved in communicating about research in Alaska's seas. The goal of the network is to promote ocean and climate change literacy by connecting ocean scientists with ocean educators and communicators, sharing best practices, and working together to share and integrate ocean science and local and traditional knowledge. Everyone interested in these goals - ocean scientists, formal and informal educators, communications and public information specialists, media specialists, students of all ages, and Alaska coastal community members- is welcome to join the group.

SEANET is being organized by COSEE Alaska. COSEE Alaska will seek the assistance of its members in the development of educational and communication products and programs to increase outreach, education, and communication skills and to increase public knowledge about Alaska ocean environments.

Anyone can join the network by subscribing to the SEANET listserve or joining the SEANET networking site <http://oceanseanet.ning.com>. COSEE Alaska will send out postings several times each month listing upcoming events and training and outreach opportunities of interest to the network and a digest of Alaska ocean climate change news. Members of the Ning group can interact with each other through sub-groups and forums on the website.

.GOVERNANCE

SEANET Steering Committee: SEANET is led by a Steering Committee made up of volunteer representatives, including ocean scientists, formal educators, informal educators, coastal community member, and students, along with COSEE Alaska members. The Steering Committee will hold one in-person meeting each year and hold periodic conference calls. Officers will include a Chair, Vice Chair and Secretary, and the COSEE Alaska Liaison.

An interim SEANET steering committee consists of Michael Castellini, UAF School of Fisheries and Ocean Sciences, Fairbanks; Francis Wiese, North Pacific Research Board, Anchorage; Russ Andrews, Alaska SeaLife Center; Reid Brewer, Alaska Sea Grant Marine Advisory Program, Unalaska; Sheryl Sotelo, McNeil Elementary teacher, Homer; Peggy Cowan, Superintendent, North Slope Borough School District, Barrow; Nora Deans, and Marilyn Sigman.

The SEANET Steering Committee will offer guidance and assist COSEE Alaska in:

- Helping to plan the annual Communicating Ocean Science workshop
- Assisting in development of a regional directory to scientists and formal and informal educators with a focus on marine and climate change research, outreach, and education
- Establishing “best practices” in ocean science communication, outreach and education,
- Planning for a national ocean science and education conference in 2012 in Anchorage

NETWORK SUPPORT

COSEE Alaska will serve as the communication hub for SEANET and for the Steering Committee and provide a listserve, electronic networking website, and teleconferencing and some travel support for the Steering Committee member meetings. To find out more about COSEE Alaska and its role in SEANET, contact Marilyn Sigman, Program Manager, msigman@alaska.edu or Nora Deans, Project Director, Nora.Deans@nprb.org.

Standing Steering Committee

Expectations of members:

- Participation in quarterly meetings, one face-to-face meeting during the Alaska Marine Science Symposium in January and three by teleconference
- Representation of one or more of the key groups in SEANET: scientists, science graduate students, K-12 educators, informal and community educators, outreach specialists, journalists, media specialists, community members, youth.
- Communication with other members of the group being represented.
- Assist with reviews of COSEE products in draft form.
- Help plan the annual Communicating Ocean Science workshop at the Alaska Marine Science Symposium
- Participation in planning for the National Marine Educators Association annual conference in Alaska in 2012.

SEANET Interim Steering Committee Meeting AGENDA December 3, 2009

- 1) Planning a half-day Communicating Ocean Science (COS) workshop and SEANETI uncheon meeting organization on January 18
- 2) Criteria and publicity for a COSEE-sponsored Ocean Literacy Award (to be awarded January 17)

SEANET Steering Committee AGENDA May 18, 2010

1. National Marine Educators Conference in Anchorage, June, 2012
2. Statewide Marine Education and Outreach Conference, January, 2011
3. COSEE Alaska Call for Vision Papers and Community Meeting

Information updates for discussion if time permits:

- ☐ COSEE Alaska has conducted two needs assessments: 1) Alaska K-12 teachers needs related to teaching about Alaska marine environments and climate change, and 2) Alaska informal educator needs related to professional development. The teacher survey results are attached.
 - ☐ COSEE Alaska is a partner in the development of the Alaska Environmental Literacy Plan. The planning effort is being led by the Alaska Department of Fish and Game with the support of the Alaska Department of Education in anticipation of federal funding that would become available to states with approved plans if Leave-No-Child inside legislation is passed by Congress. I am serving on the Steering Committee and on the Curriculum Standards Committee. The Curriculum Standards Committee has reviewed the state standards against several sets of national standards, including the Ocean Science Literacy and Climate Change Science Principles to identify gaps and recommend changes. A draft Plan will be ready for review in fall, 2010. For more information or to get involved, go to <http://anroe.wordpress.com/environmental-literacy-plan/>.
 - ☐ A K-12 Scope-and-Sequence for the Ocean Literacy Principles was recently published in the National Marine Educators Association's Currents magazine and is available online at http://oceanliteracy.wp.coexploration.org/?page_id=111 . This is in the form of concept maps that depict sequences for teaching concepts at specific grades in order to build to from foundational concepts to the more complex in an age-appropriate way.
- Schedule for teacher professional development workshops, conferences, and courses:

- O July 19-23, 2011- Bering Sea Teacher Workshop, Fairbanks (Sponsors: COSEE Alaska, North Pacific Research Board, Arctic Research Consortium of the U.S. – ARCUS)
- O September 23-25, 2010 Salmon in the Classroom Teacher Workshop September, Fairbanks (Sponsors: Cooperative Extension, U.S. Fish and Wildlife Service, Alaska Department of Fish and Game, COSEE Alaska, Alaska Sea Grant)
- O October, 2010 Alaska Sea Life Center Teacher Workshop for Kenai Peninsula School District, Seward “Go with the Flow” theme (COSEE Alaska participation)
- O November, 2010 Alaska’s Ocean and Climate Change Teacher Workshop for Anchorage School District, Anchorage (Tentative re-schedule for Anchorage Academy course, in partnership with Alaska Maritime Refuge and Alaska Sea Life Center)
- O January, 2011 Statewide Marine Education and Outreach Conference (Tentative Saturday-Sunday-Monday morning, week of Alaska Marine Science Symposium)
- O Spring, 2011 Communicating Ocean Science/Communicating Ocean Science in Informal Settings course, UAF. (Co-sponsored by COSEE Alaska, SFOS, and the Museum of the North)
- O June 25-28, 2012 National Marine Educators Conference, Anchorage

Appendix J: COSEE Alaska Year Two Report
SEANET Attendees January 2010

		Educator	Scientist	Native Org.	Outreach/Media
Adelheid Herrmann	Commercial Fisherman				
Alana Branson	Saltwater Inc				
Aleria Jensen	NOAA Fisheries				
Alice Dou-Wang	Prince William Sound Science Center	X			
Allen Marquette	Prince William Sound Science Center	X			
Amanda Barker	UAF/ Alaska Sea Grant MAP - Bethel	X			
Amy Holman	NOAA				X
Andrew Trites	N. Pac. Univ. Marine Mammal Res. Ctr.		X		
Annette deCharon	University of Maine, COSEE OS	X			
Barbara Bennett	American Cetacean Society	X			
Bob Janes	Gastineau Guiding/ecotourism co.	X			
Brendan Smith	Norseman Maritime/Wildlife Research Images				X
Brian Lax	BLM Campbell Creek Science Center	X			
Carin Stephens	UAF/School of Fisheries and Ocean Scis. (SFOS)				X
Carl Berger	Lower Kuskokwim Econom. Develop. Council		X		
Carrie Eischens	North Pacific Research Board (NPRB)		X		
Catherine Bursch	Kachemak Bay Research Reserve (KBRR)	X			
Charlotte Vick	Deep Search Foundation	X			
Cindy Hartmann Moore	NOAA - NMFS		X		
Craig Strang	University of California, LHS, COSEE CA	X			
Darcy Dugan	Alaska Ocean Observing System (AOOS)				X
Dave Grant	Ocean Institute		X		
Dave Roseneau	USFWS AMNWR		X		
Derek Hildreth	USFWS		X		
Dustin Salberg	TNC Alaska		X		
Erica Thompson	Prince William Sound Science Center		X		
Erling Westlien	Shell Exploration		X		
Fei Chai	University of Maine		X		
Francis Wiese	NPRB		X		
Frank Rack	Andrill Univerrsity of Nebraska		X		
Gary Freitag	UAF Alaska Sea Grant/MAP - Ketchikan	X	X		
George Matsumoto	MBARI, COSEE Advisory Committee		X		
Glenn Seaman	Consultant				X
		Educator	Scientist	Native Org.	Outreach/Media

Appendix J: COSEE Alaska Year Two Report
SEANET Attendees January 2010

Greg Boland	DOI/MMS		X		
Hanna Eklund	Chugach Regional Resources Commission			X	
Helen Chythlook	Bristol Bay Native Association			X	
Howard Horton	NPRB		X		
Ida Hildebrand	Chugach Regional Resources Commission			X	
Jamie Womble	National Park Service Oregon State University		X		
Jan Straley	UAS & Sitka Science Center		X		
Jana DeSilva Lage	JDC Geo Marine Consulting		X		
Jeff Stephan	United Fishermen's Marketing Association	X			
Jessican Ryan	Kachemak Bay Research Reserve - ADFG	X			
John Stein	Sitka Sound Science Center	X			
Jonathan Thar	Vancouver Aquarium/POST project				X
Judy Caminer					
Justin Jennings	ASLC				
Kate Alexander	Prince William Sound Science Center	X			
Kay Wallis	GZGTG (Tribal government Fort Yukon)			X	
Keith Cox	NOAA Fisheries		X		
Kris Holderied	NOAA Kasitsna Bay		X		
Kurt Byers	Alaska Sea Grant	X			
Laurie Stuart	ASLC, COSEE Alaska	X			
Lorrie Rea	Alaska Department of Fish and Game		X		
Leslie Pierce	North Slope Borough				X
Linda Maxson	Northwest Aquatic & Marine Educator Assoc.	X			
Linda Robinson	Prince William Sound RCAC				X
Lindsay Butters	Prince William Sound Science Center	X			
Lisa Hiruki Raring	NOAA Alaska Fisheries Science Center	X			
Liz Stahl	Gasttineau Guiding	X			
Megan Murphy	KBRR		X		
Melodie Sharon	Anchorage School District	X			
Michelle Ridway	Alaska Deep Ocean Science Institute		X		
Mike Castellini	UAF/SFOS, COSEE Alaska PI		X		
Mike Williams	NMFS		X		
Molly McCammon	AOOS, COSEE Alaska PI				
		Educator	Scientist	Native Org.	Outreach/Media
Nancy Deschu	DOI Outer Continental Shelf Program		X		

Appendix J: COSEE Alaska Year Two Report
SEANET Attendees January 2010

Nancy Lord	Writer				X
Olga vonZiegesor	Eye of the Whale		X		
Paul Twardock	Alaska Pacific University	X			
Paula Cullenberg	Alaska Sea Grant, COSEE Alaska PI	X			
Peggy Cowan	North Slope Borough School District	X			
Phil Zavadil	Aleut Community of St. Paul			X	
Phyllis Shoemaker	UAF/SFOS, NOSB Coordinator		X		
Ray Barnhardt	UAF Ctr. for Cross-Cult. Studies, COSEE PI	X			
Rebecca F. Reuter	NOAA Alaska Fisheries Science Center	X			
Reid Brewer	UAF Alaska Sea Grant/MAP - Unalaska	X	X		
Richard Newman	Minerals Management Service		X		
Rodney Cluck	DOI/MMS		X		
Russ Andrews	UAF SFOS & ASLC		X		
Ruth Post	UAF/SFOS, COSEE Alaska staff		X		
Ryjl Christianson	Pratt Museum	X			
Sadie Waddington	Deep Search Foundation				
Samantha Zacharof	Aleut Community of St. Paul				
Scott Pegau	Oil Spill Recovery Institute		X		
Sherry Dugan	Girdwood Science Camp	X			
Sheryl Sotelo	SEANET Steering Committee, teacher	X			
Stormy Haught	Kachemak Bay Research Reserve - ADFG	X			
Susanna Marquette	State of Alaska, Public Health Nursing	X			
Terry Johnson	UAF Alaska Sea Grant/MAP - Anchorage	X			
Terry Reeve	UAF Alaska Sea Grant/MAP - Bethel	X			
Terry Thompson	Kachemak Bay Research Reserve - ADFG	X			
Tim Holder	MMS-DOI		X		
Tom Van Pelt	NMFS		X		
Tonia Kushin	Pribilofs - St. PAUL SCHOOL	X			
Vera Metcalf	Eskimo Walrus Commission			X	
Victoria Nykes Steere	Ak. Native Health Comm. & ICAS			X	
Yi Chao	JPL/NASA		X		

Appendix K: COSEE Alaska Year Two Annual Report

SEANET Steering Committee

Formal Education:

Peggy Cowan, Superintendent, North Slope Borough School District, Barrow

Sheryl Sotelo, Elementary Teacher, McNeil Canyon School, Kenai Peninsula School District, Homer

Jeff Stephan, School Board Member and Alaska Sea Grant Advisory Committee, Kodiak

Informal Education:

Reid Brewer, UAF Sea Grant/Marine Advisory Program, Unalaska

Laurie Stuart, ASLC, Seward

Scientists:

Michael Castellini, UAF SFOS, Fairbanks

Russ Andrews, ASLC, Seward

Francis Wiese, NPRB, Anchorage

Kristin Shakes, UAF SFOS, Fairbanks (graduate student)

Science Communicator/Media Specialist: Lisa Busch, Encounters radio program, Sitka

Ecotourism/Citizen Science Education: Bob Janes, Gastineau Guides, Juneau

Native knowledge/Native educator: Nominations pending

Agency Outreach Specialist: Nomination pending



Appendix L COSEE Alaska Year Two Report

ALASKA CENTER FOR OCEAN SCIENCE EDUCATION EXCELLENCE

COSEE Planning Workshop for Inupiaq Region

January 22, 2010

Alaska Ocean Observing Systems Conference Room

1007 West Third Avenue (907-644-6707)

Tentative Agenda

<u>Thursday, Jan. 21</u>	Travel to Anchorage Check in to Captain Cook Hotel (276-6000)
<u>Friday, Jan. 22</u>	AOOS Conference Room (1007 West 3 rd Ave.)
9:00-12:00 am	Introductions Overview of Alaska COSEE Alaska Native Knowledge Network (Ray Barnhardt) COSEE Alaska Office (Marilyn Sigman, Nora Deans?) D9a Consultants (Alan Dick) Research Assistant (Wilma Osborne) Role of Indigenous Knowledge in Science Education (Ray)
12:00-1:00	Lunch
1:00-4:00	Review of Ocean Science Fair initiative and resources (Alan and Ray) Alaska State Science Fair (Texas Gail Raymond?) Local/Regional Science Fair planning Professional development needs/opportunities (Ray, Marilyn, Alan)
4:00	Workshop adjourns
<u>Saturday, Jan. 23</u>	Depart Anchorage



- 2009 Teacher In-Service -

Salmon in the Classroom: Connecting Local to Global

October 21 – 25, 2009

Fairbanks, Alaska

Co-sponsored by:

**4-H Natural Resource and Youth Development Program,
Cooperative Extension Service – University of Alaska-Fairbanks,
U.S. Fish & Wildlife Service, Alaska Sea Grant, COSEE-Alaska**

Wednesday, Travel Day,

October 21, 2009

7:00 – 7:30 PM Dinner Provided, Wedgewood Resort
Six word autobiography
Teacher Share Sign-up
Survey Completion
Receive Workshop Planner

Thursday

October 22, 2009

7:00 – 7:30 am Breakfast

8:00 – 8:15 Introductions – Welcome
WHY this Workshop? WHO it's for, WHERE we've been, WHAT we hope it can do for you!
Receive science Notebooks.

8:15 - Noon Bingo! Participation through out morning. Prizes

8:30 -8:45 am Activity: 'My World'
Brief report on results of teacher survey – Responding to your needs
Teacher reflections in words and/or pictures of their needs and situation.
Educators share their personal situation through words/photos. Ideas 'captured' on story board – the 'living map' for group to view throughout in-service and reference to throughout. List or draw your 3 biggest challenges and 3 best community assets for your personal education Program.

8:45 – 9:15 Teachers – 'Hear me out – report of MY World'

9:15 – 9:45 SALMON: What you know and what you'd like to know – Life History of Pacific Salmon.

9:45 – 10:15 am A Year in the Life of the In-classroom Salmon Project, How to get started?
1). Permitting from ADF&G, Sara Conrad, ADF&G
Fish Resource Permits for Classroom Incubation & Operational Study Plans
2) Why are there regulations? Local egg-takes vs. CES supplied through Blanket Permit

10:15 – 10:30	BREAK
10:30 – 10:55	<p>The year continues</p> <p>3)Preparing Students and the community NOT an enhancement project Acknowledge what they already know. Use local knowledge, Timing using ATU's (experienced teachers share their success)</p> <p>4) Receiving Eyed-Eggs, When, How many, Preparation and care</p> <p>5) Eyed egg care, white eggs, fungus</p> <p>6) The HATCHI Alevin Care, Double water exchanges</p> <p>7) Fry stage, 'buttoning up.' When to start feeding</p> <p>8) Releasing/Destroying Fry. Methods. Permit regulations! Teacher sharing – challenges and opportunities with destroying fry</p>
10:55 – 11:15	Two Teacher Sharing Sessions
11:15 – noon	<p>A Closer Look at Salmon.</p> <p>External Anatomy of a Coho Salmon: Compare and Contrast with a Human Being</p> <p>Internal Anatomy: What do you think THAT is? Fish Dissection</p> <p>How to Tie to Standards (Writing, Language Arts & Math) (Worksheet)</p>
Noon – 12:15	Fish Printing – Another example of cross-curriculum projects!
12:15 – 1:00 PM	LUNCH
1:00- 1:20	<p>Incubation Project Basics</p> <p>I. Incubator Set-Up</p>
1:20 – 1:40	<p>II. Critical Elements (ADF&G Incubator Manual)</p> <p>III. Daily and Weekly Procedures</p> <p>IV. Emergency Procedures</p>
1:40 – 1:50	V & VII Maintenance & Storage
1:50 – 2:00	Involving Students and the Community
2:00 – 2:20	Two teacher sharing sessions
2:30 – 3:00	Learning Styles Research: AK Native student preferences
3:00 – 3:15	BREAK
3:15 – 3:45	Concept Map/webbing activity. Tying the salmon program to bigger ecological concepts: watersheds, wetlands, ocean, food webs, ecosystems, sustainability, climate change, stewardship.
3:45 – 5:00 PM	<p>Intro to Alaska Seas and Rivers</p> <p>Grade 3: Rivers to the Sea and Back Again, Activities 3,4,5</p> <p>Grade 5: People and the Ocean (Stewardship), Activities 2,3,4,5</p> <p>Grade 7: Ocean in Motion, Activities 2,3,4,6</p> <p>Grade 8: Our Changing World, Activities 2,4,5</p> <p>Best Practices: Use of salmon in the classroom programming.</p>

5:00 – 5:20 Report out to whole group

5:20 – 6:00 Free Time, Browse Resources, Evaluation check-in

6:00 – 6:30 PM Dinner at the Wedgewood

Friday

October 23, 2009

7:00 – 7:30 am Breakfast

8:00 – 8:20 Dr. John Blake, UAF Veterinarian, IACUC protocols

8:20 – 8:45 Community Learning Cycle

8:45 – 9:15 Alaska Seas and Rivers activity on habitat or fisheries (Marilyn)

9:15 – 9:45 Alaska Seas and Rivers activities on currents and climate change, introduction to COSEE

9:45 – 10:05 Two Teacher Sharing sessions

10:05 Break

10:15 Integrating Alaska Native Knowledge with science and ocean science fairs (Alan Dick)

11:15 COSEE & observing networks and the community learning cycle

11:30 – 12:00 Katie Murra Straub Information about the UAF fisheries undergraduate program.

Noon – 1:00 PM Lunch

1:00 – 1:15 Working with Scientists and Researchers in schools (Marilyn)
- Show the results of scientist pre-workshop survey and ask scientists to
-Add to scientist visual of "My World"

1:15 Scientist/Researcher Content Presentations
'What's going on with research in your part of the state and how to potentially involve students and the community?

1:15 – 1:35 Seth Danielson, UAF School of Fisheries and Ocean Sciences; Quinhagak drifter study of currents affecting salmon outmigration and website animation of drifter results, potential effects of changing salinities and currents as a result of climate change

1:35 – 1:55 Martha Kopplin, International Arctic Research Consortium; The GLOBE Biomes project; collection of water quality data related to salmon habitat and phenology data related to climate change.

1:55 – 2:05 Marilyn Sigman – summary of Sue Mauger's (Cook Inletkeeper) work with water temperatures in streams and collection of water temperature data using Hobo-temps.

2:05 -2:20 Jason Hale, Yukon River Drainage Fisheries Association

2:20 – 2:35 Laura LeBlanc- Tanana Chiefs Conference

2:35 – 3:20	Mark Wipfli, UAF School of Fisheries and Ocean Sciences; cycling of terrestrial and marine-derived nutrients in salmon life cycle
3:20 – 3:40	Break
3:40 – 4:40	Teachers and scientists plan together, including brainstorm of community-based science resources
4:40 – 5:20	Four Teacher Sharing Sessions
5:20 – 6:00	Free Time
6:00 PM	DINNER at the Wedgewood

SATURDAY

October 24, 2009

7:00 – 7:30 am	Breakfast
8:00 – 5:00	Resource share fair of kits, curricula, and web sites + resources on the COSEE-Alaska website and the opportunity to join SEANET.)
8:00 – 8:30	EDU/BIO 593 Requirements
8:30 - 9:00	Brainstorm more Community Resources - incorporating community learning cycle
9:00 – noon	Teacher Planning: Using provided planner sheet and resources from workshop to incorporate into local program. Calendar of events/activities.
Noon – 12:30	Lunch
12:30 – 1:30	Individual Group Lesson Plan Sharing, Part A Lesson plan/unit/scientist connection/local resources
1:30 – 1:45	Ice Cream Bar
1:45– 3:30	Individual Group Lesson Plan Sharing, Part B Lesson plan/unit/scientist connection/local resources
3:30 – 4:30	Critique of Workshop Format through open dialogue:
5:00	Dinner on your own. Travel access provided to town

SUNDAY

October 25, 2009

**Breakfast Provided – Wedgewood
Travel day**

Course Syllabus

Course Title: Teacher In-Service for 4-H Natural Resources and Youth Development Program

Course Number, Section & Credits: EDU/BIOL 593
Section 1
1 Credit Hours

Prerequisites: Permission of the Instructor

Location: October 21-25, 2009; Fairbanks, AK

Instructor: Peter J. Stortz, Professor
UAF Palmer Research & Extension Center
533 E. Fireweed Ave.
Palmer, AK 99645
(907) 746-9459
(907) 746-2677
pjstortz@alaska.edu
8:30 am – 4:30 pm M-F

Meeting Days/Times: Face to Face Training – October 21-25, 2009 Fairbanks, AK

Course Description:

A hands-on experiential learning experience in fisheries and other natural resource issues relevant to educators from rural Alaska communities. This course will provide background information and resources to successfully incorporate fisheries and other natural resource education into standard based classroom curricula. The course will also provide instruction on incorporating local and traditional knowledge and addressing standards and grade level expectations.

Course Goals/Student Learning Objectives:

- The student will become more familiar with statewide and local fisheries and other natural resource issues and resources relevant to their communities.
- The student will demonstrate their ability to adapt/prepare activities that compliment their classroom curriculum and meet state and local performance standards.

Instructional Method:

This course will include 3 full days of face-to-face workshop training.

Course Calendar:

October 21-25, 2009: Fairbanks workshop (attendance mandatory)

Course Policies:

Grading: All assignments must be completed in the specified time in order to receive full credit. A grade will be provided to student after all work is completed satisfactorily.

Appendix M: COSEE Alaska Year Two Report

The following table provides a summary of the data collected during the COSEE Alaska Year Two Report.

The data was collected from a survey of 100 participants, with a response rate of 85%.

The survey was conducted between January and March 2018.

The survey was conducted by the COSEE Alaska team.

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2009/2010 4-H Natural Resource & Youth Development Contacts

Participant Name & Community	Registration & Agreement Form (Y/N)	TA # and Cost Est.	Transportation	Lodging/Food Service Dates and Paid by
1. Mary Alice Thomas, ATMAUTLUAK	YES	TA 533302 \$793.71	CES to pay travel. ARR: Wed. 5:07pm Depart Oct 24 at 5pm from Ft. Yukon to Bethel	CES to pay F & L. Does not need Sat lodging
2. Scott Wirick, DELTA JCT.	YES	TA 533304 \$110	CES to pay travel, mileage. ARR: 5:30PM, Weds Depart 5:30 PM Saturday	CES to pay F & L NO SAT. Lodging
3. Deborah Endicott, DILLINGHAM	YES		Endicott does not require transportation. In FAI for separate function. Arr Oct 20th Depart: 5:00 PM Saturday	CES to pay F & L NO SAT. Lodging
4. Margaret Mary McElfresh EAGLE mmcfresh@agsd.us	YES	Arrive AK Air Weds NOON.	USF&WS to pay transportation Arr NOON Weds Depart Monday 9:00am	CES to pay F & L NEEDS Sat and Sun lodging
5. Mark Vachavake, ELIM	Yes	TA 533310 \$959.70	CES to pay travel. Arr: 12:49am Thursday Depart: 6:15am on Sunday	CES to pay F&L, Weds PM - Sunday? No meals on Sunday
6. Ed Snow, Ft. YUKON	Yes		USF&WS Travel. Arr: 9:25 am Depart: Saturday, 6:20 PM Warbelow's	CES to pay F&L, Weds PM - Sat PM NO Saturday Lodging
7. Sara Rearden, NAPASKIAK	Yes	TA 533317 \$939.71	CES to pay travel: Arr. At 5:07pm Departs Sat. 5pm	CES to pay F&L NO SAT. night lodging or Sunday meals
8. Ian McRae, NOME	YES		NOME to pay travel. Arr: 12:49 am Thursday, Depart: 3:00PM Sunday	NOME to pay F&L
9. Keith Conger, NOME	Yes		NOME to pay travel. Arr: 12:49 am Thursday, Depart: 3:00 PM Sunday	NOME to pay F&L
10. Keith Orthmann, NORTHWAY	YES	TA 533319 \$ 245.30/ cancel	CES to pay travel. Arr: ?? Depart: ??	CANCELED - Family emergency, Oct 13, 2009
11. Christian Powers, OSCARVILLE	YES	TA 533309 \$532.70	CES to pay travel BET/FAI/BSF. Arr: 5:07PM Depart AS 190 Saturday 5:00PM	CES to pay F&L Weds, Thurs, Friday Lodging (3 nights only) No Sunday breakfast required
12. Milt Hooten, QUINHAGAK	YES		USF&WS to pay transportation, ARR: ERA 6:40PM Weds, Depart: 6:15am Sunday	CES to pay F&L
13. Angela Hayden, SLEETMUTE	YES	TA 533306 \$526.70	CES to pay travel. Hayden flying own plane to	CES to pay F&L

Activity	Location	Start Date	End Date	Duration	Facilitator	Participants	Summary
1. Initial meeting with project partners	Juneau, Alaska	10/15/2014	10/15/2014	1 day	Dr. [Name]	10 people	Established project goals and objectives.
2. Site visit to [Location]	[Location]	10/20/2014	10/20/2014	1 day	Dr. [Name]	12 people	Observed current site conditions and collected samples.
3. Data collection and analysis	Juneau, Alaska	11/01/2014	11/01/2014	1 day	Dr. [Name]	8 people	Reviewed data collected during site visit.
4. Public meeting with community members	Juneau, Alaska	11/10/2014	11/10/2014	1 day	Dr. [Name]	20 people	Presented findings to community members and gathered feedback.
5. Final report preparation	Juneau, Alaska	11/20/2014	11/20/2014	1 day	Dr. [Name]	5 people	Completed final report and prepared for distribution.
6. Distribution of final report	Juneau, Alaska	12/01/2014	12/01/2014	1 day	Dr. [Name]	10 people	Distributed final report to project partners and community members.
7. Follow-up meeting with project partners	Juneau, Alaska	12/15/2014	12/15/2014	1 day	Dr. [Name]	10 people	Reviewed progress of project and discussed future plans.
8. Public meeting with community members	Juneau, Alaska	12/20/2014	12/20/2014	1 day	Dr. [Name]	20 people	Presented findings to community members and gathered feedback.
9. Final report preparation	Juneau, Alaska	12/30/2014	12/30/2014	1 day	Dr. [Name]	5 people	Completed final report and prepared for distribution.
10. Distribution of final report	Juneau, Alaska	01/01/2015	01/01/2015	1 day	Dr. [Name]	10 people	Distributed final report to project partners and community members.

12. Bonnie Dompiere, TANACROSS	YES	TA 533320 \$187.00	Aniak from Sleetmute. Arr: 8:06pm Wednesday Depart: Saturday at 5pm	Will be traveling with spouse and infant. Spouse will pay food charges if used. No Sat. night lodging.
13. Andrew Smith, TOGIAC	YES		USF&WS/Togiak NWR to pay transportation. Departs Togiak Tuesday afternoon via Dillingham. Arr: AK Air 187, 2:10 PM, Depart Saturday, Oct 24, 10:05PM, AS 52	CES to pay F & L No Saturday Lodging Required
14. Melissa Schuyler, TOK	YES	TA 533318 \$225.50	ES to pay Transportation (mileage) Arr?? LV: NOME MAP to assist with transportation in lieu of their earlier offer to assist Nome Terra?? ARR: 5:20PM FAI 21 st AS 51; LV 6:15am Sunday AS180	CES to pay F&L
15. Jessica Keller, UNALAKLEET	YES		ES to pay Transportation. Arr: AS Flight 191 @ 8:06PM Weds, Dept: AS 184 Noon Sunday	CES to pay F&L. Transportation handled by Marilyn.
16. Steven Gregory, UNALASKA	YES	TA 533308 \$1,163.69	ES to pay Transportation. Arr: Wed. at 4pm AK Air, Dept. Sunday at noon AK Air	CES to pay F&L Weds, Thurs., Fri, Sat lodging (4) All meals
17. Tom Faverty, YAKUTAT	YES	TA533305 \$362.70, 10/2/09	ES to pay Transportation. Arr: Wed late afternoon. Depart Sat 5:38 PM Driving	CES to pay F&L All meals and nights CES to pay F&L
18. Mark Martin, HEALY	YES		ES to pay Transportation. Arr: Wed late afternoon. Depart Sat 5:38 PM Driving	CES to pay F&L All meals and nights CES to pay F&L
Jason Hale, YRDFA	N/A		Arr: Thursday lunch time, Depart Friday 5PM	Friday dinner Thursday Lodging only Thursday Lunch – Friday Dinner (L,D,B,L) CES to pay Thursday lunch – Friday dinner
Evan Blankenship, YRDFA	N/A		Arr: Thursday lunch time, Depart Friday 5PM	Thursday Lodging only Thursday Lunch – Friday Dinner (L,D,B,L) CES to pay Thursday lunch – Friday dinner
Sara Conrad, ADF&G, JUNEAU	N/A	Ar Weds 2:10, AS187, Dept. Sun 6:15am AS 180	ARR: Thursday lunch time, Depart Friday 5PM	Thursday Lodging only Thursday Lunch – Friday Dinner (L,D,B,L) CES to pay Thursday lunch – Friday dinner
Marilyn Sigmund, COSEE-Alaska, ANCHORAGE			ARR Wednesday 10:00am ERA Depart Saturday, 10:05PM	CES to pay F & L NO Saturday Lodging Required
Laurel Devaney, USF&WS, FAIRBANKS			N/A	CES to pay Food
Peter Stortz, CES, PALMER			ES to pay Transportation	CES to pay F & L
Allen Dick, LIME VILLAGE			ES to pay Transportation Arr: Friday?? Dept: ??	CES to pay F & L
Agency Reps				CES to pay food Friday noon lunch and Friday dinner

11/18/09 4:53 PM



U.S. Fish & Wildlife Service

Fairbanks Fish & Wildlife Field Office

2009 Rural Educator In-Service

Salmon in the Classroom: Connecting Local to Global

Background:

The 4-H Fisheries, Natural Resource and Youth Development program was started by the Cooperative Extension Service in rural Alaska in 1991 as a response to the Yukon River salmon crises, and to help increase math and science literacy in village schools. The U.S. Fish & Wildlife Service and the Alaska Department of Fish & Game have been educational partners since the program's inception.

As part of the program, rural educators attend an annual in-service training that provides them with the resources, tools, skills and hands-on learning necessary to operate an in-classroom incubator system where they hatch coho salmon and raise them through the fry stage in the classroom. With experiencing the pacific salmon life cycle as the program's core, participating educators incorporate fisheries and watershed studies and other relevant natural resource education, into their classroom curricula throughout the year.



Nineteen educators representing ten rural school districts attended the 2009 workshop.

Workshop and Program Goals

The following were developed as workshop goals and desired outcomes of the program.

As a result of participating in the Salmon in the Classroom workshop, rural educators will:

- Incorporate place-based and science-based education and a better understanding of the local environment into their classroom curricula including:
 - Salmon life cycle, habitat requirements, and management
 - Marine ecosystems and climate change
 - Sustainability
- Include information about science and natural resource career education.

Program coordinators will strategically focus on:

- Meeting teacher and school district needs to provide effective education about this content while meeting all other requirements.
- Providing meaningful and effective outreach opportunities for scientists and natural resource managers

Long-term Program Goals

Maintain focus on salmon as:

- A means to teach ecosystem, climate change, and sustainability concepts
- Significant to the resource-dependent economies of rural Alaska communities
- Significant to cultural identity (Native Alaskan and rural residents)
- Increase Native/rural involvement in natural resource careers, including jobs that provide the means to stay in the community
- Improve understanding of resource management as a means to better-informed citizens
- Contribute to improving the quality of education in rural Alaska



Workshop participants learn hands-on science activities that they can take back to their classrooms.

Workshop Overview

After a two-year hiatus where insufficient funds were available to hold a teacher training, the Salmon in the Classroom workshop was held October 21 - 24 in Fairbanks.

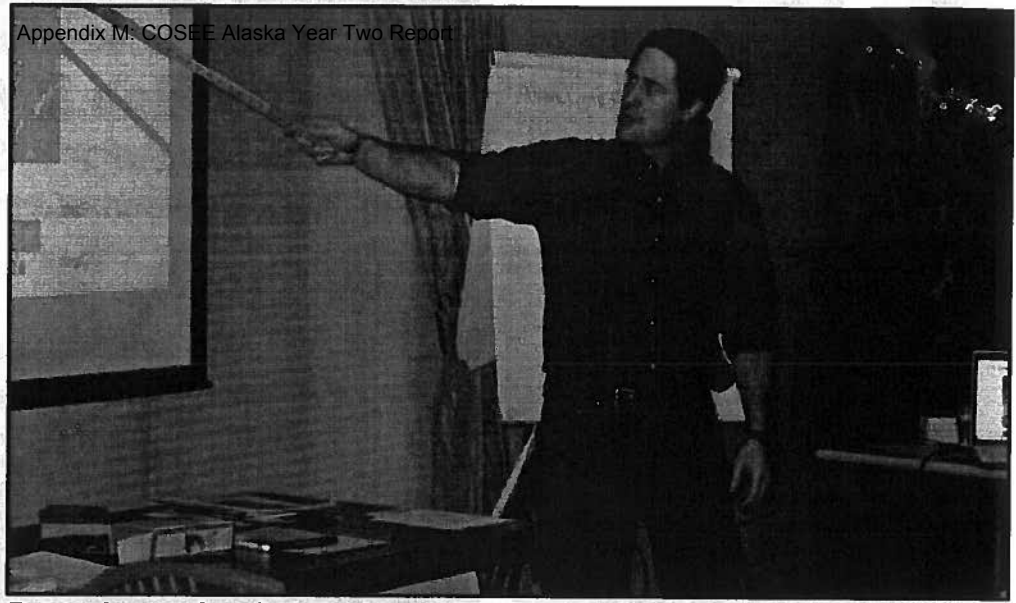
An important new partner in the program is Centers for Ocean Sciences Education Excellence (COSEE Alaska). A primary goal of COSEE is to connect scientists and schools. To help fulfill this goal, scientists were recruited who are conducting research relating to fisheries or climate change. They agreed to share information and current data from their projects with schools, or are conducting research where schools can help collect data for them.

Contributing researchers included:

Seth Danielson - UAF School of Fisheries and Ocean Sciences. Seth is conducting a Drifter study of currents affecting salmon smolt out-migration, along with the potential effects of changing salinities and currents as a result of climate change. A teacher from Quinhagak who is in the Salmon in the Classroom program, deployed some of the drifters with his students. Other teachers at the workshop will incorporate Seth's data into their classroom lesson plans.

Martha Koplin - International Arctic Research Consortium- Martha helps to coordinate the GLOBE (Global

Appendix M: COSEE Alaska Year Two Report



Researchers such as Seth Danielson of the UAF School of Fisheries and Oceans, will work closely with participating teachers to bring their research into the classroom.

Learning and Observations to Benefit the Environment) Biome Project. Participating teachers can either collect water quality data related to salmon habitat near their schools, or phenology data related to climate change. This information is posted on the GLOBE web site and participating schools around the world can communicate to compare and contrast data from their sites.

Mark Wipfli- UAF School of Fisheries and Ocean Sciences. Mark studies the cycling of terrestrial and marine-derived nutrients in the salmon life cycle. He also agreed to share his data with teachers in the workshop, and answer their student's questions about his work.

Workshop Outcomes

The teachers agreed to develop a follow-up unit incorporating both the Salmon in the Classroom program, and some aspect of the research they learned about as a requirement of participating in the workshop. Meetings with the participating researchers and unit planning time were built into the workshop for this purpose.

A share fair of available educational kits, curricula, and web sites was held to help with teacher unit planning. In addition, representatives of

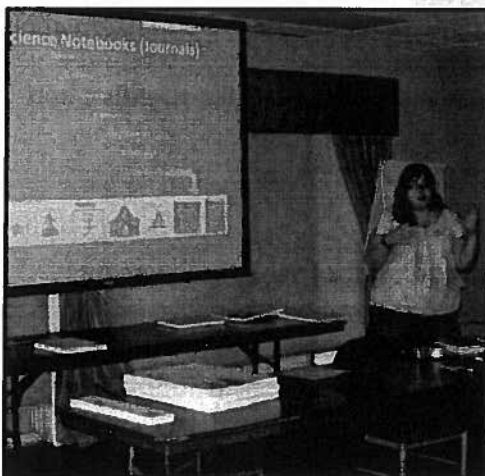
organizations that provide resources for teachers made short presentations and spent time planning with the teachers. This included Jason Hale with the Yukon River Drainage Fisheries Association, Erik Anderson with ADF&G, and Brandy Berkbigher at Tanana Chiefs Conference.

The ultimate outcome of this workshop will be that hundreds of students across rural Alaska participate in exciting and relevant lessons incorporating their salmon resources and real world research. As a result, students become more informed decision makers and stewards of their natural resources as adults.

Workshop Financial Assistance

Bringing rural educators together is essential to maintaining the program, but also extremely expensive. The workshop would not have happened without financial assistance from the following partners:

- Cooperative Extension Service
- COSEE Alaska
- Fairbanks Fish & Wildlife Field Office
- Yukon Delta NWR
- Yukon Flats NWR
- Togiak NWR
- Tanana Chief's Conference
- Alaska Dept. of Fish & Game
- YRDLA



Participating teachers developed lesson plans based on workshop content, which they shared with their peers.



4-H Science News Updates



Fall 2009

Volume 16

Number 3

Palmer Research and Extension Center, 533 E. Fireweed, Palmer, AK 99645

Natural Resource & Youth Development Program

A youth development program that utilizes natural resource management issues to enhance the math and science literacy of rural youth: to prepare them for post high school education; prepare them for a role in managing their local resource; and empower them to make a difference in the quality of life in their community.

Peter J. Stortz
Extension Natural
Resource & Youth
Development
Specialist
533 E. Fireweed
Palmer, AK 99645
(907)746-9459
(907)746-2677, fax
pistortz@alaska.edu

Dear Educators, Students and Friends,

Absolutely the BEST news is the 4-H Natural Resource and Youth Development (4-HNRYD) Program has resources to provide a limited teacher in-service this autumn. With combined resources from the US Fish and Wildlife Service, Sea Grant's new Center for Ocean Science Education Excellence (COSEE) – Alaska, and the Cooperative Extension Service, the training scheduled for October 21–25 in Fairbanks will provide rural educators with in-depth content related to fisheries and natural resources issues. Our last in-service was in the fall of 2006. This new opportunity will provide new energy to help sustain the program into the future.

In Alaska, the 4-HNRYD Program has been serving the educational needs of youth from rural communities since 1991. The original purpose, to provide math & science literacy to K-12 students through natural resource fishery education to those communities hit hardest by declining salmon returns and prices during the 1990's, remains an even more important outcome today. The highly relevant, challenging, and pressing issue of climate change (social, economic and environmental), its impact on fisheries, employment and traditional subsistence lifestyles has created an urgent need to prepare youth with the knowledge and skills to address these challenges. Educators continue to request materials and experiences that apply to student's abilities in real life situations that require innovation and problem solving skills.

The training is designed to increase science literacy for youth, (Science, Engineering and Technology) SET abilities and 21st Century learning. The youth directed, hands-on, participatory methods educators will receive will result in new knowledge, which leads to changed behavior. This approach is complimentary to 'essential elements of 4-H.' Learners involved in the scientific process using observation, measurement, analysis, rhetoric and science argumentation will develop a more positive attitude toward science, and have the skills to succeed in higher education and new careers along with responding to the real-life challenges their communities face adapting to climate change.

In the future we'd like to support and involve additional rural Alaska communities providing resources and educational programming to use and implement in your schools. More to come!

PETER J. STORTZ
Extension Natural Resource &
Youth Development Specialist



America's Arctic University

The University of Alaska Fairbanks Cooperative Extension Service programs are available to all regardless of race, color, age, sex, creed, national origin or disability, and in accordance with all applicable federal laws. Provided in furtherance of Cooperative Extension work, acts of May 8 and June 30, 1914, in cooperation with the U. S. Department of Agriculture, Fred Schlutt, Director of Cooperative Extension Service, University of Alaska Fairbanks UAF is an AA/EO employer and educational institution.



The first year of the COSEE Alaska project was a time of great learning and growth. We began by identifying the needs of our community and developing a plan to address them. We then worked to build a strong network of partners and stakeholders, and we began to implement our projects. Throughout the year, we have received many positive responses from our community, and we are excited to continue our work in the coming year.

One of the most important things we have learned is the importance of community engagement. We have found that when we involve our community members in the planning and implementation of our projects, we are more likely to succeed. We have also learned the importance of building strong relationships with our partners and stakeholders. We have found that when we work together, we can achieve much more than we could on our own.

We are proud of the progress we have made in the first year of the COSEE Alaska project. We have successfully identified the needs of our community, developed a plan to address them, and begun to implement our projects. We are excited to continue our work in the coming year and to see the positive impact we can have on our community.

Project Name	Project Description	Project Status
Project 1	Project 1 Description	Project 1 Status
Project 2	Project 2 Description	Project 2 Status
Project 3	Project 3 Description	Project 3 Status
Project 4	Project 4 Description	Project 4 Status
Project 5	Project 5 Description	Project 5 Status
Project 6	Project 6 Description	Project 6 Status
Project 7	Project 7 Description	Project 7 Status
Project 8	Project 8 Description	Project 8 Status
Project 9	Project 9 Description	Project 9 Status
Project 10	Project 10 Description	Project 10 Status



October 31, 2009

Marilyn Sigmund
Marine Education Specialist & COSEE-Alaska Manager
Alaska Sea Grant Marine Advisory Program
1007 W. 3rd Avenue, Suite 100
Anchorage, AK 99501

Palmer State Office

Palmer Research and
Extension Center
533 E. Fireweed Avenue
Palmer, AK 99645
Phone (907) 746-9459
FAX (907) 746-2677
e-mail: ffpjs@uaf.edu
www.uaf.edu/ces

Dear Marilyn,

A most sincere THANK YOU for your professional commitment and investment in co-sponsoring the recent 4-H Natural Resource and Youth Development Program (4-H NRYD) teacher in-service held in Fairbanks October 21 – 25. We created high expectations for our program outcomes when we started planning this workshop late in the summer. Reviewing the written evaluations, listening to educators sharing their appreciation for program resources that respond to REAL issues in rural Alaska, and . . . personally experiencing the interaction and energy of the group helps me to unequivocally say we exceeded those outcomes!

The new Center for Ocean Science Education Excellence – Alaska (COSEE-Alaska) was a tremendous asset to compliment where the 4-H NRYD program has been – using the in-classroom incubator systems to model ecological principles associated with the life cycle of the Pacific salmon, and where it can evolve. Climate change is a very contemporary issue in Alaska. Resources and the engaging climate change status report presentation you provided to the rural educators is an important awakening and connection to enhance ocean and climate literacy. It's obvious many of the educators look forward to incorporating the ocean climate change and place-based materials into their classroom.

The relationship of collaboration and partnership through the Alaska Sea Grant Marine Advisory Program and Cooperative Extension Service was established many years ago with contributions made by Ray RaLonde, Terry Reeve, Kurt Byers and Paula Cullenberg. With you as the new Program Manager for COSEE-Alaska, I couldn't be more delighted to continue and extend that partnership with MAP! Your environmental education expertise and talents you bring with you from your leadership at the Center for Alaska Coastal Studies in Homer are remarkable gifts. It truly is wonderful having you as a colleague. I will look forward to working with you in the future.

Sincerely,

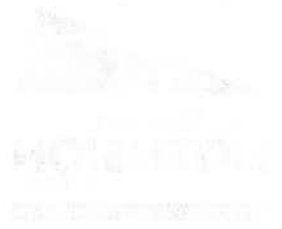


PETER J. STORTZ
Extension 4-H Natural Resource &
Youth Development Specialist

CC: ☒ Paula Cullenberg, Associate Director, Program Leader
☐ David Christie, Director
☐ Fred Schlutt, Vice Provost/Director CES

Thanks for the support Paula!
PJ





Alaska Council on Science and Technology

ACOST is a non-profit organization that provides a forum for the exchange of information and ideas among scientists, policymakers, and the public. ACOST was established in 1986 and is currently composed of representatives from the state of Alaska, the federal government, and the private sector.

1

ACOST

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4-H Natural Resource & Youth Development Program

Teacher In-Service Training

October 21-25, 2009

1. How would you rate this workshop overall?

47% very good 53% excellent

2. Was this workshop well organized?

6% good 47% very good 47% excellent

3. Were the presentations clear and well prepared?

24% very good 76% excellent

4. Quality / usefulness of hands-on activities.

6% good 35% very good 53% excellent

5. Was the time adequate for the material?

6% poor 18% good 47% very good 24% excellent

6. Were presenters knowledgeable and well prepared?

6% poor 6% very good 88% excellent

7. Did you feel "included" and part of the group?

100% excellent

8. Were the facilities appropriate for this type of workshop?

6% good 24% very good 71% excellent

9. Were the food service and meeting facilities adequate?

6% good 6% very good 88% excellent

10. Was the workshop what you expected?

6% good 12% very good 76% excellent

11. Did the workshop provide you with the information you need to integrate the material into your classroom?

24% very good 76% excellent

Hi Peter, Mon, Nov 30, 2009
Thank you for waiting! Hope you like your results & Cheers,
474-6366 Sara B

12. Extent to which you increased your knowledge, ideas and/or skills in the following subject areas:

Salmon Biology?

18% good 47% very good 29% excellent

13. Pacific salmon life cycle?

18% good 47% very good 29% excellent

14. Permitting and reporting?

6% very poor 12% good 35% very good 47% excellent

15. Egg take and fertilizing procedures?

6% very poor 6% poor 12% good 41% very good 35% excellent

16. Streamside exploration techniques?

6% very poor 12% poor 29% good 18% very good 18% excellent

17. Incubator limiting factors?

12% poor 24% good 41% very good 24% excellent

18. Care of eggs, alevin and fry?

6% very poor 24% good 47% very good 24% excellent

19. Biological integrity?

6% poor 12% good 47% very good 35% excellent

20. External anatomy of salmon?

24% good 41% very good 29% excellent

21. Internal anatomy of salmon?

6% poor 24% good 35% very good 29% excellent

22. How to "do" a fish dissection?

6% poor 6% good 18% very good 65% excellent

23. How to "set-up" an incubator?

6% very poor 29% good 41% very good 24% excellent

24. Anatomy of an ATU?

6% poor 24% good 24% very good 41% excellent

25. Emergency procedures?
18% very poor 6% poor 24% good 24% very good 24% excellent
26. End of season procedures/ destroying fry and clean-up of equipment?
6% very poor 6% poor 12% good 24% very good 53% excellent
27. "Best Practices," use of science notebooks, science probes, authentic assessment?
12% very poor 6% good 41% very good 41% excellent
28. Alaska Seas and Rivers materials: Relevancy to raising salmon in the classroom:
Grade 3: Rivers to the Sea and Back?
12% good 35% very good 35% excellent
29. Grade 5: People & the Ocean (Stewardship), Activities 2,3,4 &5?
6% poor 12% good 24% very good 41% excellent
30. Grade 7: Ocean in Motion, Activities 2,3,4,6?
6% very poor 18% good 24% very good 41% excellent
31. Grade 8: Our Changing World, Activities 2,4,5?
6% very poor 18% good 18% very good 47% excellent
32. Institutional Animal Care University Committee (IACUC) info, John Blake?
6% very poor 6% good 29% very good 59% excellent
33. Alaska Seas and Rivers-info. on climate change, intro to COSEE-AK (Marilyn)?
6% good 41% very good 53% excellent
34. Integrating AK Native Knowledge with science and ocean science fairs, (Allen Dick)?
6% good 41% very good 53% excellent
35. UAF Fisheries program, Katie Murra Struab?
6% poor 24% good 35% very good 35% excellent
36. Survey-Scientists and Researchers in schools. (Marilyn)
12% good 71% very good 18% excellent
37. Quinhagak Drifter study of currents, Seth Danielson, School of Fish?
6% good 35% very good 47% excellent

38. GLOBE, Biomes project, Int. Arctic Consortium, Martha Kopplin?
6% good 47% very good 47% excellent
39. Yukon River Drainage Fisheries Association, Jason Hale, Evan Blakenship?
6% poor 12% good 35% very good 41% excellent
40. Tanana Chiefs Conference, Brandy Birkbigler and Laura LeBland?
24% good 47% very good 24% excellent
41. Cycling of terrestrial & marine derived nutrients, Mark Wipfli, UAF School of Fish?
6% poor 12% good 29% very good 53% excellent
42. Planning and working with scientists?
6% very poor 6% poor 35% good 35% very good 18% excellent
43. Teacher Presentations/Presentations?
12% good 47% very good 41% excellent
44. Resource Fair Share (Saturday)?
24% good 18% very good 47% excellent

A High School Curriculum Framework for Teaching about Alaska Ocean Climate Change

Big Ideas:

1. What is the evidence that the climate is changing rapidly in the Arctic?
2. How is the ocean a major influence on weather and climate?
3. How will Arctic warming affect global climate systems?
4. How will the ocean in the Arctic be affected by climate change?
5. What are the effects of climate change on animals, vegetation and productivity?
6. How will people and their environment be affected by climate change?
7. How do people affect the oceans and atmosphere?

The draft framework consists of two components:

1. **Matrix.** A matrix aligning the big ideas with concepts, essential principles of ocean, climate, and earth science; and state and national science standards.
2. **Climate-Ocean Concept Maps.** Concept maps about the transfer and storage of heat, carbon, and water have been developed using the COSEE-Ocean Systems Concept Mapper and are online at <http://cosee.umaine.edu/cfuser/cmb/index.cfmh>

Alignment with Essential Principles & Standards

Climate Science Literacy is an understanding of your influence on climate and climate's influence on you and society. In addition to understanding the essential principles of Earth's climate system, the climate-literate person: 1) knows how to assess scientifically credible information about climate, 2) communicates about climate and climate change in a meaningful way, and 3) is able to make informed and responsible decisions with regard to actions that may affect climate. This framework aligns the Essential Principles of Climate Science with science education standards. The complete set of Principles and Guiding Principles for Informed Climate Decisions can be found at:

<http://downloads.climatescience.gov/Literacy/Climate%20Literacy%20Booklet%20Low-Res.pdf>

Ocean literacy is an understanding of the ocean's influence on you – and your influence on the ocean. In addition to understanding Essential Principles and Fundamental Concepts about the functioning of the ocean, an ocean-literate person: 1) can communicate about the ocean in a meaningful way and 2) is able to make informed and responsible decisions regarding the ocean and its resources. This framework aligns the Essential Principles of Ocean Sciences with science education standards. The Principles can be found at:

<http://www.coexploration.org/oceanliteracy/documents/OceanLitChart.pdf>

Earth Science Literacy Principles: http://www.earthscienceliteracy.org/es_literacy_22may09.pdf

Benchmarks, National Science Standards (NSES)

<http://www.project2061.org/publications/bsl/online/index.php?txtRef=http%3A%2F%2Fwww.project2061.org%2Fpublications%2Fbsl%2F&txtURIId=%2Fpublications%2Fbsl%2Fonline%2Fbolintro.htm>

Benchmark language from Science for All Americans (SFAA):

<http://www.project2061.org/publications/sfaa/online/sfaatoc.htm>

Alaska State Science Standards Grade Level Expectations (GLEs):

<http://www.eed.state.ak.us/tls/assessment/GLEHome.html>

Scope-and-Sequence Concept Diagrams

The Alaska framework was developed prior to the completion of a K-12 Scope and Sequence Concept Diagrams for the Ocean Literacy Principles by COSEE-California and COSEE-West. These can be found at:

http://www.coexploration.org/oceanliteracy/usa/ocean_science_literacy/scope_and_sequence/home.html

Appendix P - Presentations, publications, and exhibits

Presentations

COSEE Alaska: ways of knowing and teaching about ocean climate change. Part I: A Center for Ocean Science Education Excellence for Alaska by Marilyn Sigman and Nora Deans. Part II: Alaska Native Science Education and COSEE Alaska by Ray Barnhardt. Alaska Math and Science Teachers Conference. Juneau, Alaska. October, 2009.

Outreach and Education for the Alaska Ocean Observing System Field Experiment: Sound Predictions 2009. Marilyn Sigman, Molly McCammon, Scott Pegau, Stephanie Hoag, and Alice Douwang. AGU 2010 Ocean Science Meeting. Portland, Oregon. February, 2010.

COSEE Program Overview by Marilyn Sigman to the Alaska Sea Grant Advisory Committee. Anchorage, Alaska. November, 2010.

COSEE Alaska: Ways of Knowing about Climate Change. Marilyn Sigman and Nora Deans. National Science Teachers Association National Conference. Philadelphia, PA. March, 2010.

The COSEE Alaska Project. UAF School of Fisheries and Ocean Sciences Seminar. Molly McCammon, Michael Castellini, Nora Deans, Nicole Nelson, and Marilyn Sigman. Fairbanks, AK. April, 2010.

Future Presentations

Weaving Together Arctic Science, Place, People, and Education in Alaska. Marilyn Sigman and Ray Barnhardt. International Polar Year Science Conference. Oslo, Norway. June, 2010. Poster presentation.

Strategies for Culturally Relevant Marine Education about the Changing Ocean. Marilyn Sigman and Nora Deans. Northwest Aquatic and Marine Educators Annual Conference. Florence, Oregon. July, 2010. (Acceptance pending)

Sponsored Workshops and Presentations

2009 Rural Educator In-Service. Salmon-in-the-Classroom: connecting local to global. October, 2009. Co-sponsored by COSEE Alaska, Alaska Sea Grant, Cooperative Extension Service – 4-H Fisheries, Natural Resources, and Youth Development Program, and the U.S. Fish and Wildlife Service, Alaska Department of Fish and Game.

Communicating Ocean Science Workshop. Alaska Marine Science Symposium, January, 2010. Co-sponsored by COSEE Alaska, North Pacific Research Board, and Alaska Ocean Observing System.

Ocean Acidification Adaptation, Research and Communication Workshop. Alaska Marine Science Symposium, January, 2010. Co-sponsored by COSEE Alaska, Alaska SeaLife Center, UAF School of Fisheries and Ocean Sciences.

Participation in Workshops and Conferences

AAAS Conference on Promoting Climate Change Literacy through Informal Education. February, 2010, San Diego, CA. Invited participation by Marilyn Sigman, COSEE Alaska Program Manager, and Laurie Stuart, Distance Delivery Education Program Director, Alaska Sea Life Center.

Publications

Barnhardt, R. and A.O. Kawagley. 2010. Alaska Native Education: views from within. Alaska Native Knowledge Network, Center for Cross-cultural Studies. Fairbanks, AK.

Dick, A. 2010. COSEE Manual for Science Camps, Fairs, and Projects. Alaska Native Knowledge Network. Can be downloaded from the COSEE Alaska website.

Dutton, I. M., K. Stephens, J. Mathis, J. Short, M. Sigman, 2010. Ocean Acidification Adaptation, Research and Communication Workshop Report, Alaska Marine Science Symposium, 18 January, 2010, Alaska SeaLife Center, COSEE Alaska and SFOS-UAF, Anchorage. (in press)

Sigman, M., M. McCammon, S. Pegau, , S. Hoag, and A. Douwang. 2010. Outreach and Education for an Alaska Ocean Observing System Field Experiment. Eos Trans. AGU, 91(26), Ocean Sci. Meet. Suppl., Abstract ED41A-08.

Other Media Products:

The Prince's Predictions, Part I and II. Podcasts about the AOOS Field Experiment. Produced by COSEE NOW in partnership with COSEE Alaska. Posted to COSEE NOW and AOOS websites and included on the *Ocean Gazing* CD-ROM.

Video Series on AOOS Field Experiment. Overview of the experiment by Scott Pegau, Slocum glider and AUV technology, and six interviews with project scientists, including four women scientists. Produced by Alaska Sea Grant in partnership with COSEE Alaska. Posted to YouTube.

Exhibits

Alaska Marine Science Symposium, January 18-22, 2010

Alaska Forum for the Environment, February 8-12, 2010

Chugach Regional Resource Council Gathering, March 26, 2010

Google Earth (Ocean). Alaska Marine Science Symposium, January, 2010. Luncheon presentation and workshop on how to upload data and information by Charlotte Vick, Google Earth (Ocean) Content Manager. Co-sponsored by COSEE Alaska, Alaska Ocean Observing System, and North Pacific Research Board.