

Cross-Center Activities



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Cross-Center Activities

COSEE California

Communicating Ocean Sciences (COS) Courses Disseminated Across the National COSEE Network

Communicating Ocean Sciences in K-12 Classrooms (COS K-12) and Communicating Ocean Sciences to Informal Audiences (COSIA) bring together ocean and climate scientists in universities with formal and informal science educators to teach college courses to undergraduate and/or graduate science students. These courses promote strategic collaborations between scientists and educators that improve ocean sciences education and increase public understanding of the vital role the ocean plays in our lives.

The courses are now being taught throughout the National COSEE Network and beyond—most Centers are now offering one or both courses, in at least one partner IHE. Many IHE's offering the courses (including all those offering COSIA) do so in partnership with a local informal science education institution (ISEI).

Centers offering COS include: COSEE California (UC Berkeley/Lawrence Hall of Science, Scripps Institution of Oceanography/Birch Aquarium at Scripps, University of Hawaii, Manoa/Waikiki Aquarium and Maui College), COSEE Networked Ocean World (Rutgers University/Liberty Science Center, Wood's Hole, and Virginia Institute of Marine Science), COSEE West (University of Southern California/Aquarium of the Pacific), COSEE Coastal Trends (Hampton University, Old Dominion and Virginia Aquarium), COSEE Pacific Partnerships (University of Oregon, Oregon State University/Hatfield Marine Science Center, and Western Washington University), COSEE Ocean Learning Communities (University of Washington/Seattle Aquarium), COSEE Great Lakes (University of Michigan). There are plans underway to offer COS at COSEE Alaska (January 2011), COSEE Central Gulf of Mexico, and COSEE SouthEast.

By fall 2011, it is likely that all but one Center is likely to have the course implemented in one or more of their partnering institutions. In addition, the courses are being taught at many universities and ISEIs that were not previously part of the National COSEE Network. Teaching the courses allows a pathway for many IHEs and ISEIs to establish collaborations within the community of the National COSEE Network. The development of COS K-12 was originally funded by COSEE. NSF Informal Science Education funded the subsequent development of the derivative COSIA course and COSIA Network.

Communicating Ocean Sciences Modifications Disseminated Across Network

COSEE California is collaborating with COSEE Great Lakes (University of Michigan and Ohio State University), COSEE NOW (Virginia Institute of Marine Science) and the University of Hawaii (which has applied to become COSEE Hawaii) to develop enhancements for the

Communicating Ocean Sciences courses. VIMS developed two exemplar activities using real-time ocean observing system data. These activities were featured on the COSEE NOW web site New Resources section in December 2009, and are available for download. COSEE Great Lakes at University of Michigan is in the process of designing Great Lakes exemplars to use in the regional implementation of the course. Because of the importance of place-based education in Hawaii, faculty at University of Hawaii at Manoa and Maui College are developing and documenting ways to adapt the courses to incorporate local and traditional knowledge systems. This work is being done as part of our New Collaboration with an Existing Center grant. The plan is for this work to provide a process model for other institutions, including University of Alaska, interested in similar efforts.

Communicating Ocean Sciences Dissemination through GK-12 and Criterion 2

The COS K-12 course is being used as the centerpiece of several GK-12 programs to train their Graduate Fellows about science education pedagogy and communication strategies. The course is often taught to Fellows in a two or three week summer intensive prior to their placement in a K-12 setting. These GK-12 programs include: VIMS (COSEE NOW); University of Hawaii, Hilo and Manoa (COSEE California); University of Washington (COSEE Ocean Learning Communities); Scripps Institution of Oceanography (COSEE California); and University of Oregon (COSEE Pacific Partnerships). In addition, several investigators have used one or both COS courses to fulfill their Criterion 2: Broader Impacts on research proposals.

Museum Educators Reflecting On Practice

Based on the significant success of COS K-12 and COSIA, the Institute of Museum and Library Studies (IMLS) funded the development of a COSEE California professional development program for practicing informal science education professionals that is derived from the COSIA course. The professional development program, Museum Educators Reflecting on Practice, is comprised of three multi-session modules and a rigorous protocol for videotaping educational interactions between museum educators and the public; it uses the videos as a source of reflection to inform future instruction. Museum Educators Reflecting on Practice is currently being used by: COSEE California, COSEE West, COSEE Pacific Partnerships, COSEE NOW, and COSEE Coastal Trends.

Communicating Ocean Sciences Informal Education Network (COSIEN)

COSIEN was funded in 2009 by the NSF Informal Science Education program to take advantage of the substantive, long-term partnerships between the informal science education institutions and universities established by the original COSEE California grant and the 2006 NSF ISE-funded Communicating Ocean Sciences to Informal Audiences (COSIA) project. COSIEN strengthens and expands the 3-way partnerships between universities, informal science education institutions, and COSEE California developed through COSIA, and formalizes their role in a distributed leadership network that shares common objectives in communicating science to the public, introducing current and future scientists to the role informal science education institutions play in broader impact efforts, and promoting ocean literacy. National COSEE Network Centers that participate in leadership roles within COSIEN include: COSEE California, COSEE Pacific

Partnerships, COSEE West, COSEE Coastal Trends, and COSEE NOW. These Centers are teaching the COSIA course, leading professional development programs for informal educators based on the COSIA college course, and offering scientist workshops for university and agency scientists and for Knauss Fellows. This adapting and repurposing of the COS K-12 and COSIA courses and the formalization of the network of those engaged in implementation have significantly leveraged the relatively small investment in the program by the original COSEE California funding.

Communicating Ocean Sciences Scientist Workshops

COSIA Network partners (COSEE West, COSEE NOW, COSEE Coastal Trends, and COSEE Pacific Partnerships) met at LHS to share ideas about and experiences with scientist workshops, to co-design these workshops to be offered by the COSIA partners in their regions, and to discuss how to establish quality, integrity, and consistency in the *Scientist Workshops* across the various formats used at each site. The Scientist Workshops will be derived from the COS courses. Both COSEE and NSF ISE (COSIEN) are funding development of the workshops. One of the results of the *Scientist Workshop Design Meeting* was refinement of the *Goals of the Scientist Workshops* as follows: 1) Increase the likelihood that participating scientists will engage in high quality education/outreach efforts with public audiences; 2) Improve scientists' skills to effectively communicate science content and research to the public, their students and other audiences; and 3) Improve understanding of the need for institutional change in universities and science agencies related to increasing the importance of science education/outreach within their core mission.

Ocean Literacy

COSEE California has served as the COSEE leader in the national Ocean Literacy Campaign, that has, among other accomplishments, developed two consensus documents that comprise the Ocean Literacy Framework: *Ocean Literacy: The Essential Principles of Ocean Sciences K-12* and the complementary *Ocean Literacy Scope and Sequence for Grades K-12*. The development of the Ocean Literacy Framework has been a massive, wide-ranging, collaborative, and decentralized effort by hundreds of dedicated scientists and educators from each COSEE Center and beyond working together to systematically create a more ocean literate society. This Framework is the first to identify, articulate, and organize the essential core concepts of ocean sciences for educational purposes.

While it is not new for educators and scientists to work together on a project, the process of continued collaboration and partnership between educators and scientists in different agencies, organizations, universities, and professional cultures is significant, and has added to the potency of the Ocean Literacy Campaign. The Framework is creating a ripple of impacts throughout the science education community, including within Earth systems and climate change education. The Ocean Literacy Framework has had a direct impact on the development of countless textbooks, instructional materials, museum exhibits and programs, a dozen national conferences focused on the Ocean Literacy Framework, and K-12 science frameworks and standards, including the NRC Framework for Science Education that will guide the development of the Common Core Science Standards.

COSEE California and the National Marine Educators Association (NMEA) Ocean Literacy Committee (chaired by the COSEE California PI) drafted a unified national response to the NRC Draft Framework for Science Education during the brief public comment period in July 2010. Dozens of agencies, organizations, institutions, and individuals (including NMEA, several NMEA Regional Chapters, the National COSEE Council, several COSEE Centers, several Sea Grant Offices, NOAA, NASA, Consortium for Ocean Leadership, National Association of Marine Laboratories, the USC Wrigley Institute for Environmental Studies, Monterey Bay Aquarium, the National Ocean Sciences Bowl, the Deep Earth Academy, the New England Ocean Sciences Education Consortium, the West Coast Governor’s Agreement on Ocean Health, Mote Marine Laboratory, Mystic Aquarium, the U.S. Interagency Working Group on Ocean Education, etc.) submitted essentially the same comments to NRC calling for more complete incorporation of the Ocean Literacy Framework into the Framework for Science Education and the subsequent Common Core Science Standards.

The recently published report, “Standards for K-12 Engineering Education?” (National Academy of Engineering of the National Academies, 2010), contains the following passage on page 29:

Examples of Standards Mapping

Mapping has been used in other disciplines with some success. For instance, the ocean science community launched a mapping effort in 2004 that culminated in 2007, with the identification of seven “essential principles” and 44 “fundamental concepts,” which were then mapped to the NSES (NRC, 1996). The mapping has been illustrated as a matrix in a brochure suitable for classroom use or as a resource for curriculum development (NGS, 2007). Since 2007, an informal network of ocean literacy organizations has continued to refine this approach and recently released a set of “conceptual flow diagrams” linking the ocean literacy principles to specific learning goals in four K–12 grade bands (see <http://www.coexploration.org/oceanliteracy>). The diagrams resemble the concept mapping in the two-volume AAAS Atlas of Science Literacy (2001, 2007).

The ocean literacy mapping exercise has contributed to the establishment of grant programs at the National Science Foundation and the National Oceanic and Atmospheric Administration (NOAA), has influenced the development of new K-12 and postsecondary instructional materials, has been incorporated by several states into revisions of K-12 science standards, and has influenced programming at informal science education institutions (NMEA, 2009; Strang, 2008).

The development and widespread distribution of the Ocean Literacy Framework catalyzed and provided a model for similar efforts related to: Climate Literacy, Atmospheric Literacy, Earth Science Literacy, Great Lakes Literacy (see below), Microbial Oceanography and Neuroscience. The result has been that countless scientists in a variety of disciplines have spent considerable time meeting about and reflecting on the most important (“essential”) concepts in their respective fields that they think every member of the public should understand. The contribution to K-12 and informal science education and to the effectiveness of education/outreach efforts by scientists has been extraordinary.

Great Lakes Literacy

COSEE California partnered with COSEE Great Lakes using funds from COSEE California to respond to the region's need to enhance public understanding of the Great Lakes as well as of the ocean. The two Centers worked together to produce a Great Lakes supplement to accompany "Ocean Literacy: The Essential Principles of Ocean Sciences K-12." The goal was to develop a means of comparing the oceanic attributes of the lakes with the well-established Ocean Literacy Framework, so that Great Lakes educators and scientists would think of the Great Lakes in parallel with the ocean. As a result of the development process, the "Great Lakes Literacy: Essential Principles and Fundamental Concepts for Great Lakes Learning" has been published as a brochure similar to the Ocean Literacy K-12 brochure. An Internet site is being developed so that instructional materials and links to information will be readily available to Great Lakes audiences.

Ocean Sciences Curriculum Sequences Grades 3-8: Cross Center Scientist and Educator Involvement

The development process for the Ocean Sciences Curriculum Sequences (OSS) for Grades 3-8, based on the Ocean Literacy Framework, emphasized strategic and long-standing collaborations between scientists and educators to improve ocean sciences education and increase public understanding of the vital role the ocean plays in our lives. OSS brought scientists and educators together to develop a balanced approach for inserting ocean sciences content into the mainstream K-12 science curriculum by providing teachers and school districts with instructional materials based directly on the Ocean Literacy Framework. Funded by NOAA Environmental Literacy Grants in 2007 (OSS 3-5) and 2009 (OSS 6-8), these projects involve a partnership between COSEE California and COSEE NOW.

The development process serves as a model for how scientists and science educators can effectively work together in a collaborative and iterative process that results in a readily accessible and high impact product. These interactions around the curriculum development have led to lasting partnerships and collaborations on several subsequent projects; two recent COSEE proposals (COSEE SE and COSEE OCEAN) included plans to implement OSS Grades 3-5 in several large urban school districts. COSEE scientists involved include scientists from COSEE NOW, Pacific Partnerships, California, and West as well as from various agencies within NOAA.

National COSEE Network Diversity Working Group (DWG): Representatives from various COSEE Centers

This working group, begun in 2008 by Dionne Hoskins and Deidre Gibson, later chaired by Phil Bell, serves to review, discuss and promote equity and diversity efforts within the National COSEE Network. The DWG has surveyed equity efforts within the National COSEE Network, developed an annotated bibliography of resources on broadening participation in STEM education, and helped develop professional development experiences for scientists on

broadening participation in STEM. Lynn Tran and Craig Strang serve on the working group as the representatives from COSEE California.

Education and Public Outreach: A Guide for Scientists

Starting in spring 2004 COSEE CA collaborated intensively with three colleagues at WHOI (A. Thorrold; COSEE New England) and Rutgers (J. McDonnell and Eric Simms –now at Scripps; COSEE Mid-Atlantic) to lead the national COSEE effort to catalyze scientist-educator partnerships. COSEE CA took the lead on creating a guide for scientists interested in participating in E&O – *Education and Public Outreach: A Guide for Scientists*; http://www.tos.org/epo_guide/ – and continues to distribute the guide and web link to researchers nationwide who are interested in participating in E&O. The guide includes information and practical advice for scientists and others about various aspects of education and outreach. The guide is being used widely within the national oceanographic research community and has been cited as an important resource by those in other fields, notably the Earth sciences and physics communities.

National COSEE Network Evaluation Working Group (EWG): Representatives from various COSEE Centers

The Evaluation Working Group formed in 2008 as a strategy for gathering high quality cross-Center data on scientist-educator engagement. The EWG involves the evaluators from each Center, as well as members of the COSEE National Advisory Committee and COSEE Center PIs. Among the tasks undertaken by the EWG were two surveys (one for ocean scientists and one for educators working with the COSEE Centers). Additionally, the EWG is taking a strong role in providing data and reports to the Decadal Review process. COSEE California PI Craig Strang was the founding chair of the EWG. COSEE California Evaluator, Rena Dorph, has subsequently provided leadership to this working group on behalf of COSEE California.

National COSEE Network Scientist Engagement Working Group (SEWG): Representatives from various COSEE Centers

COSEE California is an active participant of the National COSEE Network Scientist Engagement Working Group (SEWG). SEWG is developing video profiles of scientists who are making a difference through their engagement in COSEE education and outreach activities. Jennifer Skene is the COSEE California representative to SEWG, and COSEE California Advisor, Adina Paytan, was selected by the SEWG to be the featured scientist profiled to represent the success of COSEE California at engaging scientists. The SEWG production team is currently in the process (Sept 2010) of completing the website that will feature Dr. Paytan and her work.

Linking Researchers and Graduate Students through COSEE Tools & Services

COSEE CA is a participant in this project with COSEE OS, COSEE NOW, and COSEE West. The team is creating and testing new models of "scientist-centered" workshops that partner ocean researchers and graduate students to create new and innovative ocean-climate content and/or

improve their ability to meet NSF "Broader Impacts" criterion. These workshop models are based on results from the COSEE NOW "Annual Scientist Survey: Report for 2008" (Word Craft, 2008) that cites scientists' "lack of time" as the greatest barrier to becoming involved in education/outreach and also clearly shows graduate students' comfort with using the latest online technology. Thus the proposed project will test the time-efficiency and effectiveness of capturing participants' views of ocean-climate connections as interactive maps. The teaming of these audiences to create web-based ocean-climate products taps into the scientific expertise of the researchers and the technical capabilities of the graduate students. This effort will not only strengthen each Center's individual ability to foster productive dialog among its own constituency of researchers and graduate students, but it will also provide a series of model interactions that can be used by the Network as a whole. Furthermore, the products of these interactions will result in online products that can be accessed by external audiences, thus showcasing "COSEE content" to the world.

POLYPPS

Collaboration among POLYPPS and COSEE Coastal Trends on Inquiry-based Learning in Science

Pacific Ocean Literacy for Youth, Publics, Professionals and Scientists (POLYPPS) is a collaboration between COSEE California and the University of Hawaii. POLYPPS stems from the premise that science education must draw not only from the latest advances in western science and technology but also from the cultural contexts in which learners are embedded. The project focuses on training educators and scientists to effectively communicate ocean sciences to public audiences that include multi-ethnic populations expressing a range of cultural contexts.

POLYPPS staff and COSEE CT collaborated to provide a video conference lecture and discussion session for participants in the COSEE CT Scientist-Educators Workshop in June 2010. Dr. Judy Lemus presented background information on the process of inquiry and how it can be used to build engaging and effective activities for learners. The collaboration draws on the expertise of both partners in professional development that is much needed for both the science and education communities. A plan has been developed to create an inquiry component for these workshops that can be extended to the professional development efforts at other COSEE centers.

Collaboration among POLYPPS and COSEE West for sharing Online Lectures and Resources

As part of the COSEE Island Earth proposal, POLYPPS initiated a planned collaboration with COSEE West to share online science presentations that each center has and will be developing that relate to ocean science in the Pacific. By sharing resources and expertise, the impact of any one center's efforts is multiplied. These resources will be used in COSEE IE webinars in Hawaii and other Pacific Islands, and in COSEE West online teacher workshops. The model could be extended to the network by providing a menu of online resources that can be downloaded by any center.

Collaboration among POLYPPS and COSEE Alaska on Traditional Knowledge Symposium

POLLYPS collaborated with COSEE Alaska to convene a special symposium at the AGU 2010 conference on Traditional Knowledge and Geoscience Research and Education. Dr. Pat Cooper, Ann Coopersmith, and Dr. Ray Barnhardt chaired the full-day session that presented 13 posters and 10 oral talks on topics ranging from infusing curricula with traditional, place-based knowledge to protocols for initiating successful collaborations to cultural sensitivity and multiple cultural perspectives.

COSEE West

Collaboration with COSEE Mid-Atlantic on promoting OOS in K-12 classrooms

In 2004, COSEE-West participated in an OOS workshop hosted by COSEE Mid-Atlantic and in an ORION Survey of OOS to further observatory education and outreach efforts. In spring 2006, COSEE West served as a focus group site for the use of real-time data by K-12 teachers to assess capacity and needs for integrating OOS data into K-12 classrooms, as part of a research project funded by NOAA's System Wide Monitoring Program and IOOS.

Participation and Co-Hosting of COSEE Workshops

In 2003-2004, COSEE West participated in COSEE Mid-Atlantic and COSEE Florida workshops. In 2004-2005, it participated in scientist and educator exchange for teacher workshops co-hosted with COSEE California. COSEE California staff attended a retreat on "Connecting Science Research and Informal Science Educators" on Catalina Island in October, 2004, on marine ecosystems and terrestrial and watershed issues. With COSEE California, COSEE West co-hosted the Shifting Sands workshop at the Ocean Institute in May, 2005, sponsored by QuikSilver as part of the USC QuikScience Program. COSEE West invited informal educators from the Birch Aquarium from COSEE California to participate in the Informal Science Exhibit Retreat at the Ocean Institute in March, 2008, to develop new informal science exhibits incorporating scientific research. Dr. Douglas Capone, postdoctoral fellow Dr. Jill Sohm from USC, and graduate student Dreux Chapelle from Woods Hole Oceanographic Institution delivered science content on "Ocean plankton's role in climate change." COSEE West staff participated in two live webinars hosted by COSEE NOW in May, 2009, entitled The Bridge: An Online Ocean Science Education Resource Center and Ocean Observing System Education Primer.

Partnered with College of Exploration on Online Workshops

COSEE West held the first of two online workshops in December, 2004, and March, 2005, on coral reefs featuring lectures by Dr. William Hamner of UCLA. COSEE West has subsequently held a total of 11 online workshops on a wide variety of ocean sciences topics. Online workshops have featured ocean sciences research, live scientist lectures, virtual field trips, and videos of teachers implementing curricula in their classrooms.

Co-Hosted Teacher Professional Development Workshops with NOAA

In 2005, COSEE West co-hosted a master teacher summer workshop on Catalina Island for grades 5-8 teachers in order for them to learn ways to incorporate ocean science into their curricula and conduct teacher PD workshops. NOAA Office of Exploration educators, master teachers, and LAUSD science specialists presented content and hands-on activities. COSEE West co-hosted workshop on the LiMPETS Coastal Monitoring Program as part of World Oceans Day in June 2008 with NOAA Channel Islands National Marine Sanctuary. The LiMPETS network is a collaborative effort among California's National Marine Sanctuaries,

Farallones Marine Sanctuary Association, Marine Science Institute at the University of California at Santa Barbara, and the University of California at Santa Cruz.

Collaborated with Network on Ocean Literacy Framework and Principles

COSEE-West participated in COSEE California's Ocean Literacy workshop in January, 2005, followed by additional meetings to draft an Ocean Literacy Scope and Sequence curriculum for grades 9-12. The final draft of Scope and Sequence was completed in October, 2009. In March, 2010, the Ocean Literacy website was launched with the current Ocean Literacy Framework and NMEA issued Special Report #3 Ocean Literacy, Featuring the Ocean Literacy Scope and Sequence. The Ocean Literacy Scope and Sequence product will provide guidance to teachers, curriculum developers, education researchers, and committees developing or revising science standards. This historic Special Report is the culmination of the efforts of dozens of COSEE staff, scientists and educators, NMEA members, NOAA, the College of Exploration, and the Lawrence Hall of Science. Lynn Whitley participated in the July, 2010, workshop for Ocean Sciences Curriculum Sequences for Grades 6-8, which was funded by a NOAA Environmental Literacy grant.

Participation in NOAA/NASA/GLOBE Program

Dr. William Hamner and Peggy Hamner of UCLA joined the GLOBE advisory committee to promote the integration of OceanGLOBE protocols into the GLOBE Program.

Conducted COSIA Program with USC/AOP in Collaboration with COSEE California

A partnership between USC and Aquarium of the Pacific (AOP) in the Communicating Ocean Sciences to Informal Audiences (COSIA) program started in March, 2006, to teach scientists to present their research content more effectively and teach informal science centers how to incorporate cutting edge research into their exhibits. COSEE West has offered the COSIA course at the graduate level at USC for the past five years. COSEE West implemented a new model for the COSIA course that focused on ocean science graduate students and served as a template for other universities interested in enhancing education outreach opportunities for their graduate students. USC faculty and graduate students in ocean science partnered with informal educators at the Aquarium of the Pacific. USC institutionalized the COSIA course in fall, 2008, to become a regular faculty-led course as part of the Marine Environmental Biology graduate curriculum and provide a broader option of outreach opportunities for course participants.

Co-Hosted COSEE Strand at CSTA Conference with COSEE California and SWMEA

COSEE West co-organized an ocean sciences strand at the CSTA California Science Teachers Association Conference in Long Beach in October, 2007, with one all-day shipboard field course, four 3-hour short courses, and 22 1-hour workshops. COSEE West staff served as moderators for the short courses and workshops, with a total of 38 educators participating. There were also two COSEE California presentations, one by the Lawrence Hall of Science and one by the Birch Aquarium. In 2009, COSEE West and the Southwest Marine Educators Association (SWMEA) again co-sponsored an ocean science strand at the CSTA Conference in Palm

Springs, California, with one three-hour short course and four one-hour workshops. COSEE West and SWMEA again co-sponsored an ocean science strand at the CSTA conference in Sacramento, California, in October, 2010. There were six sessions, including one COSEE West session.

Provided Feedback on NOAA's Ocean Explorers activities

In 2007, COSEE West convened focus groups of Los Angeles teachers to review video teaching models of Ocean Explorers activities. Teachers provided feedback on the pedagogical value of video teaching modules as professional development tools.

Hosted COSEE Strand at NSTA with COSEE Network

NSTA COSEE Strand: Several COSEE Centers sponsored a short course entitled *COSEE: Salting Away for our Future—Resources for Understanding the Ocean's Role in Climate Change at NSTA in March 2008*. The COSEE Network initiated a major presence at the NSTA conference in 2009, with nine concurrent session and four short courses. For the 2010 and 2011 conferences, there was an exhibition hall booth, short courses, a COSEE strand of concurrent sessions, and a COSEE sponsored luncheon.

Climate Literacy

COSEE West has used Climate Literacy Principles in its Introduction to Marine Science and OOS summer teacher workshops since 2008; March, 2008, JPL COSEE West Climate Day; November, 2008, Climate Change online workshop; and several climate change lectures and workshops over the years. COSEE West has also worked with COSEE Ocean Systems in aligning National Science Content Standards, Climate Literacy Principles, and Ocean Literacy Principles through the use of concept mapping. COSEE Centers worked with NOAA to promote the use of Climate Literacy Principles in K-12 classrooms and informal science centers and at education conferences such as NSTA in 2010. COSEE West partnered with other organizations for large climate day events: Climate Day 2008 and 2010 with NASA, NOAA, JPL, and AQMD, and A World We Can Change, an air quality and climate change conference with AQMD and JPL.

Collaborate on Concept Mapping Workshops with COSEE OS, NOW, and CA

In spring, 2008, COSEE West worked with Annette deCharon of COSEE Ocean Systems in co-hosting a concept mapping workshop at USC while it was still in its prototype phase. Based on feedback from the spring, 2008, workshop, a workshop model and software system was developed and subsequently tested at the Darling Marine Center at the University of Maine in November, 2008, and at University of New Hampshire in March, 2009. COSEE Ocean Systems developed an Educator-Scientist Collaborative Workshop model that centered on scientist-educator teams (one scientist per three educators), creating online learning resources to align with National Science Content Standards, Climate Literacy Principles, and Ocean Literacy Principles. Teams created online concept maps that evolved over the course of the workshop and scientists learned another way of working collaboratively with educators. COSEE West received

funding from a collaborative proposal to NSF with COSEE Ocean Systems, COSEE California, and COSEE NOW to do a two-day workshop on climate change in which scientists and graduate students from USC, UCLA, and local California State Universities would use concept mapping to explain their research. In January, 2010, COSEE Ocean Systems worked with Dr. Linda Duguay (COSEE West), Dr. Cheryl Peach (COSEE California), and Sage Lichtenwalner and Janice McDonnell (COSEE NOW) to launch its pilot Graduate Student/Faculty Collaborative Workshop to improve the communication of complex scientific topics through concept mapping and web-based tools. COSEE West held its first concept mapping workshop in April, 2011, followed by workshops at COSEE NOW and COSEE California.

Co-Hosted OOS Workshops with JPL, Ocean Institute, and Cabrillo Marine Aquarium

COSEE-West hosted three annual Ocean Observing System summer teacher workshops in 2008 through 2010 to expose teachers to the work conducted by OOS networks and help middle and high school teachers develop OOS curricula and incorporate near real-time data into their classrooms.

COSEE-West Colorado Collaboration

In October 2008, NSF funded the COSEE West Colorado Collaboration with Dr. Lesley Smith at the University of Colorado. In April and May, the COSEE West Colorado Collaborative conducted two teacher workshops, in which a scientist presented a lecture on cutting edge research and teachers worked on related hands-on activities. This was followed by a five day teacher summer institute in June involving scientist lectures and hands-on activities where teachers were taught how to develop their own curricula for their classroom. COSEE West staff worked with COSEE West Colorado Collaborative in sharing best practices learned from running a similar lecture and workshop series in Los Angeles. For 2010 and 2011, five COSEE West teachers participated in the summer institute in Colorado and five COSEE West Colorado collaborative teachers participated in the OOS summer workshop in Los Angeles.

Co-Hosted COSEE Strand at NMEA with COSEE Network

COSEE West staff and K-12 teachers presented their work at the NMEA conference in Monterey, California, in June, 2009.

COSEE Coastal Trends OOS Workshop Testing

Dr. Laura Murray (COSEE Coastal Trends) asked a group of teachers to test an OOS module based on their online workshop, three of which were K-12 teachers from COSEE West who were OOS workshop participants. A staff member from COSEE Coastal Trends participated and presented in the August, 2009, OOS Workshop.

Ocean Sciences 2010 Meeting

COSEE organized four strands at the February, 2010, Ocean Sciences Meeting in Portland, Oregon. Dr. Linda Duguay (COSEE West) spoke on Ocean Observing Systems Workshops;

Jane Lee (COSEE West) presented a poster on online workshops; and Linda Chilton (COSEE West) presented a poster on the one day professional development workshop model. Evaluators Patricia Kwon (COSEE West), Chris Parsons (COSEE NOW), Dr. Rena Dorph (COSEE California), and Dr. Mark St. John (COSEE Network, Inverness Research) were conveners for the strand “COSEE Evaluations: What We’ve Learned.” Other COSEE strands included “Compound Interest: Research+Energy+ Outreach=Career and Personal Yield,” “Ocean Literacy and Mutualism: Science Organizations Partnering with Informal Science Institutions,” and “Success and Challenges in Aquatic Observing Systems Education and Outreach.”

COSEE China

Dr. Robert Chen (formerly of COSEE New England) and scientist Xuchen Wang traveled together to China in 2006 and began to develop the proposal for a COSEE-China planning workshop. Dr. Linda Duguay was selected as part of a delegation to participate in a NSF workshop in China in March, 2010, to discuss a foundation-supported ocean science education project and its possible application to outreach efforts by Chinese scientists and educators. A COSEE China scientist, Dr. Min Liu, visited COSEE West in July 2010 to meet with scientists and educators from COSEE West partner institutions.

Smithsonian Ocean Science Portal

COSEE helped build the Smithsonian Ocean Portal, a website designed to deliver the latest vetted scientific information and multi-media educational resources related to oceans and biodiversity. COSEE West contributed short messages for the Portal.

JPL Climate Day Co-Hosted by COSEE-West

In 2008 and 2010, JPL Climate Day attracted 1000 students in an all-day event of lectures and hands-on activities. The 2008 event partnered with East San Gabriel Valley Regional Occupational Program and Technical Center (ESGVROP/TC) and the 2010 event partnered with South Coast Air Quality Management District. The goals of the events were to bring high school students together with climate scientists to learn about the science of climate and climate change, the role that NASA satellites play in monitoring Earth and its climate, and to learn how they could reduce their own impacts on global climate.

AQMD Air Quality-Climate Change Conference

COSEE West also partnered with South Coast Air Quality Management District, Jet Propulsion Laboratory, and several other public and private organizations for “A World We Can Change,” an air quality and climate change conference for 8500 high school students at the Los Angeles Convention Center in May, 2010. Information at the conference included science content on the relationship between oceans and global climate change. COSEE West staff had a booth in the exhibit hall and provided a link to teacher resources on related background information, lesson plans, and hands-on activities at the COSEE West website. Scientist presentations focused on the relationship between oceans and climate change and were arranged by Dr. Linda Duguay and other COSEE West staff. Dr. Donal Manahan of the University of Southern California spoke on

“Students in Antarctica” and Dr. Josh Willis of the Jet Propulsion Laboratory spoke on “The Real Deal on Global Warming–How the Oceans Ended the Climate Debate.”

Participation in COSEE Network Activities

COSEE West actively participated in the COSEE Network Council. Dr. Linda Duguay served as the voting member and Peggy Hamner and Dr. Peggy Fong served as the alternates to the council. Council members and alternates participated in Council meetings and conference calls. Dr. Linda Duguay served as chair of the Decadal Review Working Group and as Chair of the COSEE Council. Patricia Kwon served on the Evaluation Working Group and DRWG. Gwen Noda served on the Web Working Group, the Excellence in Networking Tools subgroup, and the Pathologies of Disease Working Group. Lynn Whitley served on the Diversity Working Group and PDWG.

Fall AGU Meeting

COSEE organized a session at the December, 2010, Fall AGU Meeting entitled “How Do You Measure Broader Impacts Success?” The session was designed to provide examples of successful broader impacts education outreach programs, both within and outside of COSEE. Scientists and evaluators co-presented examples of a wide range of broader impacts programs and highlighted ways to substantively measure these impacts. Linda Duguay (COSEE-West), and Gail Scowcroft of (COSEE CCO) were conveners of the session.

COSEE Central Gulf of Mexico

In April 2009, Mr. Craig Strang and Ms. Catherine Halversen of COSEE CA traveled to Ocean Springs, MS and implemented a two-day **Communicating Ocean Science to Informal Audiences (COSIA) Professional Development Program** for the COSEE CGOM PI, Co-PIs, the Webmaster, and one Advisory Board Member and his wife (also a Science Instructor).

If COSEE CGOM had been awarded its third renewal from NSF, the PI and Co-PIs would have been working with COSEE CA at Lawrence Hall of Science in Berkeley, CA in implementing COSIA; it is unknown at this time, what directions will be taken with this effort.

Collaboration with the Smithsonian Institution-National Museum of Natural History-Sant Ocean Hall (SI-NMNH-SOH) and NOAA's Office of Ocean Exploration and Research and the National Sea Grant College Program in developing a **SI-NMNH-SOH/National COSEE Network (NCN) Senior Ocean Educator Position** which was nationally advertised in the fall of 2008.

A successful candidate was hired February 2, 2009, Ms. Elizabeth Ban. Ms. Ban resigned from this position, effective July 14, 2010, and this position is currently being filled by Ms. Ban's former assistant, Ms. Catherine Sutera.

In the summer of 2009, the COSEE CGOM submitted an American Recovery and Reinvestment Act (ARRA) proposal, **Enhanced Engagement by Scientists for Broader Societal Impacts**, to NSF for funding, on behalf the entire NCN. The two objectives of this proposed effort are to: 1) assemble representatives of all COSEE and the Central Coordinating Office (CCO) as a new Scientist Engagement Working-Group (SEW-G) to consider NCN methods of promoting scientists education and outreach (E/O) efforts and 2) facilitate access to information for scientists seeking to build their E/O efforts, specifically to produce a searchable web database of programs offered by each Center.

These multimedia "case studies" (available via web and print format) represent examples from each Center describing and documenting how exemplary scientists use COSEE programs to develop model E/O programs for broader societal impacts. To date, three case studies are "live" and three additional case studies are in the process of being finalized for Year 1 of this Two-Year study.

The COSEE SouthEast and the COSEE CGOM collaborated on the **second-printing of *The Educator's Guide to Marine Debris***.

This Guide contains 37 activities within five chapters and has been provided to hundreds of formal and informal educators throughout both the Gulf of Mexico and South Atlantic regions. This resource can be downloaded from www.cosee-se.org for teachers across this country and internationally.

COSEE CGOM Goes to Japan! Dr. Mike Spranger, Florida COSEE CGOM PI, and Ms. Karen Blyler, Florida COSEE CGOM Educator, were invited to Japan in December, 2009, to

discuss the concept of both COSEE and the Sea Grant Program (community-based education). Dr. Spranger and Ms. Blyler were hosted by Professor Tsuyoshi Sasaki, Professor at the Tokyo University of Marine Science and Technology (TUMSAT).

Dr. Spranger and Ms. Blyler presented several formal lectures for faculty, students, and community members at the Fukui Prefectural University, Obama City (north of Kyoto) in Western Japan, TUMSAT in Tokyo, and Hei River Community College in Miyako in Northeast Japan. Dr. Spranger and Ms. Blyler met with governmental officials, marine educators, high school teachers, graduate students, community activists, fishermen, youth, and others interested in ocean literacy. They found these people to be dedicated, enthusiastic, and very interested in the concept of ocean literacy. Dr. Sasaki announced that TUMSAT created a new center named (in English) the Ocean Literacy Partnership. The goal of the center is to help the Japanese people understand aquatic and marine environment literacy in order to establish a sustainable society. Dr. Sasaki hopes to connect national and local governments, schools, universities, and informal education facilities in this effort.

FLEXE GLOBE. Dr. Sharon Walker was contacted by Dr. Liz Goehring from Pennsylvania State University in 2008, who requested that COSEE CGOM collaborate with FLEXE GLOBE to provide Professional Development on methane hydrate research findings in the Gulf of Mexico for formal and informal educators.

Dr. Shelia Brown coordinated the FLEXE: GLOBE: From Local to Extreme Environments Workshop in July 21-22, 2009. This Two-Day Workshop was a partnership between Temple University, the University of Southern Mississippi, and COSEE CGOM. The Workshop was funded by the NSF's GLOBE (Global Learning and Observations to Benefit the Environment) Project, the Mineral Management Service, and NOAA. There were 26 applicants and 18 participants. The composite Likert-scale evaluation of Workshop activities revealed participant responses as 68% Very Valuable, 31% Valuable and 1% Average Value. The ethnicities of these 18 participants (15 sciences, 2 math and science, and one science education) were: African American (2), Caucasian (11), Asian American (4), and Hispanic (1).

COSEE Florida (2002)

COSEE-Florida participated in training for *Communicating Ocean Sciences in K-12 Classrooms (COS K-12) (2005)* and *Communicating Ocean Sciences to Informal Audiences (COSIA) (2006)*. Both courses were piloted tested at the University of South Florida with individual graduate students. COSIA materials were then integrated into courses in the *Informal Science Institutions Environmental Education Graduate Certificate Program*. Some materials from *COS K-12* were integrated into preservice science teacher education courses.

COSEE-Florida collaborated with COSEE-Southeast in a variety of Southeast Atlantic Coastal Ocean Observing System (SEACOOS) initiatives. Florida representatives participated in the SEACOOS meetings, in developing a series of (a) Ocean Science posters for use in K-12 schools, (b) a scientists' interview video series, and a (c) CD. Florida representatives also delivered a South East Portal to Ocean Research for Teachers (SEPORT) Teacher Workshop to the minority serving teacher cadre in north Florida.

COSEE Florida contributed to the review and development of the COSEE Scientists' Engagement Guide, *Education and Public Outreach: A Guide for Scientists*. the Oceanographic society, 2007.

COSEE Florida contributed to the COSEE Network Web Working Group (WWG) with representatives from other Centers.

COSEE Florida contributed to the COSEE Network Professional Development Group with representatives from other Centers.

COSEE Florida contributed to the COSEE Network Governance Working Group (GWG) with representatives from other Centers.

COSEE FL: Partnership for education outreach of SEACOOS (southeast Atlantic coastal ocean observing system); educational posters, online lessons and co presentations at educational research conferences were products.

COSEE Florida and COSEE Southeast partnered for 3 years in developing meaningful interactions with scientists engaged with the regional ocean observing system.

COSEE Florida participated in the EARTH Workshop at Monterey Bay Aquarium and Research Institute (MBARI) (2005): and Education and Research: testing Hypotheses July 9-14, 2006 at the NMEA conference in New York City

COSEE Florida participated the Gulf Coast Alliance Education Network workshop at Rookery Bay, Naples, Florida June 21-23, 2006

COSEE SouthEast

COSEE Great Lakes

The two programs exchanged educators for summer Institutes for five years-2005-2010 with mutual funding support from each Center. The two centers had common missions for the professional development of educators and engaging scientists using geographical relevance and regional topics. For five years, one teacher from each Center participated in a residential PD program located in the Southeast and Great Lakes. The COSEE SE teachers learned about each of the Great Lakes and teaching methods. The COSEE GL teachers participated in various Institutes that included STEM undersea research and ROVs and climate change evidence. Each exchange teacher presented strategies back to her/his COSEE. This teacher also added to the richness of the local programs. One of the outcomes is that COSEE SE and COSEE GL have shared resources and materials and presented in conferences.

COSEE Central Gulf of Mexico

The two programs worked together and provided mutual support in funds and text for the publication on marine debris, Educators Guide to Marine Debris, 2008-2009. COSEE SE received a NOAA award on marine debris education. A six-state collaboration was formed to develop a regional guide with information and resources for the Southeast. The printing costs were augmented by contributions from various agencies in the participating states. Each state provided a text of how marine debris was a state problem in an education publication. COSEE SE, Florida Sea Grant and COSEE CGOM distributed the guides to constituents.

COSEE Mid-Atlantic and COSEE Coastal Trends

COSEE SE, with the assistance from staff and PIs from COSEE MA and later COSEE CT, modeled the summer workshop, "Taking the Pulse of Our Coastal Ocean," to southeastern educators in SkIO Georgia in 2005 and Jacksonville University, FL, in 2009. COSEE CT PI Laura Murray presented in 2005; PI Lundie Spence went to COSEE Coastal Trends workshop and presented. COSEE SE benefited from the efforts of COSEE MA and COSEE CT by modifying a professional development workshop they had tested. In the second TPOCO workshop, educators and scientists from COSEE CT participated in the workshop at SkIO, GA.

COSEE Alaska

The two programs used distance learning strategies to facilitate teacher interactions during the 2009 Ocean Sciences Education Institute. Educators from both the Southeast and Alaska discussed aspects of climate change education from their regional perspective via a teleconference call during a COSEE SE Climate Change Professional Development Institute. In addition, Spence (PI COSEE SE) assisted the nascent COSEE AK with proposal preparation.

COSEE Florida

This was a partnership for education and outreach by SEACOOS (Southeast Atlantic Coastal Ocean Observing System); educational posters, online lessons and co- presentations at educational research conferences were products. COSEE FL and COSEE SE partnered for 3 years in developing meaningful interactions with scientists engaged with the regional ocean observing system.

COSEE Ocean Learning Communities

COSEE Network Diversity Working Group (DWG): Representatives from various COSEE Centers

Dionne Hoskins and Deidre Gibson developed this working group in 2008 to review, discuss, and promote equity and diversity efforts within the COSEE network. Philip Bell now chairs the DWG, coordinates its activities, and represents COSEE OLC in those efforts. The DWG has helped survey equity efforts within the COSEE network, developed an annotated bibliography of resources on broadening participation in STEM education, and helped develop professional development experiences for scientists on broadening participation in STEM.

COSEE Network Governance Working Group (GWG): Representatives from various COSEE Centers

With the expansion and growth of the COSEE Network, it was determined in 2006 that the governance structure needed to be reviewed and adapted to better meet the needs of the COSEE Council and Network. The Governance Working Group was formed. The COSEE OLC director, Veronique Robigou, served on the working group with leaders of other COSEE Centers to develop and implement a new governance structure. In 2007 the COSEE Council adopted what is now the current governance structure.

COSEE Network Evaluators Working Group (EWG): Representative from various COSEE Centers

The COSEE Network Evaluators Working Group was formed in 2008 as a strategy to gather high quality cross-COSEE data on scientist-educator engagement. The EWG involves the evaluators from a number of COSEE Centers, as well as members of the Advisory Committee and COSEE Center PIs. Among the tasks undertaken by the EWG were two surveys (one for ocean scientists and one for educators working with the COSEE Centers). Additionally, the EWG is taking a strong role in providing data and reports to the Decadal Review process. Andrea Anderson, COSEE OLC evaluator, has actively participated in this working group.

COSEE Network Scientist Engagement Working Group (SEWG): Representatives from various COSEE Centers

COSEE-OLC is an active participant in the COSEE Network Scientist Engagement Working Group (SEWG). COSEE-OLC education and outreach specialist, Tansy Clay, serves on the committee and COSEE OLC PI Rick Keil was nominated by COSEE OLC and selected by the SEWG to be a featured scientist to represent the success of COSEE at engaging scientists. The SEWG production team is currently in the process of completing the website that will feature Dr. Keil and his work.

**Communicating Ocean Science/Communicating Ocean Science with Informal Audiences:
WA Sea Grant, Seattle Aquarium**

COSEE OLC provided the Communicating Ocean Science course designed by COSEE CA to undergraduate and graduate students at the University of Washington in 2007, 2008, and 2009. In 2009, the course was co-taught with WA Sea Grant. In 2010, COSEE OLC partnered with WA Sea Grant and the Seattle Aquarium to pilot a combined course of the Communicating Ocean Science and Communicating Ocean Science with Informal Settings (COS & COSIA) courses. In upcoming years, it is the intent to build stronger connections between the programs and the Seattle Aquarium's classroom and teacher partnerships in order to build local COS/COSIA programs that will have significant impact for the participating scientists and the formal/informal education community.

Citizen Science Youth Program Design Collaboration between COSEE OLC and COSEE CA

Both COSEE OLC and COSEE CA have NSF-funded OEDG projects to involve minority youth in extended science apprenticeships and personally relevant science research, with the goal of broadening participation in the sciences. Project staff from these efforts have had a series of conversations to share best practices across these efforts and plan to explore additional collaboration in the future.

Potential Collaborations Meeting between COSEE OLC, COSEE PP and COSEE AK

During the 2010 COSEE Network Meeting, leaders from each of the three Pacific Northwest COSEE Centers met to discuss the missions of their individual centers and to explore potential collaborations among the Centers that could extend out to the COSEE Network. Areas of possible future collaboration include: cross-sharing of ways to engage scientists, volunteers, and students in citizen science efforts; the design of an ocean science focused citizen science toolkit that could be shared across COSEE; ways to infuse ocean science components into Master Naturalists programs; and ways of engaging citizens in ocean science using observatory real time data.

COSEE Great Lakes

Center-to-Center Collaborations

COSEE Coastal Trends

In 2008, COSEE CT offered a professional development workshop for educators in real-time data for science teaching at F. T. Stone Laboratory on Lake Erie. Teachers from five states participated enthusiastically in the 5-day lab- and field-based program, in which CT lessons were integrated with the GL environment. Both the CT visitors and the GL resident teachers were excited to learn how science concepts applied equally to ocean and Great Lakes environments.

COSEE California

As part of its dissemination of products and concepts, COSEE CA subcontracted with COSEE GL to establish a site for teaching “Communicating Ocean Science” in the GL region [the University of Michigan]. They also provided support for COSEE GL staff to adapt the Ocean Literacy principles to the North Coast. The latter effort resulted in a set of Great Lakes Literacy Principles that are parallel to those of the ocean. GL staff have developed a brochure and website in support of the effort; <http://www.greatlakesliteracy.net> went online late in 2010 with resources for teaching each of the GL Literacy Principles. This collaboration has greatly enhanced the ways that COSEE GL can remain as an Ocean Literacy partner because we now have parallel words to apply in our region.

COSEE SouthEast

When COSEE GL and COSEE SE were developing their proposals for NSF in 2005, leaders of both Centers saw the value of assuring that their regional educators had the opportunity to learn about a coastal area different from their own. A teacher exchange program was built into the budget for each COSEE to support a GL teacher to participate in a SouthEast workshop and a SE teacher to be in a GL workshop. The response to this effort, for the exchange teachers as well as the coastal group with whom they interacted, has been very positive and eye-opening, as they realized the similarities between the North Coast and the Atlantic. COSEE GL invited the PI of COSEE SE to speak at our Great Lakes Education Summit, a culminating activity for our program; see <http://www.coexploration.org/coseegreatlakes/>.

COSEE Networked Ocean World

As a new COSEE in 2006, it was important for COSEE GL to have the input from experienced Center leaders. Janice McDonnell of COSEE NOW was invited to serve on our 12-member Advisory Committee, where she has remained as a source of wisdom and counsel throughout our 5-year program.

COSEE Pacific Partnerships

This was a less formal partnership than others, but an important one for development of products that serve the entire Network. Dr. Jan Hodder shared with her GK12 graduate fellows the opportunity to publish lesson plans in the special Ocean Literacy issue of Science Activities journal. Hodder and Fortner worked with the student teams to produce publishable manuscripts as an outreach mechanism for reaching K-12 educators. Four papers were published, engaging a total of eight student authors. An additional collaborative effort between Fortner and Hodder was the review of lyrics for Ocean Literacy music by the Banana Slug String Band. This was seen by COSEE CA, coordinator of the music effort, as a way to monitor science accuracy in the lyrics and assure that GL content was included in the music along with more traditional ocean songs.

COSEE Excellence in Networking Tools [ENT] Sub-Working Group: Great Lakes representation on Webinar: COSEE Blogs. September 16, 2010.

Jim Lubner was one of 5 presenters on this webinar, speaking about week-long workshop blogs.

COSEE Working Groups Collaborations

COSEE Network Diversity Working Group (DWG)

This working group was developed in 2008 by Dionne Hoskins and Deidre Gibson to review, discuss, and promote equity and diversity efforts within the COSEE Network. The COSEE GL representative is our Native American advisor, Jennifer Niemi.

COSEE Network Governance Working Group (GWG)

The COSEE GL Director was a charter member of the Governance Working Group and served on it in 2006-7 as the Network reviewed the governance structure and adapted it to better meet the needs of the COSEE Council and Network. The Governance Working Group was formed.

COSEE Network Evaluators Working Group (EWG)

The COSEE Network Evaluators Working Group formed in 2008 as a strategy to gather high quality cross-COSEE data on scientist and educators engagement. COSEE GL Director Fortner served as the primary PI in the group and Co-Chair of it until summer of 2010. Among the tasks undertaken by the EWG were two surveys (one for ocean scientists and one for educators working with the COSEE Centers). Additionally, the EWG is taking a strong role in providing data and reports to the Decadal Review process.

COSEE Network Scientist Engagement Working Group (SEWG)

COSEE GL participates in the COSEE Network Scientist Engagement Working Group (SEWG), with representation by Dr. Rochelle Sturtevant from NOAA's Great Lakes Environmental Research Laboratory. Our featured scientist has been selected for interviews and program development late in 2011.

COSEE Ocean Systems

Transfer of COSEE OS workshop models to other Centers:

COSEE California

Faculty-Graduate Student Collaborative (FGSC) Workshop for Young Faculty & GK-12 Students (Spring 2011) - Scripps Institution of Oceanography, San Diego, CA

COSEE Networked Ocean World

Faculty-Graduate Student Collaborative (FGSC) Workshop for Online Audiences (Summer 2011)

COSEE Pacific Partnerships

“Scientist-Educator Collaborative” workshop model: Informal Educator-Scientist Collaborative (SEC) Workshop (24-May-10 through 26-May-10) - California Polytechnic State University, San Luis Obispo, CA. Four additional versions of the SEC workshop to be facilitated by COSEE-Pacific Partnerships from Summer 2010 to Fall 2011.

COSEE West

Faculty-Graduate Student Collaborative (FSGC) Workshop for Faculty and Students at USC, UCLA, and the Cal State System (Winter 2011) - University of Southern California, Los Angeles, CA

COSEE Networked Ocean World

Co-facilitated workshop and short courses at National Science Teachers Association (NSTA) annual conferences.

“COSEE: The Oceans, They are A-Changin’: How Might This Affect You?” Short Course (21-Mar-09) - National Science Teachers Association National Conference, New Orleans, LA

and “COSEE: The Oceans, They are A-Changin’: How Might This Affect You?” Workshop (20-Mar-09) - National Science Teachers Association National Conference, New Orleans, LA

and “COSEE: Salting Away for Our Future: Resources for Understanding the Ocean's Role in Climate Change” Short Course (28-Mar-08) - National Science Teachers Association National Conference, Boston, MA

Invited presentations at other Centers' events / workshops:

Presenting at other Centers' events / workshops has served several purposes: 1) building awareness of each others' programs to help build a "COSEE Community"; 2) increasing the reach of COSEE-OS products and processes with new audiences; and 3) sharing effective practices from Center to Center.

COSEE Alaska

Online Tools Help Get Scientists and Educators on the Same Page (18-Jan-10) - COSEE-Alaska Communicating Ocean Sciences Workshop, Anchorage, AK

COSEE Coastal Trends

Scientist-Educator Partnership Program Orientation (24-Jun-10 through 26-Jun-10) - University of Maryland's Horn Point Laboratory, Cambridge, MD

and "How did I get here? Where am I going" webinar (16-Jun-10) - Online presentation for members of the 2010 "Scientist-Educator Partnership" program

COSEE Great Lakes

Best Education / Outreach Practices from Observing Systems: Applications to the Great Lakes and GLOS (10-Apr-07 through 11-Apr-07) - Great Lakes Observing System (GLOS) Symposium, Traverse City, MI

COSEE New England (New England Ocean Sciences Education Collaborative)

Scientist - Informal Educator Collaborative Workshops: Overview (15-May-09) - New England Ocean Sciences Education Collaborative Governing Council Meeting, Portsmouth, NH

and Climate Concepts: Meshing Cutting-Edge Research With Education (07-Nov-08) - 2008 New England Ocean Sciences Education Collaborative Ocean Literacy Summit, Boston, MA

and Overview of COSEE-OS Ocean-Climate Interactive, Concept Map Builder & Concept-Linked Integrated Media Builder (16-May-08) - New England Ocean Sciences Education Collaborative Meeting, Rye, NH

and Incorporating Ocean Sciences Into State Standards: New England Case Studies (04-Nov-06) - 2006 New England Ocean Sciences Education Collaborative Ocean Science Literacy Summit, Boston, MA

and This Just In: Relating Cutting-Edge Research to OSL Principles (04-Nov-06) - 2006 New England Ocean Sciences Education Collaborative Ocean Science Literacy Summit, Boston, MA

COSEE NOW

Education and Research: Testing Hypotheses (EARTH) (10-Jul-06 through 14-Jul-06) - COSEE Mid-Atlantic Conference: Taking the Pulse of the Ocean, New Brunswick, NJ

Co-authored publications with PIs at other COSEE Centers:

With Craig Strang, COSEE-California, in the COSEE Special Issue of “Current”:
Strang, C., A. deCharon, and S. Schoedinger (2007). Can you be science literate without being ocean literate?, *Current: The Journal of Marine Education*, v. 23(1), 7-10.

With COSEE-California and COSEE NOW, co-authored a set of COSEE overview articles in the Spring 2010 Special Edition of “The Earth Scientist”: McDonnell, J., A. deCharon, and C. Peach (2010). Using Ocean Observing Systems in the Centers for Ocean Science Education Excellence (COSEE), *The Earth Scientist: Journal of the National Earth Science Teachers Association*, 26(1), 25-31.

COSEE Alaska

Ocean Sciences Education Futures Community Meeting, November 3-4, 2010, Washington DC.

Molly McCammon participated in the community meeting, representing COSEE Alaska.

COSEE NOW

COSEE Alaska arranged interviews by Ari Daniel Shapiro of ocean scientists and a Native Alaskan educator and co-produced an “Ocean Gazing” podcast with COSEE NOW on sea ice, climate change effects, and observing systems, “An Imminent Thaw.”

COSEE California

COSEE Alaska sponsored and provided logistical supported for a COS/COSIA Instructor Workshop provided by Craig Strang and Catherine Halverson, COSEE California, at the University of Alaska Fairbanks. COSEE Alaska PIs Dr. Michael Castellini and Dr. Ray Barnhardt and staff Marilyn Sigman and Ruth Post were participants in the workshop.

COSEE Best Practices in the Engagement of Scientists in Education and Outreach Work Session

COSEE Alaska participated in the survey of COSEE Center best practices. Program Manager Marilyn Sigman and ASLC Distance Delivery Coordinator Laurie Stuart represented COSEE Alaska at the workshop held in Rhode Island in September, 2010.

Ongoing:

COSEE Network Diversity Working Group (DWG): Representatives from various COSEE Centers

Dionne Hoskins and Deidre Gibson developed this working group in 2008 to review, discuss and promote equity and diversity efforts within the COSEE network. COSEE P.I. Dr. Ray Barnhardt represents COSEE-Alaska in those efforts. The DWG has helped survey equity efforts within the COSEE network, developed an annotated bibliography of resources on broadening participation in STEM education, and helped develop professional development experiences for scientists on broadening participation in STEM.

COSEE Network Evaluators Working Group (EWG): Representative from various COSEE Centers

The COSEE Network Evaluators Working Group formed in 2008 as a strategy to gather high quality cross COSEE data on scientist and educators engagement. The EWG involves the

evaluators from a number of COSEE Centers, as well as members of the Advisory Committee and COSEE Center PIs. Among the tasks undertaken by the EWG were two surveys (one for ocean scientists and one for educators working with the COSEE Centers). Additionally, the EWG is taking a strong role in providing data and reports to the Decadal Review process. Andrea Anderson, COSEE Alaska evaluator, has actively participated in this working group.

COSEE Network Scientist Engagement Working Group (SEWG): Representatives from various COSEE Centers

COSEE Alaska is an active participant of the COSEE Network Scientist Engagement Working Group (SEWG). COSEE Alaska Director Nora Deans serves on the committee.

COSEE Web Working Group (WWG)

COSEE Alaska is an active participant in the COSEE Web Working Group (WWG). COSEE Program Manager Marilyn Sigman serves on the committee.

COSEE Excellent Networking Tools (ENTs) Working Group

COSEE Alaska is an active participant in the COSEE Excellent Networking Tools (ENTs) Working Group. COSEE Director Nora Deans and Program Manager Marilyn Sigman serve on the committee.

COSEE Best Practices for Professional Development of Educators Work Session

COSEE Alaska participated in the survey of COSEE Center best practices. Program Manager Marilyn Sigman represented COSEE Alaska at the workshop held in Rhode Island in October, 2009. She also served on a Professional Development ad hoc committee to review the workshop report and plan additional cross-Center activities.

COSEE NOW

COSEE Alaska collaborated with COSEE NOW's Ari Daniel Shapiro to arrange interviews for two "Ocean Gazing" podcasts about the AOOS Prince William Sound Field Experiment.

COSEE SouthEast

In 2009, COSEE Alaska provided a case study about Alaska ocean climate change and Alaskan K-12 educational strategies and resources for COSEE Southeast's "As the World Turns (Warmer and Colder): past, present and future patterns of climate change" workshop for teachers in North Carolina, South Carolina, and Georgia July 20-25 at the Baruch Marine Lab in Georgetown, South Carolina.

COSEE California

COSEE Alaska invited Craig Strang of COSEE California to be a presenter at the 2010 COSW workshop, and supported his travel to the workshop and to the UAF School of Fisheries and Ocean Sciences to meet with COSEE P.I. Dr. Michael Castellini to assist with the development of a COS/COSIA course at UAF.

COSEE OS

COSEE Alaska invited Annette deCharon of COSEE OS, and supported her travel to be a presenter about the COSEE-OS concept mapping tool at the 2010 COSW workshop.

Potential Collaborations Meeting between COSEE OLC, COSEE PP and COSEE AK

During the 2010 COSEE Network Meeting leaders from each of the three Pacific Northwest COSEE Centers met to discuss the missions of their individual centers and to explore potential collaborations among the Centers that could extend out to the COSEE Network. Areas of possible future collaboration include: sharing of ways to engage scientists, volunteers, and students in citizen science efforts; the design of an ocean science focused citizen science toolkit that could be shared across COSEE; ways to infuse ocean science components into Master Naturalists programs; and ways of engaging citizens in ocean science using observatory real time data.

COSEE Pacific Partnerships

Collaboration among COSEE PP, COSEE CA, and the COSIA Educators Network (COSIEN) on workshops for ocean scientists and informal educators, 2010-

In April 2010, through COSEE PP Co-PI Shawn Rowe's involvement with both grants, COSEE PP and COSEIN staff began planning for a series of co-sponsored workshops to be offered in 2010 and 2011 that would foster ongoing collaboration between scientists and informal educators. In May 2010, COSEE PP and COSIEN, in partnership with COSEE OS (detailed below), brought together scientists and informal educators from the central California coastal region for a three-day collaborative concept mapping workshop at California Polytechnic State University. The second workshop, held in October, 2010, at Humboldt State University, brought together graduate students and informal educators from the northern California coast for three days of COSIA-based curriculum and activities. Planning is currently underway to offer two more collaborative COSIA-based workshops for informal educators and scientists at COSEE PP partner marine stations in Washington and Hawai'i.

Collaboration among COSEE-PP and COSEE-OS on Informal Educator-Scientist Collaborative Concept Mapping Workshop, May 2010

COSEE-PP Co-PI Shawn Rowe and Coordinator Coral Gehrke contacted COSEE OS PI Annette de Charon about the possibility of running COSEE OS's Scientists-Educator Collaborative (SEC) workshop. Over a series of conference calls, Rowe and Gehrke worked with de Charon and COSEE OS staff Christy Herren, Carla Companion, and Medea Steinman and COSIA Educators Network Coordinator Heidi Schmoock to develop a three-day SEC-based workshop for ocean scientists from California Polytechnic State University, San Luis Obispo, and informal educators from the central California coast. Steinman and Companion traveled to Cal Poly to help COSEE PP staff learn to use the techniques and online tools developed by OS and to co-facilitate the workshop. The workshop was a success, with new partnerships formed, all scientists expressing in evaluation that they learned something new about communicating their work, and a burgeoning educators' network forming for the central CA coast. COSEE PP will be using the structure and tools of this workshop to hold similar workshops in Oregon in 2010 and 2011.

Collaboration among COSEE PP, Oregon Sea Grant Extension, and COSEE OS on OS renewal, 2010

COSEE PP Co-PI Shawn Rowe provided a letter of support for the COSEE OS renewal proposal to investigate how stakeholders' and scientists' existing mental and conceptual models about climate change issues can be articulated and shared as part of better decision-making. This collaboration gives OS, PP and OSGE the opportunity to extend the work each organization has been doing around visible thinking routines in general and concept mapping in particular. This will provide tools and models for a variety of educators and communicators nationwide, and will lead to on-line tools for facilitating this kind of analysis and reporting. COSEE PP will help develop and "field test" some of the techniques and tools that the OS/PP/OSGE partnership is

developing with their audiences: ocean scientists, informal educators, and community college instructors.

Collaboration with COSEE PP and COSEE NOW on the Using Ocean Data in Education webinar series, May 2010

COSEE-PP Co-PI Shawn Rowe developed and led a two-part webinar online workshop on research-based recommendations for creating and using scientific visualizations in informal science education for the COSEE-NOW Using Ocean Data in Education series. During “Beyond the Wow! Helping public audiences make sense of scientific visualizations,” participants examined some of the theoretical issues and empirical work surrounding visualizations as communicative and cognitive tools, practiced improving visualizations, and developed some common tools, techniques, and questions that can guide future work. The webinar attracted 46 participants from informal science education institutions, other COSEE centers, and institutions of higher education. The webinar evaluations were exceedingly positive and Rowe continues to work with COSEE NOW staff on developing future opportunities.

Collaboration between COSEE PP and the National COSEE Network on COSEE China

Laura Dover, a COSEE PP sponsored graduate student with Co-PI Shawn Rowe, was selected in a competitive process to represent COSEE PP on a national COSEE funded trip to China to explore the creation of a Chinese COSEE program. On the trip, Laura represented COSEE graduate research assistants, COSEE PP, and informal science education as an important element of COSEE partnerships. She was involved in all aspects of the trip, attending and participating in meetings as the COSEE PP delegate. As part of the trip, she presented a poster on COSEE PP efforts in Promoting Ocean Literacy through Formal-Informal Education Partnerships.

Potential Collaborations Meeting among COSEE PP, COSEE OLC, and COSEE AK

During the 2010 COSEE Network Meeting, staff from COSEE PP, OLC, and Alaska met to discuss the missions of their individual Centers and to explore potential collaborations that could extend out to the COSEE Network. Areas of possible future collaboration include: sharing on ways to engage scientists, volunteers, and students in citizen science efforts; the design of an ocean science focused citizen science toolkit that could be shared across COSEE; ways to infuse ocean science components into Master Naturalist programs; and ways of engaging citizens in ocean science using observatory real time data.

Working Groups:

COSEE Network Decadal Review Working Group (DRWG)

COSEE-PP PI Jan Hodder is an active participant of the DRWG and Coordinator Coral Gehrke participates in meetings as her alternate. Hodder has played a lead role in drafting the request for vision papers and worked with COSEE West PI Linda Duguay and COSEE SE PI Lundie Spence on the requests for information for the decadal review from COSEE PIs.

COSEE Network Evaluators Working Group (EWG)

The COSEE Network Evaluators Working Group formed in 2008 as a strategy to gather high quality cross COSEE data on scientist and educators engagement. The EWG involves the evaluators from a number of COSEE Centers, as well as members of the Advisory Committee and COSEE Center PIs. COSEE PP Co-PI Shawn Rowe served on the EWG in 2009 and Coordinator Coral Gehrke participated in EWG calls related to the implementation of the scientist and educator engagement surveys in 2010. COSEE PP Evaluator Lester Reed participates in joint Evaluators-EWG conference calls.

COSEE Network Web Working Group (WWG)

COSEE PP Coordinator Coral Gehrke has been an active participant of the COSEE Network Web Working Group since 2008. The WWG is charge with examining how Centers can work together interactively to make existing / future COSEE information more accessible, engaging, and up-to-date. The WWG is responsible for the rebuilding of the COSEE.net website (launched in 2009) to include a full Content Management System with centralization of web functions (calendar of events, educational resources, funding opportunities, inter-Center projects, and relevant publications), creating a common “look and feel” for all COSEE websites. The WWG work continues to improve the look and functionality of the Center and .Net sites and to foster communication and the sharing of internal information within the COSEE community.

COSEE Network Excellence in Networking Tools (ENTS) sub-working group of the Web Working Group

COSEE PP Coordinator Coral Gehrke has been an active participant of the Excellence in Networking Tools sub-working group of the WWG since it grew out of the Web Developers and Administrators group during the “Different Center, Same Boat” session at the 2009 COSEE Network Meeting. The goal of ENTS is to explore new ways to broaden the reach of COSEE by using virtual networking tools to increase internal and external collaboration, communication, and exposure and to develop guidelines and best practices for implementing effective tools and processes.

COSEE Network Scientist Engagement Working Group (SEWG)

COSEE PP is an active participant of the COSEE Network Scientist Engagement Working Group (SEW-G). COSEE PP PI Jan Hodder and Coordinator Coral Gehrke serve on the committee. Dr. Jude Apple, COSEE PP Marine Scientist and Public Education Specialist at the Shannon Point Marine Center, was nominated to be a SEW-G featured scientist.

COSEE Network Strategic Business Plan Working Group

COSEE PP Co-PI Shawn Rowe served on the Strategic Business Plan Working Group in 2009.

COSEE Coastal Trends

COSEE Coastal Trends has partnered with three other centers to implement the Ocean Observing workshop in each region. In each case, COSEE Coastal Trends staff and COSEE SouthEast, COSEE Great Lakes and COSEE West staff met to integrate the existing Ocean Observing System curriculum developed by Murray and Gibson (COSEE Mid-Atlantic), which is posted on the web. We used these jointly developed and modified versions of the curriculum to work with our COSEE partners to produce the Observing the Ocean education module (http://www1.coseecoastaltrends.net/modules/observing_the_ocean/).

Collaborating COSEEs are:

COSEE Coastal Trends and COSEE South East: Observing the Ocean Summer Institute 2008. PI Lundie Spence went to COSEE Coastal Trends workshop and presented.

July 14-17, 2008 Gibraltar Island, COSEE Great Lakes. PI Rosanne Fortner.

August 11-15, 2008 Catalina Island, COSEE West, PI Linda Duguay

As part of our COSEE proposal (2010) we engaged all currently funded COSEE to participate in our Scientist-Educator Partnership (SEP) as listed below, all of whom were supportive and are enthusiastic about participating. However, since COSEE Coastal Trends was not refunded, these partnerships will not occur.

Scientist-Educator Partnership Program: COSEE Network Partners

<u>COSEE</u>	<u>Director</u>
Pacific Partnerships	Jan Hodder
West	Linda Duguay
Alaska	Nora Deans
Networked Ocean World	Jim Yoder
SouthEast	Lundie Spence
Central Gulf of Mexico	Sharon Walker
Ocean Systems	Annette deCharone
Great Lakes	Rosanne Fortner
California	Craig Strang
Ocean Learning Comm	Phillip Bell

COSEE Networked Ocean World

COSEE Network Leadership

COSEE NOW Director Janice McDonnell was the COSEE chairperson, working with the leadership team of COSEE NE Billy Spitzer and COSEE OS Annette deCharon for the COSEE Council in 2007-2008. Sage Lichtenwalner serves on the ENTS and SEWG workgroups, Janice McDonnell on the professional development and governance workgroups, and Chris Parsons on the decadal review and evaluation workgroups. Liesl Hotaling serves on the CCO team to assist with COSEE Network presence at meetings and conferences.

COSEE Network Governance Working Group (GWG): Representatives from various COSEE Centers

The Governance Working Group was formed in 2006 with the expansion and growth of the COSEE Network. The charge of the group was to review the governance structure and develop a guidance document that would better meet the needs of the COSEE Council and Network. Janice McDonnell (Director COSEE NOW) served on the working group with leaders of other COSEE Centers to develop and implement a new governance structure. In 2007 the COSEE Council adopted what is now the current governance structure.

Broader Impact Work Group

COSEE NOW Director Janice McDonnell worked collaboratively with COSEE CA (Cheryl Peach and Sharon Franks) and COSEE NE (Andrea Thorold) to develop the COSEE Guide to Engaging Scientists in Education and Public Outreach. A guide was printed and distributed in partnership with the TOS Oceanography Society in 2006 @ http://www.tos.org/epo_guide/.

COSEE Network Evaluators Working Group (EWG): Representative from various COSEE Centers

The COSEE Network Evaluators Working Group (reactivated in 2009) is charged with providing information and advice to the COSEE Council on 1) collective evaluation needs and 2) resources and collaborative opportunities that document the extent to which COSEE goals and objectives are achieved. The first major task was to identify and gather high-quality cross-COSEE evaluation data. The EWG, led by COSEE NOW's evaluator Chris Parsons, involves evaluators from a number of COSEE Centers, as well as members of the Advisory Committee, Network Coordinating Office and COSEE Center PIs. Among the tasks undertaken by the EWG in 2010 were network-wide surveys on scientists' and educators' engagement with COSEE (the first such surveys in COSEE's history).

COSEE Network Scientist Engagement Working Group (SEWG): Representatives from various COSEE Centers

COSEE NOW is an active participant of the COSEE Network Scientist Engagement Working Group (SEWG). COSEE NOW Data Translator, Sage Lichtenwalner, serves on the committee and COSEE NOW PI Scott Glenn was nominated by COSEE NOW and selected by the SEWG to be a featured scientist to represent the success of COSEE at engaging scientists. The SEWG production team is currently in the process (Sept 2010) of completing the website that will feature Dr. Glenn and his work.

Communicating Ocean Science (COS) & Communicating Ocean Science with Informal Audiences (COSIA): Liberty Science Center and Rutgers University

COSEE NOW has been teaching the COS/COSIA course designed by COSEE CA to undergraduate and graduate students spring semester each year at Rutgers University since 2006. Rutgers has graduated 84 undergraduate and graduate students from this mentorship program. COSIA students support Liberty Science Center in their annual Ocean Weekend (inaugural event in 2009) where students present hands-on activities to thousands of Science Center visitors. In collaboration with COSEE CA, COSEE NOW is working on a short course version of the college class that will be delivered to informal educators in approximately twenty nonprofit and environmental organizations in New York and New Jersey in April 2011. Additionally, a specially tailored version of the class will be offered to early career scientists through the DISCCRS (Dissertations Initiative for the Advancement of Climate Change Research), NSF funded PIs working on REU programs, and for graduate students and early career scientists that self-select to take the training at professional meetings such as AGU, MTS, and ASLO. More broadly, Janice McDonnell is currently leading an effort to develop a leadership training program for scientists that incorporates COSEE scientist focused programming from COSEE OS, COSEE CA, COSEE OCEAN, and COSEE NOW. The first presentation of this leadership series will be at a town hall at AGU 2010 fall meeting.

Communicating Ocean Science (COS): Virginia Institute of Marine Science

COSEE NOW Partner, Virginia Institute of Marine Science, is involved in COSEE CA's Communicating Ocean Science (COS) program. The VIMS version of this project, which is still in its infancy, is slightly different that the typical COS program in that instead of a credit-bearing course for undergraduate and graduate students, it is organized as a series of seminars open to all VIMS students, faculty, and staff. In the first series of seminars, which occurred in late 2009, twelve people attended five sessions, all revolving around the COS central themes. Response was very favorable and valuable feedback was received on improving the seminar series. The second series of seminars occurred during late 2010, with similar results. The hope is that this seminar series will eventually evolve into a credit-bearing course for VIMS graduate students and staff.

COSEE Central Coordinating Office

COSEE Network Meetings

The CCO coordinates the annual COSEE Network Meeting that brings together representatives from across the Network.

May 2009
Hilton Head, South Carolina
88 participants, all Centers represented

May 2010
Seattle, Washington
75 participants, all Centers represented

COSEE Council Meetings

The CCO coordinates the annual COSEE Council Meeting. Council meetings are held each November in Washington, DC. COSEE Center Council members and alternates attend this meeting. The CCO also coordinates the monthly Council check-in calls.

COSEE Best Practices Work Sessions

Work Sessions are coordinated to bring together representatives from each Center to identify COSEE's best practices.

September 2009
Best Practices in the Professional Development of Educators Work Session

September 2010
Best Practices in the Engagement of Scientists in Education and Outreach Work Session

COSEE Annual Evaluators Workshops

The CCO facilitates annual workshops for the COSEE Center evaluators at the University of Rhode Island Graduate School of Oceanography. These workshops provide the evaluators an opportunity to share instruments, develop common data tools, and discuss their collaborative activities in contributing to the evaluation of the National COSEE Network.

COSEE Network Webinars

The Excellence in Networking Tools (ENTS) Sub-group of the Web Working Group organizes topical webinars and online training for networking tools useful to Center activities, including best practices information.

February 2010 - Introduction to Networking Tools & Question Forum
Facilitated by ENTs members from multiple Centers

June 2010 - Distance learning and online content delivery tools
Presented by COSEE Gulf of Mexico, NOW and West.

September 2010 Blogging tools

Presented by COSEE Great Lakes, Alaska, NOW, Coastal Trends, Pacific Partnerships and Ocean Systems

November 2010 - Online evaluation tools

Presented by COSEE Gulf of Mexico, Ocean Systems and South East

COSEE Council Executive Committee and Working Groups

The National Network Director is a member of the Council Executive Committee and participates in all meetings. CCO facilitates the activities of several Network working groups.

COSEE Network Decadal Review Working Group (DRWG): Representatives from various COSEE Centers

COSEE CCO Participants:

Gail Scowcroft, National Network Director

Andrea Gingras, National Network Coordinator

Romy Pizziconi, National Network Assistant

COSEE Network Evaluators Working Group (EWG): Representatives from various COSEE Centers

COSEE CCO Participants:

Gail Scowcroft, National Network Director

Romy Pizziconi, National Network Assistant

COSEE Network Web Working Group (WWG): Representatives from various COSEE Centers

COSEE CCO Participants:

Greg Baerg, Raytheon Web Solutions

Catherine Cramer, Managing Editor, COSEE Network News

Annette deCharon, National Web Director

Sean Graham, Raytheon Web Solutions

Lisa Taylor, COSEE Webmaster

Gail Scowcroft, National Network Director

Romy Pizziconi, National Network Assistant

COSEE Network Excellence in Networking Tools (ENTS) sub-group of the Web Working Group: Representatives from various COSEE Centers

COSEE CCO Participants:

Catherine Cramer, Managing Editor, COSEE Network News

Annette deCharon, National Web Director

Lisa Taylor, COSEE Webmaster

Romy Pizziconi, National Network Assistant

COSEE Network Scientist Engagement Working Group (SEWG): Representatives from various COSEE Centers

2011 COSEE Decadal Review

COSEE CCO Participants:

Andrea Gingras, National Network Coordinator

COSEE Network Strategic Business Plan Working Group: Representatives from various COSEE Centers

COSEE CCO Participants:

Gail Scowcroft, National Network Director

Andrea Gingras, National Network Coordinator

COSEE Network Messaging and Marketing Working Group Ocean Hall Steering Committee

COSEE CCO Participants:

Gail Scowcroft, National Network Director

COSEE Network Governance Working Group

COSEE CCO Participants:

Gail Scowcroft, National Network Director