



C O S E E

CONSORTIUM FOR OCEAN SCIENCE EXPLORATION AND ENGAGEMENT



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The Consortium for Ocean Science Exploration and Engagement (COSEE) is an international nonprofit network of ocean scientists and educators working together to transform ocean sciences education. COSEE provides educational programs, materials, and tools that link cutting-edge ocean science research with outreach and education initiatives to increase ocean literacy among diverse audiences and develop the highly trained workforce needed to meet today's challenges.



TODAY'S CHALLENGES

Human activity is causing unprecedented changes to aquatic systems worldwide. Many of the greatest challenges (such as sea level rise, higher intensity storms, ocean warming and acidification, and altered marine and Great Lakes ecosystems) affect the ocean and its processes. At the same time, the ocean holds great promise for solutions (such as renewable energy, new medicines, and sustainable resources).

To harness the ocean's resources requires a 21st century workforce with a strong understanding of ocean science along with the ability to integrate scientific concepts, engineering methods, sociopolitical considerations, and especially, the ability to communicate with interdisciplinary teams and the public.



THE FIRST GENERATION COSEE

In 2002 the National Science Foundation (NSF) Division of Ocean Sciences established the National Centers for Ocean Sciences Education Excellence Network (the National COSEE Network) in response to input from a broad spectrum of ocean science researchers and educators. The ocean science community recommended a nationally coordinated effort to address the need for increased ocean literacy across the country. This timely investment was reinforced in 2004, when the U.S. Commission on Ocean Policy (USCOP) also concluded that a nationally coordinated network for ocean sciences education was critical to U.S. security. In particular, the USCOP mentioned two national-level ocean education networks as having “particular importance” for the future of the United States, the National COSEE Network and the National Sea Grant College Program.

Over its 13 years of NSF funding, the National COSEE Network included 17 competitively funded Centers across the U.S., coordinated by the National COSEE Office. The National COSEE Network has become one of the largest organizations of ocean science research and education institutions in existence, with over 280 member institutions. Since its inception in 2002, the Network has facilitated new and innovative approaches to ocean science education by integrating current ocean research into classrooms and informal education venues. COSEE tools, resources, and activities have benefitted tens of thousands of educators, K-16 students, graduate students, and the public. In addition, COSEE has given thousands of scientists the opportunity to broaden the impacts of their research.



METRICS OF COSEE'S SUCCESS

COSEE's overall success is evident through the large number of scientists and educators it has reached and continues to reach through its various programs and products, not just in the Ocean Sciences and Geosciences, but throughout the broader science community. This was evident in surveys conducted by the COSEE evaluation team of both scientists and educators, which indicated that COSEE was very beneficial to improving the performance of both groups, and scientists reported increased performance in both their teaching and research. A report on the evaluation working group's study can be found at http://www.cosee.net/files/coseenet/2012_COSEE_Scientist_Study_Report_Final.pdf.

Other metrics of success include how widespread and persistent COSEE's programs have become and how COSEE products have been adopted and adapted by others. An internal NSF study reviewed project descriptions of NSF proposals submitted between October 2006 and June 2012. This study found that over 540 proposals mentioned COSEE. Additionally, over 59 percent of those proposals were outside the Geosciences Directorate, which housed the COSEE program. These findings indicated that the COSEE program has reached well beyond its target audience of ocean/geo scientists and indeed has engaged scientists and educators submitting proposals to all NSF Directorates.

COSEE scientists and educators have also been the principal leaders in developing the national Ocean Literacy Essential Principles (OLP) and Fundamental Concepts in the early 2000s and have continued to refine them and develop a

scope and sequence for use by K-12 teachers and informal educators (<http://www.coexploration.org/oceanliteracy/documents/OceanLitChart.pdf>). Through the work of the COSEE OLP group, the Next Generation Science Standards now incorporate substantial Ocean Science content. This is the first time ocean science has been included in national science education standards. COSEE was also the developer of the Great Lakes Literacy Principles (<http://greatlakesliteracy.net/>). These successful initiatives have been emulated by numerous other scientific disciplines, and now there are literacy initiatives for Climate Science (<http://www.globalchange.gov/browse/educators>), Energy Education (<http://energy.gov/eere/education/energy-literacy-essential-principles-and-fundamental-concepts-energy-education>), Atmospheric Science (<http://eo.ucar.edu/asl/>), just to name a few.

COSEE scientists and educators have developed University courses on Communicating Ocean Sciences and Communicating Ocean Sciences for Informal Audiences (COS/COSIA). These courses have now been successfully implemented and incorporated into the curriculum at over 25 universities. Finally, the very formation of the Consortium and the investment of its Charter Members is a testament to the strength and interest in continuing the COSEE mission. For further information on COSEE achievements, more than 50 specific examples of COSEE accomplishments across 10 thematic areas are highlighted on the COSEE website: <http://www.cosee.net/about/highlights/>.







COSEE'S FUTURE

COSEE's first decade built a strong foundation for future ocean science education that embraces new technologies and advances in learning sciences to enhance the understanding of, appreciation for, and stewardship of the ocean. Yet the need for an ocean science network of scientists and educators remains acute.

In December of 2013, the U.S. Ocean Research Advisory Panel published a report on ocean science education with seven key recommendations (<http://www.nopp.org/about-nopp/publications-and-reports/>), one of which stated that an ocean science education “network of networks” is critical as a foundation for the “transformation of ocean

education and STEM [science, technology, engineering, and mathematics] literacy.” It further specified, “this network must have shared, measurable performance metrics focused on achieving a more ocean-literate public and a strong U.S. workforce, as indicators for program and national success.”

In recognition of this critical need and building on the infrastructure of the National COSEE Network, the membership-funded, nonprofit **Consortium for Ocean Science Exploration and Engagement** is the next generation of this highly successful Network. It is the only entity of its kind, and although the Network made great strides in its first decade, COSEE's work is not done.



WHY THE CONSORTIUM?

COSEE is unique among ocean science organizations with its core mission of building bridges between the research and education communities to transform ocean sciences. The Consortium will leverage COSEE's established networks and resources to further strengthen ocean science education across the globe.

COSEE will continue to be the go-to resource for ocean scientists working with ocean science educators by:

- › Ensuring that their work advances discovery and understanding, while also promoting teaching, training, and learning
- › Developing and disseminating learning resources and innovative tools to scientists and educators
- › Sharing innovative approaches for broadening participation in ocean sciences
- › Developing strategies to use ocean observing data in formal and informal science education settings
- › Applying new communication technologies across the formal/informal science education continuum

COSEE will continue to be the go-to resource for ocean science educators working with ocean scientists by:

- › Integrating current ocean science research into education initiatives
- › Bringing the nature of science to educators
- › Presenting the ocean in an Earth system perspective
- › Engaging students traditionally underrepresented in STEM

- › Engaging informal and formal educators and the public in the ocean science enterprise to increase ocean literacy and stewardship
- › Providing mentors and resources to support careers related to marine systems
- › Actively engaging scientists in education initiatives

This is an exciting time to be part of COSEE, as it moves forward to serve the ocean science and science education communities and citizens across the globe. COSEE will broaden and deepen its reach, meeting the 21st century challenge to enhance awareness, understanding, and application of important ocean science research; diversify the ocean science workforce; improve public understanding of critical global environmental issues; and increase stewardship of ocean resources.

COSEE delivers tested, high impact ocean science education programs and products, such as, elementary and secondary education resources; on-line educational tools; new college courses; training for scientists, educators, and graduate students; and tested and evaluated broader impact activities.

With widespread and deeper integration of ocean-related topics into educational initiatives, COSEE fosters workforce development in critical disciplines, such as coastal resiliency, sustainability, and hazard mitigation; ecosystem management; climate prediction, mitigation, and adaptation; and implementation and interpretation of ocean observing technologies.

WHY JOIN COSEE?

Institutions and individuals are invited to join the Consortium.

Membership benefits include:

- › Staying current with advancements and effective practices in ocean sciences education
- › Opportunities to partner with members in activities and proposal development
- › Access to COSEE resources, products, and models
- › Access to the COSEE email listserv to share ideas, questions, and resources
- › Participation in COSEE meetings
- › A seat on the Governing Council (institutional members)
- › Access to “members only” section of the COSEE website
- › Your institution’s name and website link on the COSEE website
- › Opportunity to run for a at large seat on the Governing Council (individual members)
- › Opportunity to join Consortium working groups
- › Opportunity to network with individuals that share similar goals

WWW.COSEE.NET

BECOME A COSEE MEMBER

To become an institutional or individual member, please visit:
www.cosee.net/about/consortium

COSEE receives support through membership dues, grants, and gifts.
To support COSEE’s efforts, please visit: www.cosee.net/about/consortium

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For additional inquiries, please email: coseeinfo@gmail.com