

2010 COSEE Scientist Engagement Survey
Key Findings
April 2011

SUMMARY

This document reports on the second network-wide COSEE Scientist Engagement Survey, which focused on scientist/researchers engaged with COSEE during the 2010 calendar year. From the 872 invitations to take the online survey, we received 492 responses (a high 56% response rate). For an individual count of respondents for analysis, we carefully reviewed the data and eliminated those not involved with COSEE in 2010, those we could not verify from the survey data as scientists (respondents are anonymous), and all duplicates (individuals who responded to two or more Centers' surveys). As a result, we are reporting on the responses of 397 individual scientists/researchers who were engaged with COSEE during 2010.

This 2010 cross-Center survey has generated a second set of reliable, consistent, coherent and comparable data about scientists' engagement in COSEE, and, for this year, the benefits that they derive from COSEE.

Demographics

We found that the scientists engaged with COSEE are a diverse and accomplished group. A substantial majority (67%) holds doctoral degrees, and 42% of those teaching at the postsecondary level are tenured. They are roughly equally early-, mid- and advanced-career professionals (23%, 30% and 27% respectively), and bring to COSEE expertise from a wide range of disciplines. Gender is nearly evenly split (53% male; 47% female) and the racial background is predominantly white (88%). Scientists work at nearly 200 universities, agencies and other institutions located in 34 states and a few foreign countries.

The majority of scientists were engaged with COSEE in 2010 as participants in programs, activities, etc. (70%), but a substantial number also served as resources (41%), were advocates/advisors (23%) and/or partners (24%). Nine percent considered themselves leaders within COSEE. Nearly half (48%) of the respondents receive NSF funding for their scientific research. These results are consistent with those from the COSEE 2009 Scientist Engagement Survey.

This year we asked about the source of funding within NSF. Of those with NSF funding for research, 64% receive support from the Division of Ocean Sciences (OCE). Twenty-nine percent of all respondents have included COSEE or a COSEE partner in a research proposal.

Benefits

This year's survey asked about NSF's "broader impacts" criterion and COSEE's assistance to scientists in meeting that criterion. Seventy percent of scientists say that their level of involvement in "broader impacts" has increased as a result of being involved with COSEE, with 16% indicating it has increased a lot. Asked how helpful COSEE has been with each of NSF's "broader impacts" categories, scientists respond that COSEE has been very helpful with broaden participation (32%), broad dissemination (31%), advance discovery (30%), benefits to society (26%) and enhance infrastructure (19%).

An open-ended question asked scientists to comment on the benefits they have gained from COSEE. The top benefits categories (in order) are: making connections with the formal K-14 education community, including teachers and students; acquiring communications skills and science research "translation" skills; access to a vast education and outreach network; connecting with collaborators and partners; understanding the needs and challenges of the education community; and gaining assistance with NSF-required broader impacts. (*See full summary report for details and Workbook for all comments.*)

COSEE's engagement surveys, which involve all COSEE Centers and the NCO, continue to strengthen network-wide understandings and working relationships. Based on these results, and those from future surveys, COSEE will continue to track and improve the Networks' professional services to the ocean sciences research and education communities.

Survey Background

This network-wide survey was collaboratively developed and administered by the COSEE Evaluation Working Group (EWG), with COSEE Center PIs and evaluators. Inverness Research, Inc., assisted by compiling and tallying the collective set of data. The purpose of this second cross-Center scientist survey was to answer, with a high level of confidence: 1) Who are the scientists engaged with COSEE? and 2) How are they engaged? In addition, building on lessons learned and insights gained from the 2009 COSEE Scientist Engagement Survey and 2009 Educator Engagement Survey, this survey asked about benefits to scientists, in particular, how well COSEE assists with the NSF “broader impacts” criterion and what scientists gain from their relationship with COSEE.

COSEE’s three engagement surveys over the past two years have been envisioned as opportunities to develop and test cross-Center agreed-upon definitions, metrics and processes, but more importantly as ways to generate reliable, consistent and coherent network-wide data about audience participation in COSEE efforts. Results from the surveys are also useful to individual Centers for their own purposes.¹

For the 2010 Scientist Engagement Survey, the EWG modified and added to the 2009 scientist survey. There were 28 key “Tier 1” questions that all Centers were required to include, and 10 optional “Tier 2” questions that Centers could choose to use. All Tier 1 and Tier 2 questions had to be used as worded so results could be compared. All Centers, including newly funded Centers and the National Coordinating Office (NCO), participated in this survey. Some Centers added “Tier 3” questions tailored specifically for their Center (those results are not reported here).

Centers all agreed to survey scientists or researchers who were involved with their COSEE during the 2010 calendar year (from January 2010 to December 2010). In identifying the scientists to invite to take the survey, Centers used the following EWG-developed definition: *Anyone doing marine or aquatic research in a scientific discipline (or who has done research in the past).*

Survey Administration and Response Rates

Centers sent 872 invitations containing a link to the online survey to those whom each Center considered to be a scientist/researcher (per the agreed upon definition) and who had been involved with that Center in 2010. From those invitations, we received 492 responses, for a 56% response rate (lower than the 65% response rate in 2009); however, the EWG considers this to be a strong response rate for this survey.

For a count of individual respondents for analysis, we carefully reviewed the data and eliminated 75 respondents for one or more reasons: they were not scientists, we could not verify that they were scientists based on the data, or they indicated they were not involved with COSEE in 2010. For an individual count, we also deducted duplicates (individuals who responded to two or more Centers’ surveys). As a result, we are reporting on the responses of 397 individual scientists/researchers (81% of all respondents).

Note: The percentage of scientists in this year’s data set is higher than last year’s because, we believe, the Center’s were more conscientious about sending invitations only to scientists. However, we still find discrepancy between the number of COSEE-identified scientists who identify themselves as scientists and those who do not. There may be several reasons for this, including incomplete data (not everyone answers surveys completely), someone other than the intended scientist completed the survey, as well as some whom a Center considers a scientist but who does not identify himself or herself as a scientist.

Results reported in the next sections are for the 397 individual scientists who were involved with COSEE during the 2010 calendar year.

¹ For complete results for all cross-Center surveys, please see the Excel workbooks posted in the Evaluation Working Group folder on the COSEE filemanager.

Results Highlights – Tier 1 Questions (asked by all Centers)**Who are the scientists that are engaged with COSEE?**

Scientists/researchers engaged with COSEE are a diverse and accomplished group. Most work in academic institutions (79%). The remainder work for government agencies (13%), non-profits (5%), businesses (1%) or other (1%). Their main job/primary work roles vary (see chart below).

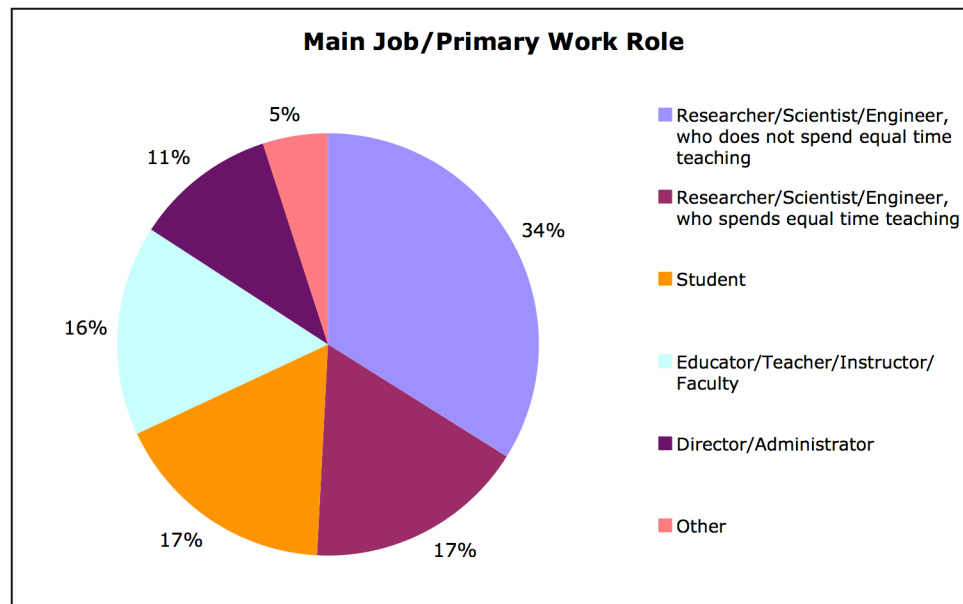


Figure 1. Main jobs/primary roles of scientists engaged with COSEE in 2010

Eleven percent are COSEE staff (receive COSEE funding), and 5% work with multiple COSEE Centers. A substantial majority (67%) holds doctoral degrees (a Tier 2 question asked by 12 of the 14 Centers), and 42% of those teaching at the postsecondary level are tenured.

Scientists involved with COSEE span the range of career stages: 24% are early-career professionals, 30% mid-career professionals, and 27% advanced-career professionals, while 18% are graduate students, 1% retired and 1% other (straddling survey categories). They bring to COSEE expertise from more than 20 different disciplines. The top ones are oceanography (49%), marine biology (44%), ecology (31%), biology (31%) and environmental sciences (30%), but also include earth sciences, fisheries, microbiology, geology, chemistry, physics and meteorology.

In terms of gender and race demographics, gender is nearly evenly split with 47% of the scientists as female and 53% as male, and most (88%) are White. Other races represented are Asian (6%), mixed/multiple races (3%), Black or African-American (2%), and 1% each for American Indian/Alaska Native and Native Hawaiian or other Pacific Islander. Two percent declined to respond and 1% checked "other." To a separate question, 5% indicated that they were of Latino/Hispanic/Spanish heritage.

Scientists work in nearly 200 universities, agencies and other institutions located in 34 states (the largest number in California and Washington), Puerto Rico, and five foreign countries (2%).

Nearly half (48%) of the respondents receive NSF funding for their scientific research, and, of those, 64% receive funding from NSF's Division of Ocean Sciences (OCE). Twenty-nine percent of all respondents have included COSEE or a COSEE partner in a research proposal.

How are scientists engaged with COSEE?

COSEE Scientists play a range of roles within COSEE Centers and the Network (see Figure 2).

Note: Respondents could choose more than one category so the total will be greater than 100%.

The majority (70%) are participants in COSEE activities, events, workshops, etc. More than 40% serve as a resource, making facilities, funds, data or other resources available, as well as conducting presentations, providing information or reviewing materials. About a quarter serve as advisors/advocates for COSEE and a quarter work as partners, creating new products or providing other opportunities. Last, but not least, are the leaders (9%) who are involved in a leadership role, including COSEE PIs.

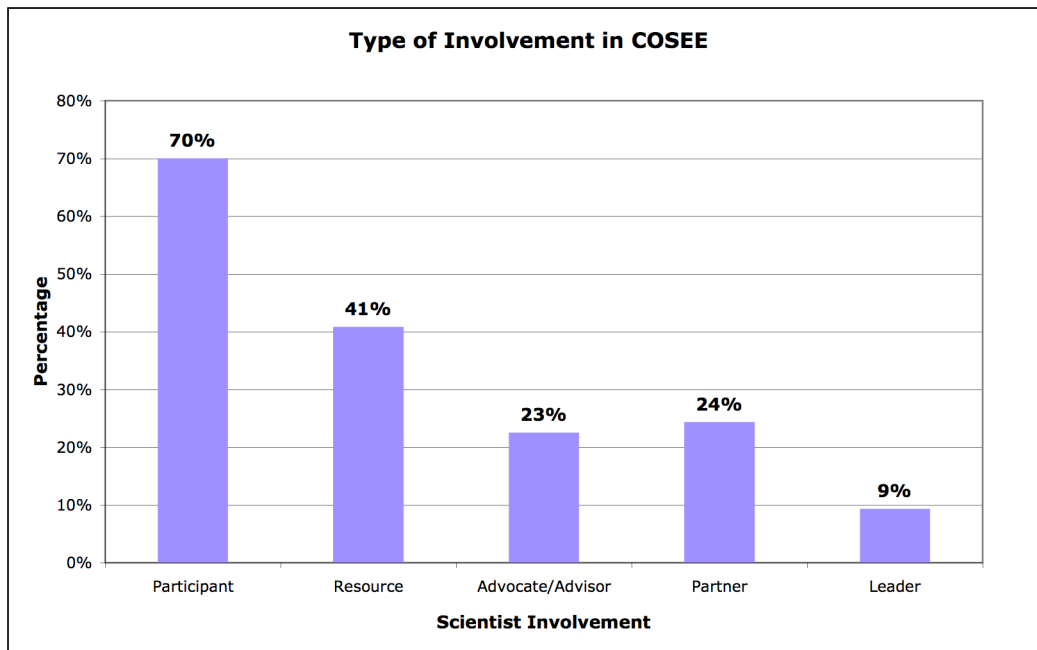


Figure 2. Types of scientist engaged with COSEE in 2010

What are the benefits for scientists?

This year's survey included questions about NSF's "broader impacts" criterion and COSEE's assistance to scientists in meeting that criterion. (See below for details on how we described the five "broader impacts categories in the survey.") When asked what percentage of their work time was spent on "broader impacts" as defined by NSF the average time was 33%, with the range from 0% to 100%. Asked if their level of involvement in "broader impacts" has changed as a result of becoming involved with COSEE, 70% said it has increased, with 16% indicating it has increased a lot. Thirty percent indicated no change.

The survey asked several questions about how helpful COSEE has been with each of NSF's "broader impacts" categories, which were described in the survey as follows:

Advance Discovery: How well does the activity advance discovery and understanding while promoting teaching, training and learning?

- Participate in professional development of educators
- Develop research-based educational materials
- Develop/disseminate effective models and pedagogic approaches

Broaden Participation: How well does the proposed activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc.)?

- Develop research/ed collaborations with underrepresented groups and those serving such groups
- Develop new approaches to engage underserved groups

Enhance Infrastructure: To what extent will it enhance the infrastructure for research and education, such as facilities, instrumentation, networks and partnerships?

- Develop collaborations between disciplines and institutions, in academia, industry, government
- Support the development and dissemination of next-generation instrumentation, facilities, and shared research/ed platforms

Broad Dissemination: Will the results be disseminated broadly to enhance scientific and technological understanding?

- Partner with museums, science centers, and similar institutions on STEM exhibits
- Present research and education results in formats useful to various audiences

Benefits to Society: What may be the benefits of the proposed activity to society?

- Provide information on the potential application of research and education results
- Synthesize research and education results in formats useful for non-scientists

When asked in which NSF categories their involvement has changed as a result of being involved with COSEE, 71% of scientists said broad dissemination, 63% benefits to society, 60% broaden participation, 51% advance discovery and 34% enhance infrastructure.

When asked how helpful COSEE has been with each category, scientists whom COSEE has helped rated in this order: broad dissemination (a mean of 3.8 out of 5.0, and 31% indicating very helpful), broaden participation (mean of 3.7 and 32% very helpful), benefits to society (mean of 3.7 and 26% very helpful), advance discovery (mean of 3.5 and 30% very helpful) and enhance infrastructure (mean of 3.1 and 19% very helpful).

We asked scientists if their association with COSEE had any positive impacts on a variety of “broader impacts” efforts. They responded yes as shown in the following table.

20. Has your association with COSEE had a positive impact on any of the following?

	Yes
Opportunities to engage in education/outreach	80%
Opportunities to work with educators	75%
Your knowledge of science education practices	74%
Your contributions to ocean sciences education in formal or informal venues	73%
Your effectiveness collaborating with educators	73%
Your feelings about the need for ocean science education	69%
Opportunities to present your research to non-scientific audiences	63%
Your effectiveness delivering research presentations to non-scientific audiences	63%
Your ability to develop high quality broader impacts programs	58%
The public's perception of your area of research	57%
Your ability to develop high quality broader impacts proposals	51%
Outreach to underrepresented audiences/groups	50%
Your success in securing funding	23%
Your publication of ocean science education articles	15%

When asked to rate their agreement or disagreement with statements related to their association with COSEE, scientists responded affirmatively as follows.

**21. To what extent do you agree or disagree with each of the following statements?
Has your association with COSEE had a positive impact on... ?**

	Strongly Agree or Agree
Your institution's capacity to participate in education/outreach	63%
Your institution's support of your involvement in education/outreach	57%
The way you teach	56%
Your graduate students' participation in education/outreach	45%
The way you conduct your research	28%
Additional funds from proposal budgets going to education/outreach	27%
Your institution receiving additional funds from participation in education/outreach	27%
The public's demand for your research	22%

The survey included an open-ended question asking scientists to comment on the benefits they have gained from COSEE (n = 223), which ranged from lengthy descriptions of how COSEE has changed careers to those identifying no benefits due to projects not being funded or just getting started. Comments were reviewed for themes and categorized, then tallied. The top benefit categories (in order) are: making connections with the formal K-14 education community, including teachers and students (26% of comments); acquiring communications and science research "translation" skills (21%), access to a vast education and outreach network (19%), connecting with collaborators and partners (15%), understanding the needs and challenges of the education community (12%), and gaining assistance with NSF-required broader impacts (12%). *Note: Percentage of responses for open-ended questions are always lower than for multiple-choice questions because respondents are free to respond as they desire. Detailed comments are in the 2010 COSEE Scientist Engagement Survey Workbook.*

Results Highlights – Tier 2 Questions (optional questions asked by some Centers)

Note: Because these questions were not asked by all Centers, the number (n) of respondents is included for each question, and this number was used to calculate percentages. Details can be found in the 2010 COSEE Scientist Engagement Survey Workbook.

Nine Centers asked for more details about scientists' ethnicity or cultural heritage (n = 229). Of those responding, 72% checked European, 11% indicated "other" and 10% declined to respond (one of the choices). Of the other choices offered, by much smaller percentages were chosen East Asian (5%), Latin American (3%) and Middle Eastern (3%). Each of the following was indicated by 1%: Indian Subcontinent, Native American, Pacific Islands (including Pacific-Islander and specific Pacific Island nationalities, including Filipino) and African.

Although a Tier 2 question, all the Centers asked the scientists if they are an educator/instructor/faculty member. Of the respondents (n = 371), 67% responded yes (n = 247). When asked about their teaching setting, 60% teach in formal education settings, 12% in informal settings and 28% in both. Most teach in large cities (53%); others in small cities (33%), suburban locales (19%) and rural areas (13%). Eight percent indicated that they teach online.

All Centers also asked about the grades or age groups that scientists had taught in 2010 (n = 241). Most teach at a post-secondary level: 68% teach undergraduates and 63% teach graduate students. Of those that teach at this level, 42% are tenured. Twenty-five percent had taught adults/adult groups, and 33% had taught at the K-12 level during the year. Of those who had taught in elementary or secondary schools (n = 60), most of the teaching occurs in public schools (78%). The subjects taught were wide ranging (*see the Workbook for the complete list*).

Almost all Centers asked scientists (n = 156) to estimate the race/ethnicity of the students they had taught in 2010 and the results are shown in the table below.

What was the racial/ethnic mix of your students or groups you taught in 2010?

	Mean	Median	Range
White %	68.3	74.5	5 to 100
Asian %	18.5	10.0	1 to 70
Black or African American %	14.1	9.0	1 to 95
Native Hawaiian or other Pacific Islander %	11.0	5.0	1 to 80
American Indian/Alaska Native %	8.6	5.0	1 to 60
Don't Know %	55.4	100.0	1 to 100
Other %	14.7	10.0	1 to 70
Latino, Hispanic or Spanish heritage %	15.1	10.0	1 to 70

(note: asked as a separate question)

From both the 2009 and 2010 COSEE Scientist Engagement Surveys we have learned a great deal about our key audience and COSEE's impact. Based on these results and from future surveys, we will continue to improve the services and support we offer the ocean sciences research community.