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**COSEE Mid-Atlantic
Ocean Observatory Scientist Survey**

**Final Report
for
2004 - 2007**

August 2008

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Final Report for 2004 - 2007

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COSEE Mid-Atlantic Ocean Observatory Scientist Survey

Final Report for 2004 - 2007

Overview

One of the National Science Foundation's main goals for funding COSEE (Centers for Ocean Sciences Education Excellence) is to promote dialog and partnerships between research scientists and educators. A great deal of research has been conducted on the science literacy and teaching practices of K-12 classroom teachers. Much less is known about scientists' involvement in public education. *Note: We are using the term "public education" to include education and outreach efforts for kindergarten through grade 12 (K-12) classroom teachers and students, the general public, community groups, and coastal managers and decision makers.*

COSEE Mid-Atlantic's focus is education and outreach about ocean observing systems, specifically, enabling teachers to use ocean observing systems data in their classrooms. The purpose of our annual scientist survey is to gather data on the education involvement, practices and needs of scientists at current and future ocean observing systems to improve the exchange of data and teaching practices between scientists and classroom teachers. This report includes the baseline survey results from 2004 (Year 1) and follow-up surveys from 2005 to 2007 (Years 2, 3 & 4).

Methods

As COSEE Mid-Atlantic, we have conducted four online surveys (via SurveyMonkey.com). To solicit respondents, we acquired email addresses from ORION (Ocean Research Interactive Observatory Networks), and we thank them for their assistance. We sent an invitational email with a survey link to scientists, PIs, directors and others. On average, we kept each survey live for 6 weeks. During that time, we sent at least one reminder email before we closed each survey. To encourage participation, we offered entry into a drawing for a gift card as an incentive. The incentive was different each year. Although our focus is on U.S. sites, we have received and included responses from sites around the world.

Near the beginning of the online survey we asked respondents to indicate their main job/title. Those who selected "Researcher/Scientist" or "Director/PI," we have classified as "scientists" and are reporting only their responses here. The 2004 baseline survey was conducted in December 2003/January 2004; the 2005 survey in January 2005; the 2006 survey in February/March 2006; and the final survey under this COSEE grant was in January/February 2007. *Note: We've continued this project as COSEE NOW, conducting a survey in early 2008. Those results are reported separately due to changes in the survey's focus and questions.*

The table below shows the number of respondents and response rates for each of the surveys. We have estimated the response rate based on the number of email solicitations divided by the number of respondents. This is an estimate due to possible duplications or inaccuracies on the email lists.

Survey	# on Email List (approx.)	Total Respondents	Estimated Response Rate	Scientist Respondents
2004	318	100	31%	80
2005	285	48	17%	48
2006	350	98	28%	89
2007	435	134	31%	98

Results Highlights

Below are highlights of the results from four online surveys conducted annually from 2004 to 2007. To date we have tracked a few trends and found some consistencies from year to year.

- In terms of trends, we have seen increases in...
 - the number of ocean observatories / observing systems that are operational and collecting data (at least most of the time): from 48% in 2005 to 58% in 2007.
 - the percentage of scientists who say they're involved in education / outreach: 74% in 2004, 69% in 2005, 73% in 2006 and 77% in 2007.
 - support for scientists' involvement in education as indicated by a decrease in those disagreeing with, "I don't have my institution's / agency's support to get involved in public education" (46% in 2004; 49% in 2005; 39% in 2006; 38% in 2007).
- Consistently, most ocean observatory scientists have been positive about their role in education. The majority (85% in 2004; 86% in 2005; 79% in 2006; 75% in 2007) agreed with the statement, "It's important for me to get involved in public education / outreach." However, over the four years the percentages have trended downward and in both 2006 & 2007 we saw a greater percentage (20%) who were "undecided."
- Of those respondents who said they are involved in education / outreach between half to two-thirds are required by funding to conduct public education (55% in 2004; 63% in 2005; 55% in 2006; 63% in 2007).
- We asked if they had someone on staff dedicated to public education / outreach and saw a downward trend: 51% stated no in 2004; 53% in 2005; 61% in 2006 and 65% in 2007. Of those who stated yes, we found changes in full-time staff (12 months per year): from 38% in 2004; 33% in 2005; 57% in 2006; 31% in 2007. During that time, we saw an increase in part-time staffing (less than 12 months), from 58% in 2004 to 68% in 2007.
- When asked to indicate which education / outreach activities they were currently involved in, we saw consistency in the top activities (although levels of involvement changed from year to year). The top responses were:
 - contributing to websites (76% in 2004; 82% in 2005; 77% in 2006; 78% in 2007),
 - working with science educators on programs / materials for K-12 teachers and students (37% in 2004; 57% in 2005; 46% in 2006; 40% in 2007)
 - presenting at public / decision-maker meetings (35% in 2004; 41% in 2005; 37% in 2006; 39% in 2007)
 - working with science educators on programs / materials for the public (31% in 2004; 50% in 2005; 39% in 2006; 38% in 2007),
 - presenting at K-12 teachers at workshops / meetings (21% in 2004; 50% in 2005; 29% in 2006; 31% in 2007), and
 - presenting in K-12 classrooms (35% in 2004; 36% in 2005; 35% in 2006; 29% in 2007).
- When asked about the best way to involve scientists in public education, the top choice again was "giving talks / presentations" (16%* in 2004; 60% in 2005; 61% in 2006; 69% in 2007). That was followed by "as an advisor on science content" (47% in 2005; 60% in 2006; 49% in 2007). A consistent third choice (although lower this year) was teacher professional development workshops (10%* in 2004; 58% in 2005; 51% in 2006; 40% in 2007). *Note: This was an open-ended question in 2004, which is why the percentage is lower than those in the years that follow.
- Results regarding the "greatest public benefit" to having scientists involved in public education have been consistent. The top three choices were "increasing public's understanding of science" (23%* in 2004; 47% in 2005; 53% in 2006; 50% in 2007), "assisting with management, policy & decision making" (18%* in 2004; 38% in 2005; 29% in 2006; 31% in 2007) and "increasing public's appreciation of science" (21%* in

2004; 29% in 2005; 29% in 2006; 27% in 2007). **Note: This was an open-ended question in 2004, which is why the percentage is lower than those in the years that follow.*

- The greatest barriers to getting involved in public education remained consistent: lack of time (42%* in 2004; 62% in 2005 - 2007) and lack of money (34%* in 2004; 51% in 2005; 49% in 2006; 40% in 2007). **Note: This was an open-ended question in 2004, which is why the percentage is lower than those in the years that follow.*
- In 2007, we asked respondents who were the main education / outreach audiences for ocean observing systems data. When allowed to choose as many responses as they wanted, the top responses were: other scientists (77%), decision makers (governments, agencies, etc.), college teachers / students and high school teachers / students (76% each), science literate public (75%) and informal education institutions (72%). When asked the same question but allowed to check only one response, the top responses were: decision makers (19%), other scientists (15%), college teachers / students and science literate public (13% each), and high school teachers / students (12%).
- When asked how to involve K-12 schools / the public in research, the top response again was through websites or web products (25%* in 2004; 65% in 2005; 49% in 2006; 56% in 2007). Next was “partnering on projects” (11%* in 2004; 44% in 2005; 37% in 2006; 39% in 2007). Again, we saw a willingness to include teachers, students and the public on sampling trips / cruises (11%* in 2004; 33% in 2005; 43% in 2006; 37% in 2007) and in the field / on field trips (10%* in 2004; 22% in 2005; 35% in 2006; 35% in 2007). **Note: This was an open-ended question in 2004, which is why the percentage is lower than those in the years that follow.*
- On the 2005, 2006 and 2007 surveys, we asked a variety of questions about “broader impact statements” or similar initiatives. Most respondents were familiar with such: 86% in 2005, 83% in 2006 and 88% in 2007 said yes. This year when asked if such initiatives benefit public education, 33% said yes (26% in 2006) and 26% said probably (25% in 2006). When asked if they benefit research, 24% said yes (18% in 2006) and 20% said probably (23% in 2006).
- Scientists continued to say they needed help with public education. About two-thirds (69% in 2004; 68% in 2005; 62% in 2006; 69% in 2007) agreed with the statement, “I could use help on how to work with the public.” In the response to the statement “I could use help on how to work with K-12 teachers,” 66% agreed in 2004, 73% in 2005, 59% in 2006 and 72.5% in 2007.
- When asked what assistance they need to get more involved or do a better job at public education, the top responses were related to more funding or financial help (45% in 2004; 41% in 2005; 43% in 2006; 48% in 2006), as well as staffing (linked to financial assistance) and more time. Communication issues between scientists and educators and among federal agencies also arose as an issue on this year’s survey.
- In 2007 when asked how a COSEE dedicated to ocean observing systems could best support scientists’ education / outreach work, 73% chose “increase public awareness about the importance of the ocean,” 64% chose “develop opportunities for scientists and educators to work together,” and 61% (for each) chose “work to get ocean sciences research to decision makers to improve public policy” and “bring together scientists and educators to improve science education.”
- Respondents indicated an increasing familiarity with COSEE until this year (57% in 2004; 84% in 2005; 89% in 2006; 79% in 2007). They also became more familiar with *Scientist Connections* on our website (21% in 2005; 30% in 2006; 31.5% in 2007). This year 27% said they were familiar with *Education and Public Outreach – A Guide for Scientists* and 18.5% with the Communicating Ocean Science (COS) course, both COSEE projects.

The full report with more details follows this Results Highlights section.

Results

There were a few question additions/ deletions each year, and so question numbers for each year are indicated as such: 2004 are plain; 2005 are in (parentheses); 2006 are in [brackets]; and 2007 are in {braces}. Results for the same question from each year are presented side by side for comparison.

For most questions with close-ended response choices (i.e., multiple choice or rating scale), we are reporting frequencies and percentages. For questions requiring open-ended responses (which are noted), we have organized and tallied responses based on categories and are reporting only the top response categories.

1(1)[1]{1}. Institution/Agency Name.

3(3)[3]{3}. Ocean Observatory Name.

See Appendix 2.

5(5)[5]{27}. Your Name

Not included in this report to assure anonymity.

2(2)[2]{2}. Type of Institution/Agency.

Response Choices	2004 (n=80)		2005 (n=48)		2006 (n=89)		2007 (n=98)	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
academic	63	79%	34	71%	69	78%	76	78%
government	7	9%	1	2%	2	2%	9	9%
nonprofit	6	8%	10	21%	14	16%	8	8%
business	1	1%	3	6%	3	3%	5	5%
research/academic	2	3%	—	—	—	—	—	—
independent	1	1%	—	—	—	—	—	—

Note: The last two response choices were included only on the 2004 survey.

(4)[4]{4}. Is your ocean observatory up and running (that is, collecting data)?

Response Choices	2005 (n=48)		2006 (n=89)		2007 (n=98)	
	Frequency	%	Frequency	%	Frequency	%
yes	14	29%	35	39%	44	45%
most of the time	9	19%	9	10%	13	13%
no	24	50%	41	46%	33	34%
not sure/ don't know	1	2%	4	5%	8	8%

Note: This question was not asked in 2004.

6(6)[6]{5}. Your main job title/role. Choose from a pull-down menu.

Response Choices	2004 (n=79)		2005 (n=46)		2006 (n=89)		2007 (n=98)	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Researcher/Scientist	35	45%	24	52%	46	52%	65	66%
Director/PI	36	46%	12	26%	35	39%	33	34%
Other (write-in responses)	8	9%	10	22%	8	9%	0	0%

7. What's the main focus of your research?

(7)[6]{6}. What's the main focus of your research and/or job as it relates to your ocean observatory?

Response Categories	2004 (n=80)		2005 (n=46)		2006 (n=87)		2007 (n=90)	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
physical processes/ oceanography	28	35%	9	20%	25	29%	21	23%
admin./management	1	1%	6	13%	25	29%	20	22%
engineering/hardware R&D	12	15%	12	26%	15	17%	20	22%
earth science/geology	22	28%	8	17%	12	14%	10	11%
biology	24	30%	8	17%	18	21%	9	10%
ecology	17	21%	8	17%	9	10%	7	8%
chemistry/biochem	11	14%	6	13%	6	7%	7	8%
data transfer/analysis	1	1%	5	11%	5	6%	7	8%
education	5	6%	9	20%	7	8%	6	7%

Note: This is an open-ended question. Because many respondents offered more than one response, the totals may equal more than 100%. Only the top responses are reported here with some slight adjustments to category names from previous years to better track responses.

8(8)[7]{7}. As part of your funding, are you required to conduct public education?

Response Choices	2004 (n=79)		2005 (n=46)		2006 (n=89)		2007 (n=98)	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
yes	44	55%	29	63%	49	55%	62	63%
no	26	33%	13	28%	35	39%	28	29%
not sure/ don't know	9	11%	4	9%	8	8%	8	8%

{8}. Who do you think are the main education/outreach audiences for ocean observing systems data? (check all that apply)

Response Choices	2007 (n=95)	
	Frequency	%
other scientists	73	77%
decision makers (governments, agencies, etc.)	72	76%
college/university teachers & students	72	76%
high school teachers & students	72	76%
science literate public	71	75%
informal education institutions (aquariums, science centers, etc.)	68	72%
middle school teachers & students	59	62%
media/press	59	62%
community college/technical school teachers & students	49	52%
elementary school teachers & students	42	44%
other (please specify) see responses in Appendix 3	14	15%

Note: This question was not on earlier surveys.

{9}. If you were to choose one audience, who do you think should be the main education/outreach audience for ocean observing systems data? (check one)

Response Choices	2007 (n=95)	
	Frequency	%
decision makers (governments, agencies, etc.)	18	19%
other scientists	14	15%
college/university teachers & students	12	13%
science literate public	12	13%
high school teachers & students	11	12%
informal education institutions (aquariums, science centers, etc.)	7	7%
media/press	7	7%
middle school teachers & students	5	5%
elementary school teachers & students	3	3%
community college/technical school teachers & students	0	0%
other (please specify) see responses in Appendix 3	6	6%

Note: This question was not on earlier surveys.

9. What's the greatest public benefit to having scientists/researchers like you involved in public education?

(9){8}{10}. What do you view as the greatest public benefit to having scientists/researchers like you involved in public education? (check your top one or two)

Response Choices	2004 (n=79)		2005 (n=45)		2006 (n=89)		2007 (n=94)	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
increasing public's understanding of science	18	23%*	21	47%	47	53%	47	50%
assisting with management, policy & decision making	14	18%*	17	38%	26	29%	29	31%
increasing public's appreciation of science	17	21%*	13	29%	26	29%	25	27%
presenting the benefits and relevance of research	21	26%*	22	49%	22	25%	19	20%
providing accurate information	13	16%*	8	18%	20	22%	19	20%
focusing attention on environmental issues	21	26%*	8	18%	9	10%	14	15%
serving as a model and motivator for teachers & students	20	25%*	12	27%	18	20%	13	14%
other (please specify)	—	—	2	4%	2	2%	1	1%

*Note: In 2004 this was an open-ended question and so percentages will be lower than for 2005 - 2007 when we changed this to a multiple-choice question (based on 2004 responses). Only the top responses are reported for 2004. Because some respondents offered more than one response, the total may equal more than 100%.

10(10)[9]{11}. What's the greatest barrier you face getting involved in public education?
(check your top one or two)

Response Choices	2004 (n=79)		2005 (n=45)		2006 (n=89)		2007 (n=94)	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
lack of time	34	43%*	28	62%	55	62%	58	62%
lack of financial support	25	34%*	23	51%	44	49%	38	40%
lack of staff	5	6%*	14	31%	20	22%	24	25.5%
no acknowledgment by my institution/agency	6	9%*	3	7%	5	6%	11	12%
not sure what K to 12 teachers & students need	1	1%*	4	9%	8	9%	7	7%
not sure what the public needs	2	3%*	4	9%	7	8%	6	6%
not sure how to get involved	2	4%*	2	4%	3	3%	5	5%
the public's not interested	—	—	1	2%	2	2%	1	1%
I'm not interested	—	—	1	2%	0	0%	0	0%
other (please specify) see responses in Appendix 3	4	5%*	3	7%	9	10%	9	10%

*Note: In 2004 this was an open-ended question and so percentages will be lower than for 2005 - 2007 when we changed this to a multiple-choice question (based on 2004 responses). Only the top responses are reported for 2004. Because some respondents offered more than one response, the total may equal more than 100%.

11(11)[10]{12}. What's the best way to involve someone like you in public education?
What would be the best use of your time? (check all that apply)

Response Choices	2004 (n=79)		2005 (n=45)		2006 (n=89)		2007 (n=94)	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
giving talks/presentations	13	16%*	27	60%	54	61%	65	69%
as an advisor on science content	—	—	21	47%	53	60%	46	49%
assisting with teacher professional development/workshops	8	10%*	26	58%	45	51%	38	40%
contributing website data/content	7	9%*	20	44%	34	38%	29	31%
as an advisor on how to do science	—	—	12	27%	25	28%	26	28%
involving others in my research	5	6%*	10	22%	17	19%	23	24.5%
conducting tours of my facility/lab	5	6%*	6	13%	20	22%	9	10%
other (please specify) see responses in Appendix 3	—	—	9	20%	3	3%	13	14%
school outreach (2004 only)	5	6%*	—	—	—	—	—	—
as an advisor/consultant in general (2004 only)	6	8%*	—	—	—	—	—	—

*Note: In 2004 this was an open-ended question and so percentages will be lower than for 2005 - 2007 when we changed this to a multiple-choice question (based on 2004 responses). Only the top responses are reported for 2004. Because some respondents offered more than one response, the total may equal more than 100%.

— indicates that response choice was not offered that year.

12. How might scientists/researchers, such as yourself, involve K to 12 schools or the public in your research?

(12)[11]{13}. What's the best way to involve K to 12 students, teachers, decision makers and/or the public in your research? (check all that apply)

Response Choices	2004 (n=79)		2005 (n=45)		2006 (n=89)		2007 (n=94)	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
through website/ web products	18	25%*	29	65%	44	49%	53	56%
partnering on projects/ partnerships	8	11%*	20	44%	33	37%	37	39%
on sampling trips/ cruises	8	11%*	15	33%	38	43%	35	37%
attending talks/ presentations	9	13%*	19	42%	35	39%	33	35%
on field trips	7	10%*	10	22%	31	35%	33	35%
assisting as staff/ interns/ volunteers	6	8%*	19	42%	34	38%	31	33%
data processing	12	17%*	5	11%	9	10%	8	8.5%
other (please specify) see responses in Appendix 3	—	—	3	7%	11	12%	11	12%

*Note: In 2004 this was an open-ended question and so percentages will be lower than for 2005 - 2007 when we changed this to a multiple-choice question (based on 2004 responses). Only the top responses are reported for 2004. Because some respondents offered more than one response, the total may equal more than 100%.

13(13)[12]{14}. Are you currently involved in public education/outreach?

Response Choices	2004 (n=79)		2005 (n=46)		2006 (n=89)		2007 (n=94)	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
yes	56	74%	31	69%	65	73%	72	77%
no	17	22%	14	31%	23	26%	19	20%
not sure/ don't know	3	4%	0	0%	1	1%	3	3%

14. From this list of public education/outreach activities, check all of those in which you are currently involved.

(16)[15][17]. From this list of activities, check all of those in which you are currently involved. (check all that apply)

Response Choices	2004 (n=75)		2005 (n=44)		2006 (n=89)		2007 (n=94)	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
contribute data, content or other services to a public website	57	76%	36	82%	69	77%	73	78%
consult with science educators/ education specialists on the development of programs and/or materials for K to 12 teachers and students	28	37%	25	57%	41	46%	38	40%
present to the public or coastal managers at community meetings	26	35%	18	41%	33	37%	37	39%
consult with science educators/ education specialists on the development of programs and/or materials the public	23	31%	22	50%	35	39%	36	38%
present at K to 12 teachers at workshops or meetings	16	21%	22	50%	26	29%	29	31%
present/ talk to K to 12 students in the classroom	26	35%	16	36%	32	35%	27	29%
provide funding for science educators/ education specialists to work with teachers and/ or the public	14	19%	12	27%	19	21%	26	28%
involve public or coastal managers in research	16	21%	7	16%	12	13%	18	19%
conduct lab or field experiences for K to 12 teachers	15	20%	8	18%	23	26%	15	16%
involve K to 12 teachers in research	11	15%	8	18%	12	13%	13	14%
none of the above	3	4%	4	9%	4	4%	8	8.5%
conduct lab or field experiences for the public or coastal managers	13	17%	4	9%	13	15%	7	7%
conduct lab or field experiences for K to 12 students	11	15%	8	18%	11	12%	7	7%
involve K to 12 students in research	10	13%	5	11%	7	8%	6	6%
other (please specify) see responses in Appendix 3	19	26%	2	5%	14	16%	9	10%

15(14)[13]{15}. Do you have someone on staff whose job or majority of time is dedicated to public education and/or outreach?

Response Choices	2004 (n=75)		2005 (n=45)		2006 (n=89)		2007 (n=94)	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
no	38	51%	24	53%	54	61%	61	65%
yes	32	43%	21	47%	30	34%	30	32%
not sure/ don't know	5	7%	0	0%	5	5%	3	3%

16. If yes, how much time (in terms of months per budget year)?

(15)[14]{16}. If yes, approximately how much time (in terms of months per budget year) does that person spend on public education?

Response Choices	2004 (n=32)		2005 (n=21)		2006 (n=30)		2007 (n=29)	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
0 months	1	3%	0	0%	0	0%	0	0%
1	4	13%	2	8%	2	7%	1	3%
2	3	9%	1	4%	0	0%	2	7%
3	3	9%	2	8%	1	3%	1	3%
4	1	3%	1	4%	2	7%	5	17%
5	1	3%	0	0%	0	0%	0	0%
6	3	9%	2	8%	0	0%	6	21%
7	0	0%	0	0%	1	3%	0	0%
8	1	3%	4	16%	1	3%	0	0%
9	1	3%	0	0%	1	3%	2	7%
10	2	6%	1	4%	3	10%	2	7%
11	0	0%	0	0%	1	3%	1	3%
12 months	12	38%	8	33%	17	57%	9	31%

Note: In 2004 this was an open-ended question. In 2005 - 2007, this question was a pull-down menu from which respondents could choose a response. Only those who answered yes to the previous question are included here.

17(17)[16][18]. How much you agree or disagree with each of the following statements?

Response Choices	2004 (n = 75)	2005 (n = 43)	2006 (n = 89)	2007 (n = 92)	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
	a. It's important for me to get involved in public education.	32%	44%	29%	36%	53%	42%	20%	5%
b. I could use help on how to work with K to 12 teachers.	15%	26%	10%	18.5%	51%	47%	21%	13%	3%
c. It's important for me to work directly with teachers, K to 12 students and/or the public.	21%	30%	21%	16%	49%	33%	30%	14%	3%
d. I enjoy interacting with K to 12 students.	33%	35%	20%	20%	44%	37%	48%	4%	0%
e. I don't have my institution's/agency's support to get involved in public education.	12%	5%	9%	9%	23%	19%	22%	29%	9%
f. I enjoy working with K to 12 teachers on science education issues.	27%	28%	22%	20%	43%	47%	40%	0%	0%
g. It doesn't benefit me to get involved in public education.	7%	2%	6%	4%	16%	7%	13%	12%	25%
h. I could use help on how to work with the public.	20%	19%	13%	16%	49%	49%	49%	12%	4%

18(18)[17][19]. Are you familiar with any of the following?

Response Choices	2004 (n = 75)			
	2005 (n = 43)	Yes	No	Not sure
	2006 (n = 89)			
	2007 (n = 92)			
Center for Ocean Science Education Excellence (COSEE)	57%	40%	3%	
	84%	12%	5%	
	89%	10%	1%	
	79%	21%	0%	
Coastal Ocean Observation Lab (COOL)	51%	48%	1%	
	88%	9%	2%	
	72%	26%	2%	
	76%	23%	1%	
COOL Classroom web curriculum	35%	63%	3%	
	70%	28%	2%	
	57%	39%	3%	
	65%	33%	2%	
Marine Activities Resource & Education (MARE)	17%	79%	4%	
	28%	67%	5%	
	26%	72%	2%	
	33%	66%	1%	
Gulf Stream Voyage website & curriculum	5%	92%	3%	
	7%	91%	2%	
	8%	91%	1%	
	12%	88%	0%	
Ocean Observatories with Zeal for Education (OOZE)	7%	93%	0%	
	7%	91%	2%	
	2%	98%	0%	
	1%	99%	0%	
<i>Scientist Connections on COSEE-MA website (added to survey in 2005)</i>	—	—	—	
	21%	70%	9%	
	30%	65%	5%	
	31.5%	66%	2%	
<i>Striper Tracker website (added to survey in 2005)</i>	—	—	—	
	16%	81%	2%	
	11%	89%	0%	
	18.5%	81.5%	0%	
<i>Education and Public Outreach—A Guide for Scientists (added to survey in 2007)</i>	—	—	—	
	—	—	—	
	—	—	—	
	27%	72%	1%	
<i>Communicating Ocean Science (COS) college course (added to survey in 2007)</i>	—	—	—	
	—	—	—	
	—	—	—	
	18.5%	81.5%	0%	
<i>The Pulse e-newsletter for scientists (added to survey only in 2006)</i>	—	—	—	
	—	—	—	
	6%	92%	2%	
	—	—	—	

Note: Not every choice has been included every year.
— indicates that the response choice was not offered that year.

(19)[18]. If you've visited the Scientist Connections on the COSEE-MA website, use this rating scale to tell us how beneficial you found it.

not useful at all

extremely useful N/A

Response Choices	1	2	3	4	5	6	7	not applicable
2005 n = 43	0%	0%	2%	5%	7%	0%	7%	79%
2006 n = 87	0%	0%	0%	1%	14%	2%	0%	83%

Note: This question was not asked in 2004 or 2007.

[19]. If you received *The Pulse* e-newsletter, use this rating scale to tell us what you thought of it.

not at all

For 2006, n=87

extremely N/A

Response Choices	1	2	3	4	5	6	7	not applicable
Interesting	0%	0%	0%	0%	1%	2%	0%	97%
Usefulness	0%	0%	0%	0%	1%	2%	0%	97%

Note: This question was not asked in 2004, 2005 or 2007.

{20}. The COSEEs are funded by an NSF Research Directorate and one of the mandates is to support the education/outreach/communication needs of scientists. We'd like to know how a COSEE dedicated to ocean observing systems (OOS) could best support your work. (Please check your top priorities)

Response Choices	2007 (n=92) Frequency	%
increase public awareness about the importance of the ocean	67	73%
develop opportunities for scientists and educators to work together	59	64%
work to get ocean sciences research to decision makers to improve public policy	56	61%
bring together scientists and educators to improve science education	56	61%
increase public awareness about OOS and related research	49	53%
train scientists on how to work with educators	43	47%
train educators on how to work with scientists	34	37%
recruit/ train diverse undergrad/ grad students to work in the OOS community	22	24%
recruit/ train more undergrad/ grad students as researchers for the OOS community	19	21%
recruit/ train more undergrad/ grad students as technicians for the OOS community	17	18.5%
other (please specify) see responses in Appendix 3	4	4%

Note: This question was not on earlier surveys.

(20)[20]{21}. Are you familiar with “broader impact statements” or other initiatives that include public education as part of research proposals and projects?

Response Choices	2005 (n=42)		2006 (n=87)		2007 (n=92)	
	Frequency	%	Frequency	%	Frequency	%
yes	36	86%	72	83%	81	88%
no	6	14%	12	14%	10	11%
not sure / don't know	0	0%	3	3%	1	1%

Note: This question was not asked in 2004.

[21]{22}. Do you think such initiatives benefit public education?

Response Choices	2006 (n=87)		2007 (n=92)	
	Frequency	%	Frequency	%
yes	23	26%	30	33%
probably	30	35%	24	26%
not sure	25	29%	28	30%
no	2	2%	6	6.5%
definitely not	0	0%	0	0%
no opinion	7	8%	4	4%

Note: This question was not asked in 2004 & 2005.

[22]{23}. Do you think such initiatives benefit research?

Response Choices	2006 (n=87)		2007 (n=92)	
	Frequency	%	Frequency	%
yes	16	18%	22	24%
probably	20	23%	18	20%
not sure	34	39%	30	33%
no	11	13%	16	17%
definitely not	0	0%	4	4%
no opinion	6	7%	2	2%

Note: This question was not asked in 2004 & 2005.

(21). Do you think such initiatives are a good way to facilitate a linkage between scientific research and public education?

Response Choices	2005 (n=42)	
	Frequency	%
yes	15	36%
probably	15	36%
not sure	6	14%
no	0	0%
definitely not, do more harm than good	2	5%
no opinion	4	10%

Note: This question was asked in 2005 only.

(22). Do you think such initiatives are needed to facilitate a linkage between scientific research and public education?

Response Choices	2005 (n=42) Frequency	%
yes	13	31%
probably	17	40%
not sure	6	14%
no	2	5%
definitely not	0	0%
no opinion	4	10%

Note: This question was asked in 2005 only.

(23.) Do you have any ideas/suggestions on better ways to facilitate linkages between scientific research and public education?

Response Categories	2005 (n=22) Frequency	%
more communication between educators and scientists	9	41%
provide a forum for scientists, educators and others to partner up	3	14%
have funders require and fund partnerships	2	9%
encourage real science projects in K-12 classrooms	2	9%
other (<i>individual responses</i>)	9	—

Note: This was an open-ended question asked only in 2005. Only the top responses are reported here.

[23]. What are your concerns (if any) about such initiatives?

Response Categories	2006 (n=37) Frequency	%
education at the expense of science	13	35%
funds aren't supporting quality education/ no commitment to quality ed	12	32%
unfunded mandate/inadequate funding for education	8	22%
no assessment of effectiveness	3	8%
scientists not skilled in education	3	8%
no agency monitoring	3	8%
other (<i>individual responses</i>)	5	—

Note: This was an open-ended question asked only in 2006. Only the top responses are reported here and due to multiple responses, the total equals more than 100%.

19(24)[24]{24}. What assistance do you need to get more involved in or do a better job at public education?

Response Categories	2004 (n=70)		2005 (n=27)		2006 (n=58)		2007 (n=52)	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
more funding / financial help	33	45%	11	41%	25	43%	25	48%
staff (if funded, would provide time)	11	15%	4	15%	11	19%	11	21%
time	16	22%	9	33%	15	26%	10	19%
better coordination & communication between scientists and educators	—	—	—	—	—	—	7	13%
institution recognition / support	7	10%	2	7%	7	12%	5	10%
information / direction on what's needed &/ or how to meet needs	6	8%	3	11%	2	3%	4	8%
changes at NSF / federal level	—	—	—	—	—	—	4	8%
people / group to translate science to education	—	—	—	—	6	10%	2	4%
information on what works in education	7	10%	8	30%	4	7%	2	4%
networking / partners / match-making with teachers	6	8%	3	11%	7	12%	—	—
information on resources to help	8	11%	4	15%	—	—	—	—
see all 2007 responses in Appendix 4								

Note: This is an open-ended question. Only the top responses are reported here and due to multiple responses, the total equals more than 100%.

[25]{25}. Would you like any of the following from us? (check all you'd like)

Response Choices	2006 (n=71)		2007 (n=70)	
	Frequency	%	Frequency	%
entry in the drawing for the gift card	58	82%	52	74%
a copy of the results of this survey	55	78%	48	69%
a copy of <i>Education and Public Outreach— A Guide for Scientists</i>	—	—	48	69%
someone from COSEE-MA to contact you about your ed needs	7	10%	4	6%
other (individual responses)	4	6%	1	1%

Conclusions & Recommendations

The results from our four observatory scientist surveys have shown a few trends and some consistencies from year to year. However, we recommend caution regarding conclusions. Even though we've surveyed the same population (ORION's email list), survey respondents have self-selected and so are not necessarily the same individuals from year to year.

In terms of trends, we have seen steady increases in the number of ocean observatories / observing systems that are operational and collecting data, the percentage of observatory scientists who say they're involved in education / outreach, and some increase in support for scientists' involvement in education.

In terms of consistencies, ocean observatory scientists are positive about their role in education, believing in its value; however, the percentage agreeing has trended downward since 2005. Scientists continue to say they need help with public education. When asked what assistance they need, the top responses were consistently related to more funding or financial help, more time and staffing (which was linked to financial assistance and time).

Finally, when asked how a COSEE dedicated to ocean observing systems could best support observatory scientists' education/outreach efforts, top choices were "increase public awareness about the importance of the ocean," "develop opportunities for scientists and educators to work together," "work to get research to decision makers to improve public policy" and "bring together scientists and educators to improve science education."

Based on the results in this report, the evaluator offers the following recommendations:

- Continue to encourage and support ocean observatory scientists' involvement in public education—they believe in its value although they're sounding a bit frustrated.
- Reduce barriers to ocean observatory scientists' involvement by assisting with financial support and staffing and by developing incentives, such as working with institutions/agencies to acknowledge research scientists' role in public education.
- Provide ocean observatory scientists with information on best practices for public education, especially developing and delivering websites/web products, making public presentations and contributing to teacher professional development (their main education activities).
- Continue to provide ocean observatory scientists with opportunities to interact with science educators to develop educational programs and materials.
- Provide ocean observatory scientists more opportunities to interact with classroom teachers and the public (in addition to giving talks as most said they currently do).
- Work with observatory scientists who have successfully engaged the public in their research to develop a "how to" primer and offer training or mentoring to encourage more scientists to engage with the public.
- Develop venues for observatory scientists where they can showcase what they believe are the greatest benefits of being involved in public education: increasing the public's understanding of science and the ocean, increasing the public's appreciation of science, and assisting with management, policy and decision making.
- Research/evaluate scientists' involvement in public education to determine a catalog of best practices based on what has been shown to work.

As COSEE NOW, with our continuation of these annual scientist surveys and the development of a virtual meeting space, we hope to continue our collaboration with scientists and the entire ocean observing systems community to improve public education.

APPENDICES

APPENDIX 1
SURVEY INSTRUMENTS

*This report includes all of the questions asked on all four online surveys.
For a copy of a survey instrument as it appeared online (for any years reported here),
contact
Chris Parsons at cp@word-craft.com.*

APPENDIX 2 ACKNOWLEDGMENTS

We graciously thank all those from the following institutions and/or agencies (*listed alphabetically each year*) who responded to our survey. The data they provided have been insightful and invaluable.

In 2004

Bigelow Laboratory for Ocean Sciences
California Polytechnic State University
Coastal Carolina University
College of Charleston
Dalhousie University
Florida Atlantic University
Florida State University
Hampton University
Ifremer
International SeaKeepers Society
IRIS
Japan Marine Science and Technology Center
Lamont Doherty Earth Observatory (LDEO)
Laval University Québec Canada
Memorial University of Newfoundland
Monterey Bay Aquarium Research Institute
NC State University
NC Sea Grant
NASA/GSFC
Ocean US
Oregon State University/COAS
Prince William Sound Science Center
Princeton University
Rutgers University IMCS
San Diego State University
Scottish Association for Marine Science
Scripps Institution of Oceanography
Skidaway Institute of Oceanography
Stevens Institute of Technology
Texas A&M University
United States Naval Academy
University of Alaska Fairbanks
University of California at Santa Cruz
University of Delaware
University of Hawaii
University of Maine
University of Maryland Center for Environmental Science, Horn Point Laboratory
University of New Hampshire
University of North Carolina at Chapel Hill
University of Puerto Rico Mayaguez Campus
University of South Florida
University of Victoria Canada
University of Washington
Virginia Institute of Marine Science, College of William and Mary
WET Labs
Woods Hole Oceanographic Institution

In 2005

Applied Physics Lab, University of Washington
Oregon State University, COAS
College of Charleston
Fugro Seafloor Surveys, Inc.
Lamont-Doherty Earth Observatory of Columbia University
MBARI
Memorial University of Newfoundland
Mote Marine Laboratory
National Institute of Oceanography
Ocean Design Inc
Rutgers University
Scripps Institution of Oceanography
SDSU (San Diego State University)
Skidaway Institute of Oceanography
Stevens Institute of Technology
Texas A&M University
UCSB (University of Calif, Santa Barbara)
UNH (University of New Hampshire)
Univ. California Los Angeles
Univ. of Wisconsin Fox Valley
University College London
University of Delaware
University of Maine
University of Oregon
University of Rhode Island
University of Washington
USF (University of South Florida)
WET Labs
Woods Hole Oceanographic Institution

In 2006

Bermuda Biological Station for Research and Marine Biological Laboratory
Bigelow Laboratory for Ocean Sciences
CNRS
Dalhousie University
FL Fish and Wildlife Research Institute
Florida State University
Fugro Seafloor Surveys
Harvard University
Joint Oceanographic Institutions
Lamont-Doherty Earth Observatory of Columbia University
Ideo
Monterey Bay Aquarium Research Institute (MBARI)
Mote Marine Laboratory
National Oceanography Centre, Southampton
NEPTUNE Canada, University of Victoria
Nova Southeastern University's Oceanographic Center
Ohio State University
Old Dominion University U
Oregon State University
Pondicherry University, India
Rutgers University
Scripps Institution of Oceanography
Sea-Bird Electronics
Skidaway Institute of Oceanography
SOEST/University of Hawaii
Sound and Sea Technology
Stevens Institute of Technology
Texas A&M University
UNC-CH
UNCW
Univ. California Los Angeles
Univ. of South Florida
University College London
University of Alaska
University of California Santa Barbara
University of Delaware
University of Hawaii
University of Maine
University of Miami, RSMAS
University of Minnesota
University of New Hampshire
University of North Florida
University of Oregon
University of Puerto Rico
University of South Florida
University of Southern Mississippi
University of Victoria
University of Washington
Woods Hole Oceanographic Institution

In 2007

2WE Associates Consulting Ltd.
Bigelow Laboratory for Ocean Sciences
California Polytechnic State University
College of Marine Science, USF
Columbia University
Dalhousie University
Darling Marine Center, University of Maine
Fisheries and Oceans Canada, Bedford Institute
Great Lakes WATER Institute, University of Wisconsin-Milwaukee
Jet Propulsion Laboratory
Lamont-Doherty Earth Observatory of Columbia University
MBARI
Metron, Inc.
Montclair State University
Mote Marine Laboratory
NASA/GSFC
National Oceanography Center
Naval Research Laboratory
NOAA
Ohio State University
Oregon State University
Rutgers University
Satlantic
Scripps Institution of Oceanography
Skidaway Institute of Oceanography
Texas A&M University
The University of Southern Mississippi
U. Rhode Island
UCSB
UCSD
UNC-CH
UNCW
Univ. of Washington
Univ. California Los Angeles
Univ. of South Florida
Univ. of Wisconsin - Madison
University of Connecticut
University of Florida
University of Hawaii
University of Maine
University of Manitoba
University of Miami
University of South Carolina
University of South Florida
University of Southern Mississippi
University of Victoria
University of Washington
Woods Hole Oceanographic Institution

In 2007, Participating Ocean Observatories (*as noted in the survey*)

ALOHA, H2O
Bermuda Testbed Mooring and HALE-ALOHA mooring
CaroCOOPs
CenGOOS
Center for Coastal Marine Sciences
Central Gulf of Mexico Ocean Observing System (CenGOOS)
CIMT
COMPS
COOL
CORMP
FL COOS
GCOOS & SECORRA
global moorings
GLUCOS (Great Lakes Urban Coastal Observatory System)
GMOOS
GoMOOS
Integrated Ocean Drilling Program
JdF CORK
LEO-15
LISICOS
LOBO
Martha's Vineyard Observatory, Hudson River Aquatic-Atmospheric Observatory, Army Field
Research Facility Air-Sea Interaction Observatory
MARS
MEPS-Bay
MOBB
MOMAR
MOOS
MVCO
NANOOS
NanTroSEIZE Borehole Earthquake Observatory
nccoos
NeMO
NEPTUNE or ORION RCO
OrCOOS
ORION RCO aka NEPTUNE
Palmer LTER
Porcupine Abyssal Plain
PORTS
QuikSCAT
RU COOL
sabsoon
Santa Monica Bay Observatory
SCCOOS
SCOOS
SEACOOS/COMPS
SEACOOS/SABSOON
SECOORA/SEACOOS
SECOOS
SO COOL
Texas Automated Buoy System (TABS)
TABS-HABS
Upper Ocean Processes Group
VENUS
Wallops Coastal Ocean Observing Laboratory (WACOOL)

APPENDIX 3
"OTHER" RESPONSES TO VARIED QUESTIONS
FOR 2007 ONLY

{8}. Who do you think are the main education/outreach audiences for ocean observing systems data? (check all that apply)

Other Responses

all of the above (2)

I believe ocean observing can reach everyone

don't know

commercial activities that use the ocean as their life blood

Industry (ferry companies), barges, etc

boaters, fishermen, surfers

Fisherman and Recreational Boaters

fishers and other boat/ship operators

fishing community

fishing/transport/port etc. industry

General Public

the general public linked to the ocean for leisure, sport, or work

other stakeholders

{9}. If you were to choose one audience, who do you think should be the main education/outreach audience for ocean observing systems data? (check one)

Other Responses

The answer is context dependent

All of the above

don't know

Cannot decide on just one

boaters, fishermen, surfers

fishers and other boat/ship operators

{11}. What's the greatest barrier you face getting involved in public education? Check your top one or two.

Other Responses

FCAT killed my outreach program

if funding agencies like NSF would truly be serious about it

interested but not high enough priority

lack of a school districts interest combined with low expectations that outreach does any good

lack of more competent agency assistance/staff/interest

lack of public awareness

MCAS - little to no time in K-12 curriculum for non "standardized test" information, as well as lack of

emphasis in high schools at high achiever levels to learn anything that has an AP test

observatory not yet mature enough

There is great interest and we do carry on activities with teachers, but we are resource limited in terms of having the staff

{13}. What's the best way to involve K to 12 students, teachers, decision makers and/or the public in your research? Check all that apply.

Other Responses

All these possibilities talk to different learning styles and they are all needed to serve the largest and widely varied groups

Direct interaction/feedback from fishing, transport, other marine industry.

Each group requires differing "best way" to get them interested; therefore the question is biased.

I frequently advise high school students on science fair projects

I'd add sampling/field trips but I go into the field about once every 6-10 years so that's not useful at this point --- maybe if the NEPTUNE/ORION project succeeds.

Not sure that my research has a component that would interest K-12. It's mostly programming.

Our most productive experience has been to take teachers to sea and then involve them in post cruise activities that build on their experience.

Partnering with established education/outreach programs -- not trying to build this from scratch

Really don't have a good view on this:- laboratory work is not safe to bring people in for; taking K-12 students to sea for 30 days not feasible.

Varies with age

We are partnering with the OSU SMILE program in developing curricular material and activities for their high school program.

{17}. From this list of activities, check all of those in which you are currently involved.

Check all that apply.

Other Responses

advise other scientists on appropriate projects

I write general articles for non-science or non-specialist journals and give talks to general audiences

involve undergraduate students in summer research activities

NOAA teacher at sea program, interns as cruise volunteers, presentations to media

Ocean Science Bowl (3)

prepare and distribute fact sheets

Provide talks to pre-university students and parents on oceanographic and marine biology research at the NOC.

{20}. The COSEEs are funded by an NSF Research Directorate and one of the mandates is to support the education/outreach/communication needs of scientists. We'd like to know how a COSEE dedicated to ocean observing systems (OOS) could best support your work. (Please check your top priorities.)

Other Responses

before such interactions can begin, observatory infrastructure must be in place. That's what I am working on.

Develop a means for sharing generic education products, course labs, tools, processes across OOS. i.e. educate the science community

Have NSF support more of these Centers in different regions with different focus or relevance to institutions strength or regional interests

not sure

APPENDIX 4

{24}. What assistance do you need to get more involved in or do a better job at public education?

ALL RESPONSES FOR 2007 ONLY

\$\$\$

a contact person or specialist that establishes links between schools and teachers and fosters relationships based on mutual needs

A different mind-set. I come from a family boasting 6 full-time educators. I was quite clear, from an early age, I was more interested in conducting my own research instead.

A e-bulletin to be made aware of opportunities, resources, needs, and special requirements as they become available.

At the end of the day a resource issue; for us there is great interest in the activity, but we are limited because we do not have the staff to commit to these activities.

At the local (institutional) level, we are looking to develop a partnership with local/regional educators to build the framework for ongoing education/outreach. Much of our effort in this area to date has been project-specific, or at least not part of an ongoing, institute-wide program. Some prior effort has been through the COSEE-SE. Some through ties with the UGA Marine Education Center and Aquarium (MECA). Having been somewhat of an intermediary in researcher-educator interactions, a problem, at least from the perspective of some of my less patient colleagues, is getting both the professional educators and teachers to listen and better consider the material and education options that are being presented to them. To often the discussion goes directly to the personal experience of the educators and teachers ("this is how I do it"). The professional educators also often seem to focus on developing "activities" without considering whether these are appropriate to demonstrate the processes that are the object of the lesson. Recognition of the limitations of the present observing system capabilities is also not always an easy thing to get across. It is an iterative process for those new to it. Having templates that are judged successful by both researchers and educators would be useful. But with the recognition that the latest flashy demonstration that the professional educator has seen at a workshop is not always easily reproduced locally.

better idea of what to do given little time or money more opportunities (I've seen some but they often come when I'm busy with proposals/talk preparation/grading)

Dedicated personnel to do this important work. There are no obvious ways to fund these people.

Dedicated staff.

financial support - long term

Financial support to devote adequate time and staff.

Funding

Funding and a dedicated education and outreach specialist for our existing projects.

funding to allow me hire research assistants to ultimately free up some of my time.

Funding: it is time consuming, yet generally NSF does not appear to offer routine PI salary for researchers for education outreach portion of a research project.

Give me an extra lifetime or two and resources and a mandate and more time on top of that. Realistically, it requires an investment in personnel who have the mandate. Researchers like me can provide ideas and content, but there are too many other responsibilities to stay on the education file.

grant funding

Grant opportunities for that purpose

I am fully served here at U Maine. Thanks for the offer

I know from whom to learn. To do more, I need more time and/or funding.

I need a trained professional to work on my projects, that doesn't cost in the review process.

I would like the hotshots of outreach to stop assuming that scientists don't have an interest in outreach and stop accusing us of not communicating. My grad students and I had a flourishing program of outreach to local public schools that was killed in its tracks when Jeb Bush was elected Governor of Florida; local public schools stopped their Speaker's Bureau when FCAT (Florida version of No Child [All Children] Left Behind) was initiated.

I'm already working with Outreach staff at JOI and IODP, so no major need.

Information, perhaps a website to visit or document to read to become better acquainted with opportunities to participate.

Institutional recognition for such activities

It really comes down to money and time. I don't have specific funds identified for these activities and my time is currently dedicated elsewhere. If I had specific funding for outreach activities I would love to get involved.

money

Money and Time. Unfortunatley, it seems that while people say that education and outreach is important, very rarely does it translate into dollars. The emphasis is on the research, not education in the grant system. Instead of shared time between research and education, education appears to me to be an added burden, since the same research output is still expected.

Money. It is a huge time sink with little to no acknowledgement from the scientific community (infact, sometimes it's even held against me). So, for me to do it for free as a soft-money scientist is just shooting myself in the foot (though I do it anyway). Ultimately bringing in overhead counts for something, and that way they can't ignore. Also, it would help me a great deal if NSF actually took criteon 2 seriously in proposal reviews. I've done so much outreach work and get no recognition for it.

More funds dedicated to public education. Institutional incentives so researchers get credit for conducting public education programs.

more support for those in my department whose job it is to link my research with public education.

More time! :)

More time (funding and dedicated personnel). - Mandate and funds from funding agency

Need more funding!!!! I have never received the financial support commensurate with my efforts in Outreach and Education. We are doing everything on an absolute shoestring. I am tired of NSF in particular not backing up their intentions with ANY MONEY WHATSOEVER. NSF is very very hypocritical about outreach.

none -- will leave that to our outreach person

None, It is more of an initiative at both ends of the spectrum and the expectations that each have. Up to now these have not come together and are in fact moving farther and farther apart.

not sure

Provide an outreach coordinator in one of my laboratory offices to document everything I do.

Reasonably consistant funding for the OOS. If >40 hours/week are spent keeping the OOS operating, there is little energy or time left for public education activities.

Salary support. I'm a full time researcher so when I teach as a lecturer I take a significant pay cut. In my position incentive does not exist.

Staff members and information.

Support at work

Teaching support so that I can free some space for outreach activities

The federal government needs to get its act together! There is a disconnect between what the federal government and state governments are requiring for K-12 (that is, emphasis on standardized testing for math and English, science at the highest levels restricted to bio, chem and physics - earth science (and oceanography is included) is only taught at the high school level to those NOT excelling in math) and vs what the federal government is requiring researchers in earth and ocean sciences to do as broader impact (e.g., outreach to K-12 students). If the federal government is truly interested in improved public awareness and improved understanding of ocean and earth sciences, then earth sciences must be required of ALL high school students, not just those who are not excelling in math! An AP test in Earth and Ocean science would go a long way toward addressing this problem.

The greatest help that i need is the tranlation. What is the bet way to present the data/process to the desired audience. I can generate the data and present the results at a science meeting, but how do i present it to K-12 teachers, the general public, and decision makers?

The resources need to be focused more on those actually doing the work, as contrasted with those who are making a career of saying they are doing the work. In other words, education outreach resources are woefully misplaced. If COSEE wants better scientist interaction it needs to better respect the input of the scientists. The same can be said of the so-called decision-makers who are oftentimes not educated enough to make their decisions. As we traverse from blue water to brown water the level of decision-making competence dwindles as the level of territorialism blossoms. Both of these trends are

detrimental to sound environmental decision-making and enlightened public and educational outreach.

The support and acknowledgment of my institution.

Time

Time and resources are the biggest are the biggest issues. Beyond that it would be useful to have a list or source of projects than needed defined input. It is sometimes pretty fuzzy as to how we can really provide meaningful input and to whom? There are a lot of busy scientists who would willing provide help and information if the requestes were direct and clear.

time is the big one

time, a 36 hour day

To do a better job at PE I need for all of us (funding agencies like NSF, COSEE Network, Aquaria, Scientists, and educators) to continue to push forward and increase the level of awareness that research and education walk hand in hand and benefit from ecah other.