

jessica.kastler@usm.edu  
 sharon.walker@usm.edu  
 susan.ross@usm.edu  
 Gulf Coast Research Laboratory  
 Marine Education Center  
 University of Southern Mississippi  
 703 East Beach Drive  
 Ocean Springs, MS 39564

## 1. Face-to-Face Session

The Center for Ocean Sciences Education Excellence: Central Gulf of Mexico is nearing the end of its second grant period. This project catalyzes relationships among scientists and educators to infuse research into classroom activities via the Teacher-Scientist Institute which includes a weeklong Face-to-Face and a six-piece Online Session. The Teacher-Scientist Institute is held every summer in each state represented in the COSEE:CGOM (LA, MS, AL, FL). Each state hosts a Face-to-Face Session every other year.

The Face-to-Face Sessions are engaging, field-oriented experiences during which teachers work side-by-side with research scientists to produce lesson plans aligned to National Science Education Standards and Ocean Literacy Principles and Concepts that are based on the scientists' work. The Face-to-Face Sessions vary depending on where they are held, to allow each leader to take advantage of local issues, participant/leader strengths, and serendipitous opportunities. A key element that differs from state to state is the amount of time scientists participate in the institutes. During early years of the grant, scientists' participation was limited. The amount of time scientists spend at the Face-to-Face Session has increased each year during project implementation.

This poster examines variations in the outcomes for scientists who participated in the Face-to-Face Sessions held at two different sites (Site 1 and Site 2) in 2007 and 2009. Site 1 is in a remote location; during all years of COSEE:CGOM implementation all participants have arrived and left at the same times on Sunday and Friday. In 2007 at Site 2 teachers arrived and left at the same times on Sunday and Friday. Scientists however, made a presentation on one day and led the teachers through a field experience the following day. In 2009 all scientists arrived and left at the same times as teachers at Site 2.

## 2. Survey

During 2007 and 2009 implementation, COSEE:CGOM assessed scientists' experiences at the Teacher-Scientists Institutes using a 10-question survey. The external evaluator traveled to each site and interviewed each scientist individually. The recording of each interview was transcribed, the subjects' names replaced with an identifying number, and the transcripts read to capture answers to specific questions and compelling comments.

1. Please tell me a little bit about yourself, your background, your area of expertise, and how you came to be a part of the COSEE institute.
2. Is this your first experience with COSEE?
3. Have you ever worked with K-12 teachers before?
4. Has this week's experience with teachers changed your beliefs about K-12 teaching or teachers?
5. Would you be willing to work with teachers in the future?
6. Is this a good avenue for dissemination of your research or reaching the public?
7. Have you learned anything about K-12 curriculum, National Science Education Standards, or Ocean Literacy this week?
8. Will you work with, or encourage colleagues to participate in COSEE or other teacher programs in the future?
9. Do you anticipate this weeklong institute will have an impact on your research or teaching, or any part of your career?
10. Will you stay in touch with teachers or scientists met this week?

## 5. Conclusions

- All Scientists who participated in COSEE:CGOM Face-to-Face Sessions in 2007 and 2009 expressed enthusiasm for 1) working with teachers, 2) the COSEE program, 3) disseminating their research through COSEE, and 4) the benefits of scientists working with formal educators.
- Resident Scientists 1) experienced a change in their perceptions of K-12 teachers, 2) learned much about Science Education Standards and Ocean Literacy principles and concepts, and 3) expressed great enthusiasm for enhancing interactions among research scientists and formal educators.
- Resident Scientists described teachers as fellow professionals with a similar mission. Visiting Scientists expressed occasional impatience with teachers.

## 3. Elements of Face-to-Face Session

**Day 1:** Individuals teachers and scientists analyze water quality of a local water body to 1) learn how for the week ahead, and 2) begin to learn each others' names.



**Day 2-5:** Scientists and teachers work together in teams, completing field activities to learn about each habitat (Left). Back at the home base, scientists and teachers continue to work as teams, to produce a lesson plan and presentation regarding some aspect of the scientist's research that is aligned to Science Standards and Ocean Literacy principles and concepts (Right).



**Day 6:** Each scientist-led team presents their lesson plan. Above, one team presents water quality activities. Left, the team learns meiofauna-microscope activities being presented by another team.

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday
7:00		BREAKFAST	BREAKFAST	BREAKFAST	BREAKFAST	BREAKFAST
8:00						Preparation
9:00		Salt Marsh, Spoil Banks & Tidal Creeks (canoes)	Barrier Islands (small boats)	Marsh Tracts & Water Sampling along an Estuarine Gradient: Fresh (small boats)	Bay Cruise & Water Sampling along an Estuarine Gradient: saline (research vessel)	Presentations of Teamwork
10:00						Evaluations, Post-Test
11:00						HOT LUNCH
12:00						CHECK OUT
1:00		Lab Work, Clean Gear, Enter data	Lab Work, Clean Gear, Enter data	Lab Work, Clean Gear, Enter data	Lab Work, Clean Gear, Enter data	
2:00	CHECK IN					
3:00	Welcome, Pretest					
4:00	Water Sampling	Teamwork	Teamwork	Teamwork	Teamwork	
5:00	Tch & Sci Intros	Break	Break	Break	Break	
6:00	DINNER	DINNER	DINNER	DINNER	SEAFOOD BOIL	
7:00			Estuary Adaptations, Productivity, Hypoxia, Reflections	Ocean Sampling, Hypoxia, Reflections		
8:00	Delta, Salt Marsh, Reflections	Barrier Island, Land Loss, Reflections			Teamwork	
9:00					Reflections	
10:00						
11:00						Quiet hours from 11:00 PM until 6:00 AM

## 4. Results

### Participants

18 scientists provided responses to the survey. Several who attended were unable to the evaluator for interview. The charts below illustrate scientists' responses to survey questions 1-3, which describe scientists and their experience in education and outreach.

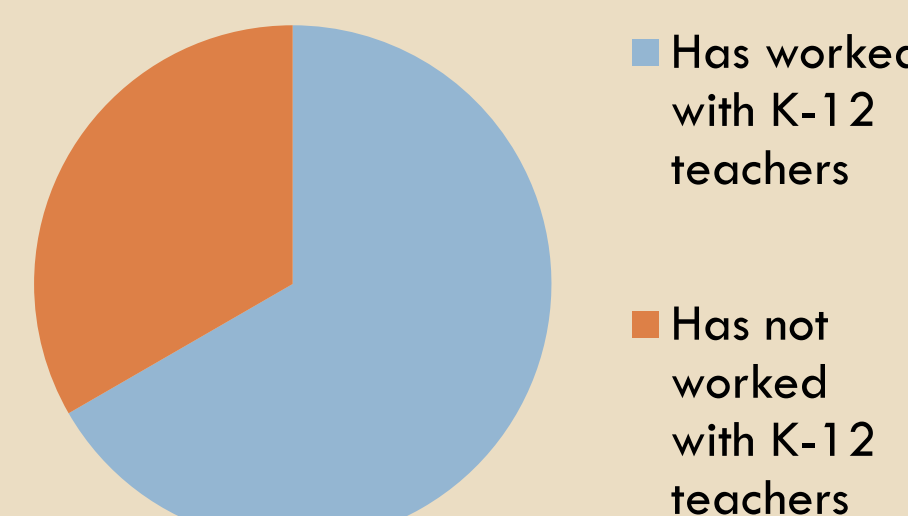
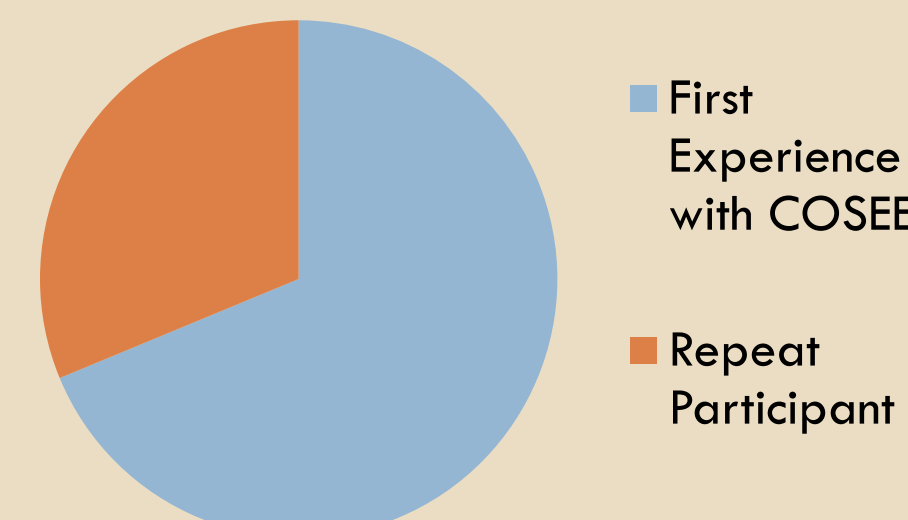
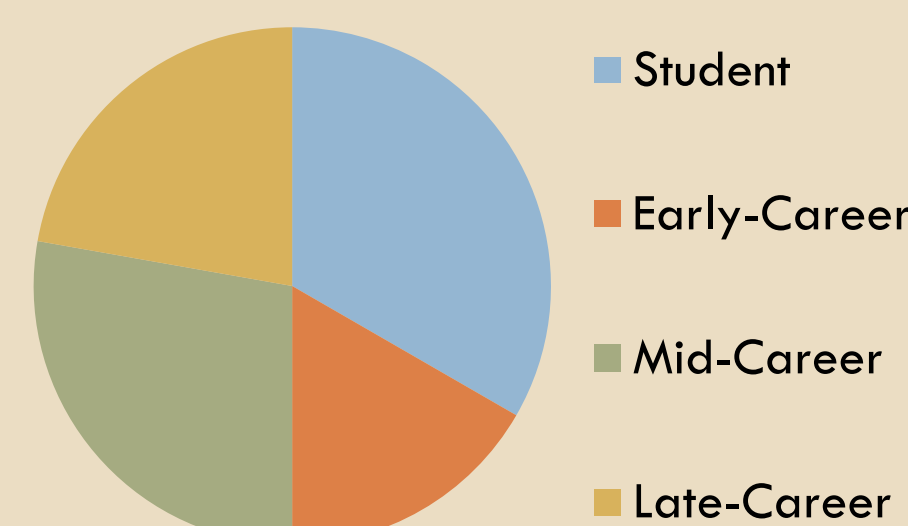
N	Site 1	Site 2
2007	3	4
2009	5	6

#### Types of Education Experience

- COSEE, Similar Programs
- Lesson Plan Development
- Classroom Presentations
- Science Fair Projects
- Career Days
- Informal Science Center Programs
- Public Safety Demonstrations
- Courses for Pre-Service Teachers

#### Self Described Expertise

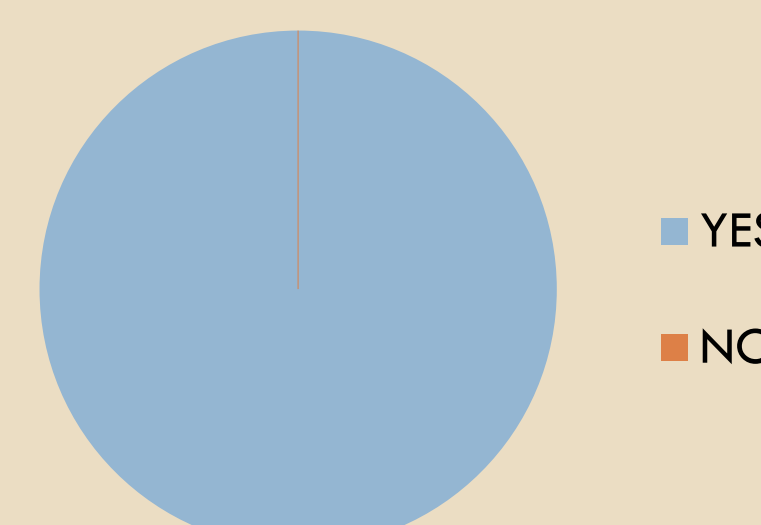
- Fisheries
- Agriculture
- Phytoplankton pigment
- Benthic ecology
- Oceanography
- Marine ecology
- Mycology
- Animal behavior
- Water quality
- Geospatial technologies
- Shark/terrapin ecology
- Molecular genetics
- Antarctic bacteria
- Habitat restoration
- Nutrient cycling



### General Results

- Responses to most survey questions showed no difference in scientists' responses based on which institute the scientist attended.
- All scientists expressed strong support for COSEE and education/outreach. This pie chart applies equally to all of these questions:

5. Would you be willing to work with teachers in the future?
6. Is this a good avenue for dissemination of your research or reaching the public?
8. Will you work with, or encourage colleagues to work with COSEE or other teacher programs in the future?
9. Do you anticipate this weeklong institute will have an impact on your research or teaching, or any part of your career?



### Scientists' Comments

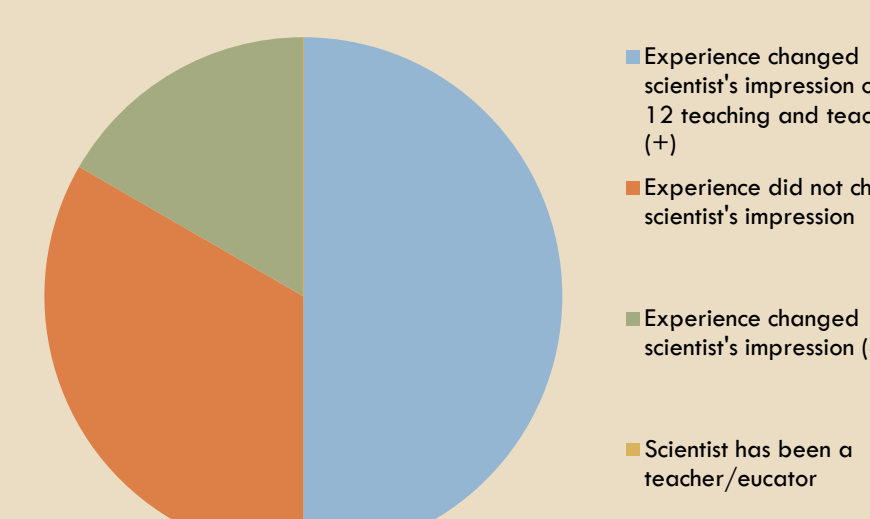
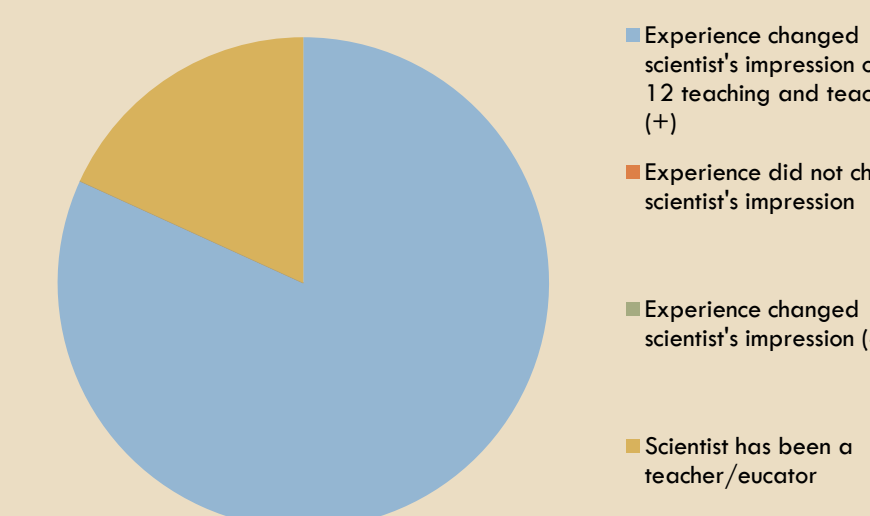
- 2-07 They're really excited and they really want to learn... It would be good to keep these relationships going between scientists and teachers because they have limited resources.
- 2-07 It's something that I'm willing to devote some time to because I think it's important that we scientists connect with them so we can influence the quality of our education...
- 2-09 I've enjoyed this... especially with the particular lesson plan we did. It was neat for me to see how... that kind of information could be related to a... to a seventh grader or a high school kid...
- 2-09 It's... always good to get teachers excited about [important topics] because they have such a strong influence on a variety of people...
- 2-09 It's just that I've only got x amount of time during the day, and I have to prioritize where I put my time...
- 2-07 I think it's good for the scientists too because it gives us an opportunity to have an impact with our work... By educating the teachers, we are educating so many people... I think that is a very good use of science.
- 1-09 [This experience] will make me approach my research differently in the future...
- 2-09 I don't think research should be just confined to laboratory or... journals that we publish in... I like that I can pass it down to the teachers; they understand what I'm doing. Then they can pass it further pass it down to their students.
- 2-09 It's very productive... for us... to be able to relay what we do to the public, to... to teachers, even to, you know, other scientists who don't work in the field.
- 1-07 We kept busy, worked from early morning till late at night, and it was good. I had the best team.
- 1-07 Absolutely. I tried to recruit more this time, not knowing what to expect. Having had the experience, I think they should all learn. When I went to graduate school, most of my professors were excellent scientists but could be really poor teachers.
- 1-07 I think it's a good idea to learn a little bit about simplifying things... I actually had to stop and think about ways to explain these words.
- 2-09 Having an understanding of what goes on in the classroom on a day-to-day basis, how they approach teaching science, I think is important for every scientist to know.
- 1-07 It was refreshing for my knowledge of certain things I took for granted and wasn't too clear about. So I learned a few things again.
- 2-07 Two big things that I take away from these experiences are looking at these questions from fresh eyes and learning how to be a better educator.
- 1-09 If they [National Science Foundation] didn't have that [broader impact] requirement... I don't know... They [scientists] probably wouldn't do it [work with COSEE]... I know it's a good requirement because, if you don't educate the public, they're not going to support the National Science Foundation or the conservation scientists... If you're going to educate the public, you've got to educate the teachers first.
- 2-09 I investigate, modeling estuaries, remote sensing, and developing 3D models and 4D models... I can't continue at a pace I would like to without having a better workforce that understands mathematics-related applications, applied sciences... [Teachers are] developing my workforce for me.
- 2-09 No, I don't. And I don't mean that to be a reflection on the particular program... because I've really been amazed at how... hard the educators have worked - and the scientists as well - with the program. But honestly, I don't see it having too much of an impact on the way I... conduct my own research.
- 2-09 I'm always very nervous when I'm teaching, ... watching all of the teachers and other scientists in action, teaching their lesson plans or their presentations, I... watched them and picked up a few things... Yeah, [the experience] definitely has helped me...

### Different Experiences, Different Results

- Resident scientists expressed enthusiasm at the amount they learned and surprise at the work of teachers. They expressed interest in enhancing interactions between teacher and scientist communities.
- Visiting scientists did not necessarily have any negative impressions, although a few did.
- Visiting scientists did not learn as much about classroom culture or develop the same degree of respect for K-12 teachers as professionals.

### Scientists' Comments

- 1-07 Being an experienced teacher makes you a good student, I think.
- 1-07 They're really sharp. They're doing stuff I know I couldn't do.
- 1-07 I haven't had much experience working with K-12 teachers before this, and I think I've learned a lot from them.
- 1-07 I didn't know that they had to do that. I figured that they got a textbook and just taught. But it's very strict about what certain topics they have to teach and cover.
- 2-09 It's made me a little envious of the kids that they teach because ... we were never taught that stuff when I was in middle school or even high school.
- 2-09 This has definitely increased my appreciation for them.
- 2-09 I did not know that they had to go through a lot of the things they do go through... The standards, lesson plans, how to deal with their students - all those... I wish a little bit nicer to my teachers.
- 2-07 Well, I felt a lot of quality when I talked to them... I can see that they are very good professionals. I feel very good and very hopeful about the future of the state if these are the teachers of our children.
- 2-07 What I would say is I thought that this group was not very well-behaved...
- 2-07 Anybody who's done this say just one time probably isn't necessarily going to take away a major eureka moment.
- 2-07 No. I spent too brief a time with them to really know what they think and what they don't think.



### Scientists' Comments

- 1-07 My focus this week was that I wanted them to do more math, and I didn't know that it was a part of the national science emphasis.
- 1-07 I was trying to help them meet different GLEs. I don't do this all the time, so I think this is fun, but they were like "oh GLEs."
- 1-07 I have a pamphlet from before this week that talked about Ocean Literacy, but I... didn't know how teachers were going to apply that.
- 1-09 There were a lot of subjects covered that I hadn't realized would be covered in one year... there was a greater diversity of topics than I had anticipated.
- 2-09 I've... I've seen to what extent it's driven by standards - things that these teachers must present to their students as opposed to the... things that are likely to pull kids into science.
- 2-09 I learned that it's hard to cover all of the standards because they're very diverse. They cover a whole, huge field of things.
- 2-07 All I understood from the last two times I participated in COSEE was that there are limitations. But I don't know where to go to see about the limitations
- 2-07 I never heard that conversation take place... I didn't hear anything about national standards
- 2-07 Not really too much, I mean we didn't talk to much about it.
- 2-07 I just had some informal conversations with them. I'm still totally unfamiliar with the structure of it.

