2012 NOAA Northeast Region Teacher at Sea Alumni Workshop Summary
May 19-20, 2012
NOAA Northeast Fisheries Science Center and Woods Hole Aquarium
Woods Hole, MA
Jennifer Annetta, The College of Exploration/NOAA Teacher at Sea Program

A NOAA Northeast Region Teacher at Sea Alumni Workshop was held on May 19-20, 2012 in Woods Hole, MA at NOAA's Northeast Fisheries Science Center and Woods Hole Aquarium. Nine Teacher at Sea Alumni from the northeast region attended a two-day professional development workshop in order to strengthen oceanographic content knowledge and build an alumni network in their region.

Alumni gained both physical and marine oceanography content from NOAA scientists and hands-on activities. Content included: shallow ocean currents and drifter pattern tracking; sea turtle conservation, sea turtle research, at-sea sampling and satellite tagging/tracking; and marine mammal and fish passive acoustic research, conservation and management. Information and classroom applications from NOAA's FishWatch, http://www.fishwatch.gov/, and Ocean Explorer, http://oceanexplorer.noaa.gov/, websites were shared, and alumni brought ocean science lessons to present and distribute.

Workshop Goals:
The goals of the workshop are aligned with selected NOAA Teacher at Sea Program goals. In summary, the goals are to enhance teachers' ocean science content knowledge and to build a network of alumni in the northeast region.

Short-term Goals (Skills and Knowledge)
Teachers will:

- Understand how NOAA oceanic and atmospheric research is linked to National Education Science Standards and Ocean Literacy Principles (lesson plans shared by teachers and connections teachers make with drifter tracking and scientist content in the classroom).

Mid-term Goals (Behavior and Action)
Teachers will:

- Use NOAA data and resources in classroom activities (drifter tracking and research, turtle tracking and research, passive acoustic research, Woods Hole Aquarium and NEFSC resources).
- Use NOAA-related career information in classroom activities, when mentoring students and when working with colleagues (connections and relationships with NEFSC scientists).

Long-term Goals (Social, Environmental, and Economic)
In support of NOAA's mission, the Teacher at Sea Program will:

- Build an understanding of physical and marine oceanography among teachers and students.
- Build strong working relationships among teachers, emphasizing collective participation of groups of teachers.
- Build relationships among NOAA scientists, teachers, and students.

Main Workshop Components:

- **Speakers/Topics**

1. George Liles – NOAA NEFSC Aquarium Director, Woods Hole Aquarium – *Woods Hole Aquarium Orientation*
2. Jim Manning – NOAA NEFSC, Physical Oceanographer - *Satellite-Tracked "Drifters" Monitoring the Transport Pathways and Validating Numerical Circulation Models*
3. Heather Haas – NOAA NEFSC Research Fisheries Biologist, Protected Species Branch – *Protected Species At-Sea Sampling and Satellite Tagging*
4. Sofie Van Parijs – NOAA NEFSC Zoologist, Protected Species Branch – *Marine Mammal Passive Acoustic Research*
5. Ambrose Jearld - NOAA NEFSC Director of Academic Programs – *Woods Hole Educational Opportunities and Programs*
6. Shelley Dawicki – NOAA NEFSC, Communications Specialist, Research Communications Branch – *NEFSC and Woods Hole Aquarium History*

- **Aquarium Orientation** – George Liles, the NEFSC Woods Hole Aquarium director, shared information about the animals at the aquarium, daily operations, and high school student opportunities offered. George showed the alumni a rescued Kemp's Ridley Sea Turtle and spoke to them about how animals are rescued and rehabilitated.

- **Drifter Building** – Jim Manning, a physical oceanographer at the NOAA Northeast Fisheries Science Center for over 25 years, has been taking observations off the New England coast for the last decade with the help of students and fishermen. He has developed a low-cost ocean observing system called "Environmental Monitors on Lobster Traps" (see emolt.org) with cooperative research funding. As part of this program, he has schools construct satellite-tracked "drifters" which are deployed by fishermen in the coastal currents for

purposes of monitoring the transport pathways and validating numerical circulation models (see www.nefsc.noaa.gov/drifter).

These student-built NOAA drifter buoys are built to simple specifications: each has a 4-foot vertical "mast," made of PVC pipe or wood, and 4-foot horizontal fiberglass rods that support four vinyl cloth "sails" that rest beneath the sea surface. Fishermen's net buoys are used for flotation. The submerged sails harness the currents and move the drifter through the water similar to how a kite or balloon rides the air currents.

The drifter communicates its position every four hours via a satellite transmitter much like a handheld GPS device. The transmitter, mounted on top of the mast, is typically the only part of the drifter exposed to the wind. The location of each drifter can be logged over time, thus indicating surface current patterns. The tracks are updated on the NEFSC website minutes after each reported position.

Prior to building the drifters, Jim spoke to the TAS alumni about his background and research. He explained the ocean observing system called "Environmental Monitors on Lobster Traps" (EMOLT). As part of EMOLT, Jim began to work with area schools to have students construct satellite-tracked "drifters". The drifters are deployed by fishermen in the coastal currents for purposes of monitoring the transport pathways and validating numerical circulation models. The alumni learned the process for building the drifters, how to activate the transmitters, and how to track the drifters once they are deployed.

After Jim's presentation, the alumni went out behind the aquarium to a large open space where they built four drifters. Jim set up five stations that were each a step in construction. He then demonstrated each step. At station one, alumni had to spray paint a stencil that said "drifter study" onto a piece of wood. Station two was the sail making station. Alumni had to measure sail cloth and cut it to size. Sixteen sails were needed. Station three was the drilling station. Holes were drilled into the wooden mast so that rods for the sails could be inserted. Station four was the ballast station. Old window weights were hit with a sledge hammer to break them to a certain size. These weights were later attached to the bottom of the drifter. At station five, alumni measured a fiberglass rod and cut it to the necessary size.

After Jim's demonstration, the TAS alumni selected a station and worked together to complete each station task. Once each station was finished, alumni put together the drifters. They each wrote the name of their school on a sail so that their students could track a specific drifter. The drifters were deployed on May 31, 2012.

- **Protected Species Branch At-Sea Sampling and Satellite Tagging** – TAS alumni learned about sea turtles and NOAA's Protected Species Branch from Heather Haas, a NOAA research fisheries biologist. Heather's current work is focused on sea turtle ecology, with a special interest in loggerhead behavior in the mid-Atlantic foraging grounds. Alumni learned

about Heather's research and what a typical research cruise entails. They saw how Heather identifies sea turtle species, takes measurements of at-sea turtles, and scans for existing tags. They then had an opportunity to simulate data collection using sea turtle models.

One week after the NE TAS Alumni Workshop Heather went on a research cruise and captured and tagged more than thirty loggerhead sea turtles from offshore mid-Atlantic waters. This tagging initiative is part of a large, multi-agency project called AMAPPS (Atlantic Marine Assessment Program for Protected Species), which is designed to provide a comprehensive assessment of marine mammal, marine turtle, and seabird abundance and spatial distribution in U.S. waters of the western North Atlantic Ocean. The sea turtle tagging data will be incorporated into models to provide seasonal, spatially-explicit estimates of sea turtles in the western north Atlantic. Turtle number 2012.06.886 was named *TAS the Turtle*. It was tagged and released with the four drifters that were built by the TAS alumni on May 31 and can be tracked at http://1.usa.gov/KBXw5y. *TAS the Turtle* and the four drifters will be tracked by NE TAS alumni's students now and in the fall.

- **Marine Mammal Passive Acoustic Research** – Sofie Van Parijs is currently the program leader for passive acoustics research in the Protected Species Branch at the NOAA Northeast Fisheries Science Center. Within this program she and her group are responsible for using passive acoustic research to improve the conservation and management information available on marine mammals and fish. The passive acoustics program aims are to use sound for understanding the occurrence, distribution, density and behavior of these species throughout the northwestern Atlantic Ocean. To do this, researchers use bottom mounted recorders, real time acoustic buoys as well as underwater autonomous vehicles for collecting data.

  TAS alumni learned about Sofie's research and then were taken to the Educational Interactive "Sounds of the Sea" exhibit in the Woods Hole Aquarium. The exhibit focuses on ocean noise, marine mammal sounds, and human impact. They also learned about the chronic ocean noise on Massachusetts Bay that is caused by boating, whale watching, fishing, shipping and other commercial activities. This anthropogenic sound overlaps with marine animals trying to communicate with each other. Sofie is working on a project with the Stellwagon Bank National Marine Sanctuary to map ocean noise and evaluate the impacts of human-produced underwater sound on marine mammals and fish.

- **Lesson Sharing** – TAS alumni presented exceptional oceanography lessons of their choice that they tested in their classroom. They then addressed why the lesson worked well and provided helpful hints for adapting the lesson to different grade levels. Each lesson was duplicated and distributed.

- **NOAA Resources** – Elizabeth Bullock, NOAA Teacher at Sea Program Support Specialist, introduced and explained NOAA Fisheries, FishWatch website to the TAS alumni. She showed them the key components of the website and demonstrated how they could use it in their classroom by modeling a lesson. The alumni were divided into two groups and asked to create a public service announcement either promoting or demoting eating Atlantic Albacore Tuna. Groups then presented their public service announcements.

  NOAA OER Ocean Explorer website was also explained and materials from the OER Education Program were distributed.

- **Protected Marine Mammals** – George Liles introduced Bumper and Lu-Seal, two rescued Harbor Seals. He explained how they were rescued and why they haven't been released. George explained how the aquarium staff care for and train the seals.

- **NOAA and Woods Hole Orientation** – Shelley Dawicki, NEFSC, explained the history of NEFSC and the aquarium, and pointed out other research facilities and landmarks along the way.

- **Alumni Network Round Table Discussion** – The next phase of the New England Region Teacher at Sea Alumni network was discussed.

Workshop Planning Team:

- Jennifer Annetta, Education Consultant - The College of Exploration/Alumni Coordinator - NOAA Teacher at Sea Program
- Elizabeth Bullock, Program Support Specialist – NOAA Teacher at Sea Program
- Shelley Dawicki, NOAA NEFSC, Communications Specialist, Research Communications Branch

Advisors:

- Jennifer Hammond, Director – NOAA Teacher at Sea Program
- Elizabeth McMahon, Deputy Director – NOAA Teacher at Sea Program
- Peter Tuddenham, President/Executive Director - The College of Exploration
- Kristina Bishop, Vice-President/Academic Director – The College of Exploration

Participants:

- 9 Teacher at Sea Alumni from the Northeast Region
- 2 NOAA Teacher at Sea Staff
- 3 NOAA Scientists
- 3 NOAA NEFSC Staff

Overall Workshop Evaluation (May 19-20, 2012):

An overall evaluation was given at the end of the workshop in order to measure how well the workshop objectives were met and to provide teacher feedback on various workshop arrangements.

	Excellent	Good	Adequate	Poor
Overall Workshop	100%	0%	0%	0%
Quality and usefulness of the workshop content	100%	0%	0%	0%
Relevance of workshop to work/professional development	100%	0%	0%	0%
Ability of the workshop to meet the following workshop goals:				
TAS alumni will learn marine science content and will explore ways in which these understandings and concepts can be incorporated in their curriculum	100%	0%	0%	0%
Build an understanding of NOAA – related sciences	89%	11%	0%	0%
Lesson Sharing: Usefulness and value of sharing lessons	78%	22%	0%	0%
Aquarium Orientation: Usefulness and Value	67%	33%	0%	0%
NOAA and Woods Hole Orientation: Usefulness and Value	56%	44%	0%	0%
Building Drifters: Gained content knowledge (Did you learn something new?)	100%	0%	0%	0%
Speakers: Gained content knowledge (Did you learn something new?)				
Jim Manning: Drifters	100%	0%	0%	0%
Heather Haas: Turtle At-Sea Sampling and Tagging	100%	0%	0%	0%
Sofie Van Parijs: Passive Acoustic Research	100%	0%	0%	0%
Elizabeth Bullock: FishWatch/Misconceptions	89%	11%	0%	0%
Workshop Location	89%	11%	0%	0%
Hotel Accommodations	89%	11%	0%	0%

Communication Prior to the Workshop	89%	11%	0%	0%

Evaluation Comments:

What was the most valuable part of the workshop?

- **Lesson plan sharing – such a great idea, adaptable to different levels; inspired by others creativity.**
- Hearing from the local scientists about their research and its application.
- Actually BUILDING the drifters instead of just hearing about them.
- **I would say the drifters was the most important part of the workshop. I can see myself starting an after school science club to build and put out drifters by collaborating with NOAA scientists. I also plan to do a variety of ocean activities and field trips.**
- It was really great to have visiting scientists.
- Gathering face to face with other teachers who share the passion and desire to teach ocean science. Learning about hands-on activities/resources that I can use in my classroom. Better understanding possible connections between the different ocean sciences.
- **Building relationships with scientists, science center staff and each other. Getting to see what you read about in action!**
- I enjoyed every aspect. Interacting with scientists was inspiring and reinvigorating with regard to my love of science. I enjoyed the hands-on aspect of building the drifters and can't wait to share this with my students.
- Interacting with true scientists in person regarding their research. Would love to volunteer at their labs one day a week in the summer!
- Learning how to build drifters, how to track them, and who is associated with them in New Hampshire so we can tie them into our currents section.
- **Visiting again with the TAS alumni and hearing how all the folks are incorporating their experience in the classroom. This activity done together amplifies my source of content times 10 because of all that I have picked up.**
- I like the pace, the variety and various speakers. It was spaced out well and allowed for different modalities of learning.
- **Coming together as a group of alumni was incredibly valuable. I think it brings this amazing experience back to the forefront.**

How could this workshop have been improved?

- **Make it longer! Just kidding – there never seems to be enough time. Thank you for all you did to incorporate so many of the suggestions and ideas from the fall workshop.**
- Staying together at the same hotel.

- The only thing – I wish we could have all stayed in the same place – but something you couldn't fix.
- The only thing that I can think of is that being an early riser I would have preferred an 8-4 schedule.
- Trip out on the water.

Do you plan to use the content from this workshop in your classroom? If yes, please explain.

- **I want to use FishWatch myths as one of the final activities in my Aquatic Bio class. I am doing marine mammals now and will definitely have students check out sounds from Sofie's work.**
- Yes, using Heather's tagging and Sofie for classification and adaptation. I plan to use Jim's work with drifters and the Gulf of ME.
- **I plan to incorporate NOAA websites into several of my lesson plans. I hope to explore the possibility of building/deploying drifters with my students.**
- Field trip to the aquarium, sea turtles with Heather – grade 2, Build a drifter – grade 5, Aquarium and whole tour – grade 5
- **Yes, I am teaching about currents and the ocean right now and plan to use drifter tracking data.**
- Drifters and turtle – mapping/watching currents
- Yes. Probably not until next year, but I would like to contact UNH to see how we can work together to study currents and the drifter data sent out of Great Bay.
- Yes. The turtle tracking allows students to work on plotting graphs, data collection, etc.
- FishWatch, whales and I'll bring my class to the aquarium this year if we can fit it in.

Do you plan to continue to work with the scientists from Woods Hole in the future?

- I hope so. I need to give some thought to how I can connect live. I will at least make better use of the website now that I know what's there. It can be overwhelming.
- Not sure yet, but possibly with Jim and Heather with the drifters.
- **I will have my students follow the sea turtle of Heather Haas and hope to connect with Jim Manning about the drifter project.**
- Sofie and the whales – I would love to incorporate her into my Grade 2 reading group – skype interview.
- Yes. Would love to volunteer in their labs this summer.
- Yes. I will need to contact Jim in the future regarding the drifters.
- Yes – I plan to return with my class and hope to find more chances to do hands-on learning.
- **Yes. I'm going to get back in touch with the scientists from my Teacher at Sea trip.**

Other comments:

- **I'm looking forward to seeing where this takes us in the future. I hope to stay connected.**

- Thank you so very much for providing us with opportunities that we would not have on our own. Love the collaboration and I so enjoyed you and Liz. We will miss you.
- **Thank you for such a wonderful opportunity. NOAA Teacher at Sea has been the best professional development experience hands-down.**
- Another fantastic workshop! I think we are all in a better place to take NE region to the next step – either meeting on our own, online, etc. The chance to get to work with scientists was great! And – thanks especially to Shelley for her help and insight.
- Excellent professional development!
- Thanks so much for another great workshop, hope you have funding for more. Fingers crossed!
- **It was great seeing everyone. I really enjoyed ALL aspects of the weekend. Guest scientists are always a great addition because it is very difficult to have that experience through my school.**
- Excellent job by all!

Northeast Region NOAA Teacher at Sea Alumni Network:

Teachers had the opportunity to discuss their alumni network. They were given focus questions and then participated in a round table discussion and brainstorming session.

Focus Questions:

How did you use the content from the fall workshop in your classroom?

- Resources were helpful. Maury Project: Wind-Driven Ocean Currents – I did change some parts because of time. This helped me rework my unit on Water and Currents and how to transition to Weather. I ended up using the concept of wind as my connector between the water and current unit. This leading to the weather unit made it a lot easier
- I contacted Colleen Coogan after seeing a drawing by a Provincetown student at the Truro Public Library. It was quite anti-NOAA (the student's father is a fisherman). I took a photo of the drawing and sent it to Colleen asking if anyone from NMFS could come and present for the community to dispel myths.
- I used information about turtles with the grade 2 teacher.
- Incorporated handouts/brochures about whales, whale strikes into my grade 2 Humpback unit.
- Passed along Maury Project Modules to another teacher.
- Passed along the ideas shared by Deborah Cramer to a grade 6 teacher. I used her video as a jumping point for a writing assignment.
- One important, but less concrete way this workshop was part of my teaching was how it added to my energy and passion for teaching ocean science. I had the opportunity to present my NOAA experience at a staff meeting and I shared the resources available to teachers. My team has been giving planning time this summer to build on an interdisciplinary marine ocean unit we started last fall.
- I have used Deborah Cramer's book, *Smithsonian Ocean*, just about all year long. Initially I talked about her presentation and we looked her up online. I read parts of her book at the beginning of the school day. I focused on several topics: stewardship of our oceans, animal characteristics and adaptations, and how to read non-fiction text. It is by my white board for everyone to read. At first I was hesitant to leave it out, but students have treated it with the

utmost respect. One student asked her parents to buy it for her for Christmas and she got it! She has spoken highly about it to her friends. We have recently started a research project and my students have used the book to choose an animal and as a reference.
- Gave me ideas for planning my new Oceanography course. Information that Bryan Hirschman gave me about the Maury Project encouraged me to apply and I got accepted. The lesson was great – I want the rest!
- Used part of the Maury module - surface currents. Hope to incorporate some of the bathymetry next year.
- Spent more time on TAS website reading blogs of fellow workshop participants. Also checked out the National Marine Sanctuary because of work done by one of the other participants.
- I used my NOAA experience to show at-risk students that there are many occupations that a person can do – even if they are not great scientists. I got plenty of mileage having the students hang the posters up in the classroom and share their prior knowledge of whales, clams and fish.

How would you like to stay connected in order to continue this alumni network (In-person, Wikis, Wordpress, Skpe)?

- I would like to have a way to tell each other about what we are doing in our schools – lessons, activities, events.
- Collaborate on projects.
- Take advantage of events and conferences that are already happening like the Marine Educators Association conferences or regional NSTA.
- Continue to interact with scientists in person, web conference, or Skype.
- Create videos of scientists doing presentations to give to teachers that they can use in their classrooms.
- Alumni could create a list of ocean resources and a list of scientists in their area who would be willing to visit or Skype with classes.
- Each year a different alum could host an in person regional workshop.
- Alumni are willing to review lesson plans from current and past TAS.

Next Steps:

Due to the success of the fall and spring workshops, the New England Teacher at Sea Alumni are now ready to continue their network independently. Meeting in person for two weekends allowed this group of teachers to become a cohesive unit. They feel comfortable with each other and are excited about continuing to meet and collaborate with like-minded professionals.

The NOAA Teacher at Sea Team will meet and work on the following goals:

- Select an online platform for the New England Teacher at Sea Alumni (NETASA) forum.
- Create an online NETASA forum that allows alumni to share lessons, ideas, collaborate and communicate with each other. Professional development could also be offered through this forum.
- Define the role of the NETASA coordinator.
- Identify a NE regional coordinator.
- Launch the NETASA forum.