NOAA's Teacher at Sea Program

2016 Year in Review

January 2017

NOAA's Teacher at Sea Program
2016 Year in Review

Overview

- Operational Review
- 2016 Special Alumni Season – Teacher Spotlights
- Alumni Activities and Events – Highlights
- 2017 Season Outlook

"I know I am far from a professional scientist, but through NOAA, I can now speak authentically and accurately about what happens in the field and why."

- TAS '16 **Denise Harrington**

NOAA's Teacher at Sea Program
2016 Year in Review

Operational Review

- Revised program operations and reorganized team member duties
- Conducted special season focused on alumni
  - 9 TAS alumni
  - 3 new TAS through continued partnerships
- Streamlined and overhauled online training system
- Participated in external evaluation to be completed March 2017

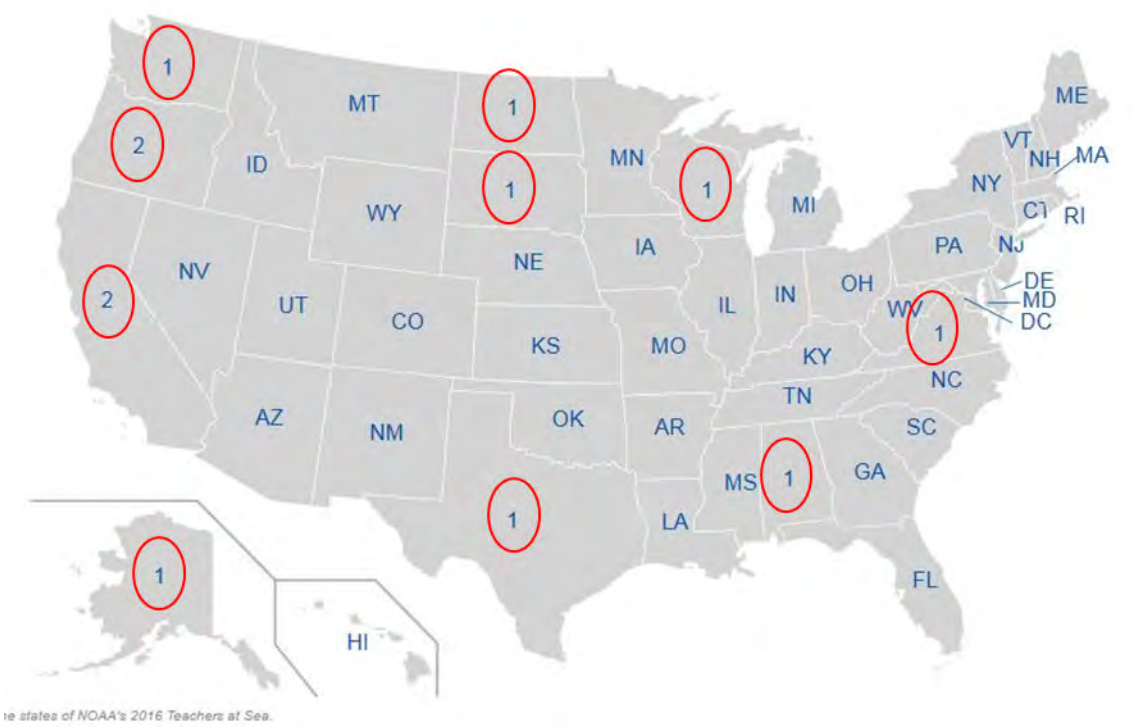
"My students will learn from this adventure of mine that there are programs that can lead them to successful oceanic careers."

- TAS '16 **Julia Harvey**

NOAA's Teacher at Sea Program
2016 Year in Review

2016 Special Alumni Season

- Teachers sailed: **12**
  - **3** elementary
  - **2** middle school
  - **7** high school
- Days at sea: **182**
- Research hours: **2,184**
- States represented: **10**
- Media articles/interviews: **21**



ıe states of NOAA's 2016 Teachers at Sea.

NOAA's Teacher at Sea Program
2016 Year in Review

Teacher Spotlight: Mary Cook – First cruise & Alumni cruise

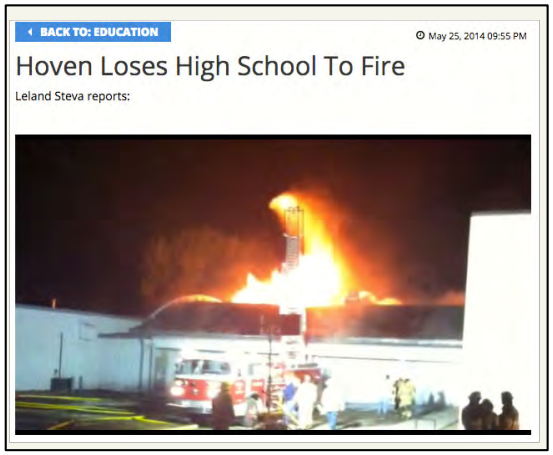
- First sailed in 2004 on NOAA Ship *Ronald H. Brown*
- Now teaches in Scammon Bay, Alaska – a rural Yupik Eskimo village
- In 2016, sailed with OER mission on R/V *Norseman II* surveying corals in Glacier Bay, Alaska
- All of Scammon Bay School (grades PreK-12) followed Mary's adventures

TAS '16 Mary Cook (holding eagle mascot) poses with Scammon Bay School's 4th grade class, who won the school's banner contest

NOAA's Teacher at Sea Program
2016 Year in Review

Teacher Spotlight: Spencer Cody – First Cruise

- Teaches in Hoven, South Dakota
- First sailed in 2014 on NOAA Ship *Pisces* – days after a fire destroyed his school



May 25, 2014

May 28, 2014

- Spencer's cruise received local attention and it helped his small community argue for the school to be rebuilt rather than consolidated

September 21, 2015

NOAA's Teacher at Sea Program
2016 Year in Review

Teacher Spotlight: Spencer Cody – Alumni Cruise

- In 2016, sailed on hydrographic survey on NOAA Ship *Fairweather*

TAS '16 Spencer Cody and NOAA Ship Fairweather

Student viewing 360° images

- Took 360° photos & used smartphones & Google cardboards to give students a "Virtual Field Trip"

NOAA's Teacher at Sea Program
2016 Year in Review

Alumni Activities and Events

- Teacher at Sea alumni participated in **35 events** and shared their research experience with their schools, communities, and the public
  - **8 local, regional, or national conferences** at which a total of 62 TAS alumni delivered presentations
  - Collaborations with as many as 30 NOAA scientists

TAS '15 Cristina Veresan, NOAA scientist Denise McKelvey, and TAS Alumni Coordinator Jenn Annetta at Smithsonian "Expert is In" Event

NOAA's Teacher at Sea Program
2016 Year in Review

Highlight: Seven Seas Celebration at Weatherly Heights Elementary in Huntsville, Alabama

- Annual school-wide ocean-themed family event on April 15, 2016
- Created and managed by TAS alumna Sue Zupko
- Participants made nautical flags, tracked a drifter buoy, created and measured fish
- NOAA Corps LT Jonathan Heesch participated and taught participants about ship safety

LT Heesch poses with a Seven Seas Celebration participant trying on a survival suit

NOAA's Teacher at Sea Program
2016 Year in Review

Highlight: Teacher in the Lab (TIL) project profiled in *Fisheries*

- Published article by long-time collaborator NOAA scientist Gary Winans at Northwest Fisheries Science Center
- TIL pilot project involves WA teachers & their students in genetic stock structure analysis

ESSAY

NOAA's Teacher in the Laboratory Program–Northwest Fisheries Science Center

Gary A. Winans
Conservation Biology Division, Northwest Fisheries Science Center, National Marine Fisheries Service, National Oceanic and Atmospheric Administration, 2725 Montlake Boulevard East, Seattle, WA 98112-2097. E-mail: gary.winans@noaa.gov
Jon Baker
Mariner High School, Everett, WA
Jennifer Hammond
NOAA Teacher at Sea Program, National Marine Fisheries Service, National Oceanic and Atmospheric Administration, Silver Spring, MD

INTRODUCTION

In 1990, the National Oceanic and Atmospheric Administration (NOAA) implemented the NOAA Teacher at Sea Program (TAS) to place competitively selected teachers on NOAA research vessels (McMahon and Hammond 2010). The goal of the program is to increase teachers' awareness of ocean-related research through hands-on experience, thereby stimulating the development of relevant, real-world NOAA-related science studies for students. Since its inception, teachers from all 50 states have participated in TAS, bringing NOAA-related science back to their classrooms (Figure 1). In 2010, TAS expanded to include a similar shore-based program called Teacher in the Laboratory (TIL), which allows teachers to spend part of their summer working with scientists in NOAA research laboratories around the country. Research topics covered by TIL have ranged from field studies of green turtles *Chelonia mydas* to krill culture to fish genetics (Table 1).

We developed a TIL program at the NOAA Northwest Fisheries Science Center (NWFSC) that emphasizes collecting and analyzing population genetic data of English Sole *Parophrys vetulus* within the Salish Sea, an estuarine ecosystem that includes the Strait of Georgia, Puget Sound, and the Strait of Juan de Fuca. This species was chosen because it represents one of the dominant members, by biomass, of the demersal fish group in the Salish Sea, and it is used extensively in NWFSC studies of eco-toxicity of the marine ecosystem (Johnson et al. 2008). We train teachers to gather population genetic data for DNA microsatellite loci of English Sole and to apply their findings to a current marine science issue. For two to three weeks during the summer, scientists mentor teachers at the center's Mukilteo Research Station in Mukilteo, Washington. During the following academic year, the teachers spend several weeks teaching a population genetics unit to their high school classes. During this time, students collect, interpret, and apply genotypic data to a mini population genetic survey.

The Mukilteo Research Station is an ideal setting for this program. It is a small research facility located on Puget Sound, where teachers, in the course of their training, are exposed to a variety of in-house research programs, including the use of fish and invertebrate culture for eco-toxicity, life history, and aquaculture investigations. Moreover, use of this field station in the summer helps to ensure that the TIL laboratory and classroom work does not interfere with other agency research at the main NWFSC research laboratory in Seattle.

The purpose of training teachers in population genetics is to give teachers the necessary skills and experience to collect their own genetic data from individual specimens. After training, TIL participants are able to:

- extract DNA from tissue samples and prepare it for analysis,
- amplify specific DNA microsatellite loci via polymerase chain reaction (PCR),

Figure 1. Number of teachers by state on NOAA research cruises 1990–2015. See NOAA (2016a).

Table 1. Examples of NOAA Teacher in the Laboratory programs 2010 to 2014.

Research topic	Laboratory	Location
Green turtle biology	Southwest Fisheries Science Center	La Jolla, CA
Boundary layer climatology	Earth Systems Research Laboratory	Erie, CO
Krill culture	Alaska Fisheries Science Center	Juneau, AK
Water quality	Chesapeake Bay Laboratory	Oxford, MD
Juvenile fish	Southeast Fisheries Science Center	Miami, FL
Fish population genetics	Northwest Fisheries Science Center	Seattle, WA

Gary A. Winans, Jon Baker & Jennifer Hammond (2016) NOAA's Teacher in the Laboratory Program–Northwest Fisheries Science Center, Fisheries, 41:8, 481-483

NOAA's Teacher at Sea Program Year in Review

Highlight: Workshop & Evaluation

- Successful Pacific Northwest Alumni Workshop November 2016 at NOAA's Western Regional Center
  - Connected with 20 TAS alumni from the Pacific Northwest (WA, OR, WY, MT and AK)
  - Met NOAA scientists and experts from the region and explored NOAA resources, facilities, materials, and activities
- Participating in an external evaluation with the goal to research the long-term and unexpected outcomes of the program with a final report expected in March 2017

Pacific Northwest Teacher at Sea Alumni Workshop at NOAA's Western Regional Center in Seattle, November 4-6

NOAA's Teacher at Sea Program
2017 Season Outlook

2017 Season Outlook

- Selected 30 teachers out of 280 applicants to start sailing in March
- Participating in many National and local education and outreach events
- Managing a Gulf Coast Alumni Workshop tentatively planned for May 2017

NOAA's Teacher at Sea Program
Teacher Perspectives

"[The scientists on board R/V *Norseman II*] are teachers in their own right. Their enthusiasm for their work and for learning new things is infectious and I plan to carry that attitude back to my students in Scammon Bay, infusing my classroom with awe and excitement to be brave, conscientious, problem-solving citizens of our magnificent Earth!"

- TAS '16 **Mary Cook**

NOAA's Teacher at Sea Program
Teacher Perspectives

"Thank you *Rainier*! I am confident that when I return to my classroom your efforts to help me better understand your work of hydrographic surveying will pay off. You have given me the gift of new knowledge that, when shared with my students has the potential to ignite in them the same excitement and passion for science that so many of you possess."

- TAS '16 **Lynn Kurth**

NOAA's Teacher at Sea Program Scientist Perspectives

Photo from channelislands.noaa.gov

"Nichia was a pleasure to host. She did an excellent job connecting with the researchers and portraying the importance of their work through the course of her blog posts. [The TAS Program] enables unique interactions between scientists and educators; a diverse and engaged crew is always good to create a positive working environment."

- Chief Scientist **Chris Caldow**, Channel Islands National Marine Sanctuary

NOAA's Teacher at Sea Program
Scientist Perspectives

Photo from nwfsc.noaa.gov

"Cathrine was a committed member of the science party from the moment she stepped on board. She was invaluable in the lab and eager to learn the other aspects of our work at sea. Both Scientists and Crew enjoyed her blog and cartoons...and I even heard a few comment that they learned something from them! Cathrine was an excellent ambassador for the TAS program and I have no doubt she'll translate what she learned during her time with us into engaging lessons for teachers and students."

- Chief Scientist **Sandy Parker-Stetter**,
Northwest Fisheries Science Center