

Partnership

Winter 2010/2011 Issue: Volume 21, No. 1

Letter from the Chair

- Suzanne Avtges, WHSTEP Co-chair, Mashpee High School

As we welcome a new year we are faced with many challenges. Currently in Massachusetts we are feeling the pressures of MCAS and other standardized tests. More changes are on the way with the state's participation in the U.S. Department of Education's Race to the Top (RTTT) program. As this translates down to our schools and classrooms, the focus has moved away from exploration and discovery to test-taking practice.

WHSTEP recognizes this philosophical shift and we now are asking you: How can we serve you better?

In order for you to enhance your classroom instruction, we hope to bring 21st century teaching and learning skills to you through WHSTEP Programs. WHSTEP has a plethora of opportunities for a classroom teacher. Over the years I have taken advantage of professional development, especially the Science Safaris. We have explored labs of WHOI, MBL and Fisheries. We have walked the carbon trail at the Woods Hole Research Center and even explored the wind turbine at Massachusetts Maritime Academy. Most recently, tours of the Woods Hole labs have increased my knowledge of remotely operated underwater vehicles, as well as DNA replication and amplification. At an Annual Meeting program event I learned about the online Encyclopedia of Life (EOL) at MBL. I immediately applied the program into my Marine Science and AP biology classes as I had them work on a field guide of indigenous plants and animals. Their primary source was the EOL. While something may not directly apply to the subject you teach, as life-long learners any knowledge we gain can certainly enhance our students' learning. We want to continue to offer exciting professional development to teachers that will keep you on the cutting edge of science and technology.



Phoebe Cohen

Teachers visit the lab of Dr. Linda Amaral-Zettler in the MBL Bay Paul Center during a recent WHSTEP Science Safari on the topic of Astrobiology.

Recent topics for our general meetings have been learning about the geology of the Upper Cape and the MBL Aquadome Project to raise Black Sea Bass. Our Annual Liaison Dinner this year showcased local field lessons that could allow your students to explore the local area. This year we offered a new programming format – a forum for students on the Gulf of Mexico Oil Spill. Teachers, students and members of the community attended this very successful evening event.

Your feedback and participation are important to us. As my co-chair, Debbie Scanlon, and WHSTEP administrator, Kama Thieler, and I plan this year's events with the Executive Committee, we'd like to know what types of programming events would you like to see from us. Do you need a mentor for a student project? Is the liaison network effective? With the wealth of resources available to serve the Falmouth, Mashpee and Bourne school districts, we want to ensure that we are still attaining the goals of WHSTEP to reach out to our communities and share scientific knowledge and technological advances – as they develop!

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So please keep in touch and let us know your thoughts. Email us at: savtges@gmail.com, dscanlon@mbl.edu or whstep-info@whoi.edu

WHSTEP 2010 Highlights

In January, the **WHSTEP General Meeting** was held at the Woods Hole Research Center (WHRC). About 30 teachers, students, institution liaisons, and members of the public heard an interesting summary of the meetings at the 15th Conference of the Parties (COP 15) of the United Nations Framework Convention on Climate Change in Copenhagen. Attendees also learned about WHRC's green building, completed in 2003, and its on-site education trail.

For 13 years, WHSTEP has organized a **science project mentoring program** at the Lawrence School in Falmouth. Members of the WHSTEP scientific community volunteer their time to meet with 7th and 8th grade students and help them design and refine their science projects. This year, mentoring took place over a week in early February. Thirty volunteers participated from MBL, WHOI, USGS, WHRC, SEA, and WBNERR.

WHSTEP arranged for **science institution exhibits** at the Falmouth District Science Fair in late February. Students and families enjoyed the informative and interactive displays. The inaugural Bourne Science Fair, sponsored by the PTA, was held in mid-March at Bourne Middle School. WHOI, USGS, MBL Marine Resources Center and the Encyclopedia of Life project exhibited at the Fair.

In April, a **WHSTEP Science Safari** "Exploring Local Conservation Lands" was held in East Falmouth, originating at the East Falmouth School and culminating with a walk through a nearby conservation property on Green Pond. Local author, naturalist and educator Beth Schwarzman led the safari. Teachers received ideas for activities, as well as maps and information highlighting conservation parcels near each school in Falmouth, Mashpee and Bourne.

In May, nearly 100 friends and supporters of WHSTEP turned out to celebrate its **20th Anniversary** at WHOI's Clark Building. Several of the WHSTEP founders and early advocates attended along with active and retired teachers and scientific institution staff. Keynote speaker was WHOI's Director of Special Projects, Dr. David Gallo. Each school district and scientific institution sent its superintendent, director, or representative to congratulate and encourage WHSTEP.

In early October, WHSTEP hosted a **forum on the Gulf of Mexico oil spill** for students and their parents and teachers at Falmouth High School. A panel of 5 speakers from WHOI, USGS, and the National Park Service spoke about oil formation in the Gulf, their experiences surveying the spill from research ships, technology used to detect oil in the ocean, and spill's effect on wildlife, marshes and beaches. The students, grades 4-12, then had the opportunity to ask questions of the panelists.

In mid-October, the annual **WHSTEP Liaison Welcome Dinner** was held at the Landfall Restaurant in Woods Hole with 35 attendees. Outreach and education staff from the science institutions and local informal science programs presented opportunities for student field trips and field experiences. School and institution liaisons, elementary, middle and high school teachers, school administrators and scientists enjoyed an evening of networking and planning.

In mid-November a **WHSTEP Science Safari** "What is Life and How Do We Detect It?" was presented at the Marine Biological Laboratory by the NASA Astrobiology outreach team. Teachers learned about what Astrobiology is and how to use it in teaching students basic science concepts, and tried out three hands-on activities for easy transference into the classroom. Then they visited the lab of Dr. Linda Amaral-Zettler to learn about her research on acid-tolerant microbes from the Rio Tinto in Spain. Teachers received many materials including the Astrobiology Teachers Guide.

On-going projects:

- Through the **Registry of Science Outreach Volunteers** (WHSTEP R.O.V.) and our liaison network, WHSTEP links teachers with researchers and materials from the member scientific institutions, and links researchers with schools to fulfill their outreach goals. Some examples from 2010 include finding scientists to visit classrooms and collaborate on lesson plans, arranging field trips to Woods Hole institutions, collaborating on the GLOBE student water sampling program with WHOI, and partnering on a NOAA Environmental Literacy Grant proposal.
- WHSTEP awards **mini-grants** to support and enhance science, math and technology education in our member schools. This year's funded projects were the LEGO Club at Bournedale Elementary School to provide gears, wheels and other LEGO components for the new enrichment club; funds for supplies for the Cross-Age Science Teaching program in which Lawrence School 8th graders teach concepts of electricity to 3rd grade students in Falmouth; and a project at Peebles Elementary School in Bourne to provide supplies and equipment for a hands-on science program, based on standards in the elementary science curriculum, and to promote participation in the yearly science fair.
- "Partnership", the WHSTEP newsletter, is published bi-annually and distributed to a mailing list of over 400 people.
- WHSTEP administers an email listserv to publicize our programming and meetings, as well as relevant local workshops and lectures on topics of science, math and technology.

WHSTEP Liaison Welcome Dinner

- Debbie Scanlon

The annual WHSTEP liaison dinner was held on October 20, 2010 at the Landfall Restaurant in Woods Hole. This year's program featured presentations to teachers on field trips and field experiences for their students. Eight scientists and outreach staff members brought displays about lab and ship tours, aquarium visits and exhibits, and hands-on collecting trips that are available nearby.

Anne Thessen of the Encyclopedia of Life (EOL) and the Marine Biological Laboratory (MBL), presented information on EOL's efforts to gather information on all the Earth's animals, plants and microorganisms and make it available as a web-based resource. Pam Wilmot of MBL shared information on tours of the MBL and its Marine Resources Center. Kathy Zagzebski of the National Marine Life Center in Buzzards Bay brought a display on her center's rescues of stranded marine animals. Abbey Spargo from Ocean Explorium at the New Bedford Seaport explained her organization's ocean science public education program, and Joan Muller from Waquoit Bay National Estuarine Research Reserve presented the research reserve's educational programs. Information on the Woods Hole Oceanographic Institution Ocean Sciences Exhibit Center and tours was presented by Karen Damelio of WHOI Exhibit Center, and Kathleen Savage of Woods Hole Research Center explained the center's educational trail and "green" building. Rob Reynolds of Zephyr Education Foundation presented information on marine collecting boat trips and field studies.

Thirty-five school and institution liaisons, elementary, middle and high school teachers, school administrators and scientists attended and enjoyed networking and planning.



Debbie Scanlon

Kathy Zagzebski (left) describes the programs at the National Marine Life Center in Buzzards Bay to Bob Laquidara, Lawrence School.

Special thanks to Don Estes, owner of the Landfall Restaurant and member of the WHSTEP Executive Committee, who donated use of the restaurant for the event, and to the scientific institutions that provided literature, maps and other educational material for the teachers and raffle prizes.



Debbie Scanlon

Chloe Starr (left) and Kathleen Savage of Woods Hole Research Center and Gordon Starr of Teaticket School discuss student field trips to the Center's education trail.

Liaison Dinner presenters and web resources:

Encyclopedia of Life Outreach and Education

<http://education.eol.org/>

Marine Biological Laboratory Tours

http://www.mbl.edu/about/visit/visit_tours.html

National Marine Life Center, Buzzards Bay

<http://nmlc.org/>

NOAA Marine Fisheries Woods Hole Science Aquarium

<http://aquarium.nefsc.noaa.gov/>

Ocean Explorium at New Bedford Seaport

<http://www.oceanexplorium.org/>

Waquoit Bay National Estuarine Research Reserve Educational Programs

www.waquoitbayreserve.org

Woods Hole Oceanographic Institution Ocean Sciences Exhibit Center and Tours

<http://www.whoi.edu/page.do?pid=9135>

Woods Hole Research Center Education Trail and Green Building

www.whrc.org

Zephyr Education Foundation Boat Trips and Field Studies

<http://www.zephyrmarine.net/>

WHSTEP Science Safari : Bringing Astrobiology into the Classroom

- Debbie Scanlon and Kama Thieler

"What is life, and how do we detect it?" was the theme for the WHSTEP Fall Science Safari at Marine Biological Laboratory in November 17, 2010. Led by Peter Mangiafico and Michele Bahr of MBL and Phoebe Cohen of Massachusetts Institute of Technology, the two-hour teacher workshop was designed to bring the topic of Astrobiology into the classroom.

Astrobiology is the study of the origins, evolution, and future of life in the Universe. It is interdisciplinary by nature, incorporating life science, Earth and space science, math and physics.

Teachers and other interested participants took part in four activities focused on defining life and how we look for life on Earth and other planets. The activities were chosen for easy transference to the classroom. In the first activity, participants used the "Near and Far" and "Small and Large" card games from the Alien Earths Program to gain perspective on the scale and structure of the Universe. They sorted 10 images of Earthly and celestial objects (including an eagle, the space shuttle and the Hubble Deep Field view) in order of their distance from Earth's surface and according to their size.

In the next activity, participants were asked to look at a series of pictures, including jellyfish, sponges, and crystals, and for each one, answer, "Is it alive?" and "Why?" As they discussed each image, they were asked to write down characteristics of life.

The final two activities can be found in the *NASA Astrobiology Educator Resource Guide* (see sidebar). Each group received three jars that contained combinations of sand, sugar, yeast and ground antacid tablets. They added water to each jar and observed the results. Using the list of life characteristics from the earlier activity, they looked for signs of life in the jars.



Debbie Scanlon
Lee Campbell, WHSTEP, and Tim Willmott, Upper Cape Tech, look for evidence of life in an activity in the Astrobiology safari.

Finally, in the "What makes a world habitable?" activity, the participants examined characteristics of planets and moons and discussed if they might be able to sustain life.

The teachers also visited the lab of Dr. Linda Amaral-Zettler at MBL's Bay Paul Center for Comparative Molecular Biology and Evolution to learn about her research on acid-tolerant microbes from the Rio Tinto in Spain. These microbes are considered "extremophiles", organisms that live in extreme conditions of temperature, pressure, pH, etc. The survival of life in extreme environments on Earth may serve as a model for life on other planets and moons.



Phoebe Cohen
Teachers take a look at acid-tolerant Euglinids from Rio Tinto, Spain.

Bob Laquidara, science department head, Lawrence Junior High School, said, "The Safari was great. We all left with a much broader appreciation of defining life and the challenges of recognizing it outside of the framework of what is familiar to us on earth. I've been to most of the WHSTEP Science Safaris over the years. This one was a 10 out of 10."

Astrobiology Resources

NASA Astrobiology site:

<http://astrobiology.nasa.gov/>

Astrobiology Educator Resource Guide,
"Life on Earth...and elsewhere?":

<http://nai.arc.nasa.gov/library/downloads/Astrobiology-Educator-Guide-2007.pdf>

MIT "Advent of Complex Life" site:

<http://www.complex-life.org>

"Near and Far" and "Small and Large" Activity Cards:

<http://www.alienearts.org/exhibit/education/activities.html>

More information on Linda Amaral-Zettler's research in RioTinto, Spain:

http://amarallab.mbl.edu/rt_main/rt.html

Spotlight on Mini-Grant Awardees: Cross Age Science Teaching Program

- Lynn Parks

Thanks, in part, to WHSTEP for supporting the CAST Program, an innovative approach to learning and a very successful one.

For the past two years, I have been fortunate to be part of the CAST program, otherwise known as the Cross Age Science Teaching program. Lawrence School eighth grade students learn how to teach third grade students about electricity. Each Falmouth elementary school is visited by different groups of 8th grade students who teach three hands-on lessons to the 3rd grade students. Many have latent leadership qualities that just aren't as obvious in a classroom as they are in a program such as the CAST program.

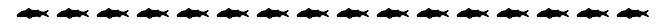
The third grade receiving teachers always welcome the eighth grade students as they, too, recognize how these young adults can teach the same concept they might teach but with a more receptive audience, someone new to the classroom but also someone closer to their age. Additionally, some of these teachers have had these students in the past and they really enjoy seeing how they have developed into such competent leaders and enjoyable young adults.

As their instructor, I enjoy seeing them learn how to teach others which only strengthens their own knowledge base. One must know in order to teach. Also, comments are made about how difficult it is to be a teacher and how they will make sure to help their teachers as much as possible, said in different words, though. The volume on the bus from the school is always much louder than going to it. They have so many stories to compare about how this worked and that didn't. Most importantly, they are put in a leadership position, which shows them that they really can be in such a role and succeed.

Quite often, as I cruise through the rooms helping out wherever I can, the teachers tell me how some of the students they have are so excited and that they are very engrossed in the activity, more so than they have been in the past. One student, who wasn't particularly successful in third grade, was very successful at doing the CAST activities. One of his peers said in front of the whole group, "So, that's what you're good at – science." This youngster proudly said, "Yes."

An eighth grade student once told me at the end of our session that he was thinking about becoming a teacher as he really liked how rewarding it was to work with young people. He had a particularly challenging group and had learned how to engage them and how to be an effective

teacher. I saw him later that summer in the grocery store where he was working; he said, without hesitation, the same thing and I know sincerely meant it. Many others leave there with a smile on their faces knowing that their participation has been a wonderful part of their education – both at the third grade and eighth grade levels. Although, I'm still not sure who gets the most from this program. It might even be me!



Bon Voyage, Pat Harcourt, and Welcome New Liaisons and Committee Members

-Kama Thieler

Many of you might be wondering about the whereabouts of Pat Harcourt, our former Executive Committee Chair, and education coordinator at the Waquoit Bay Reserve. In late summer Pat moved to Long Beach, California, and is currently working with COSEE West (Center for Ocean Sciences Education Excellence). She reports that her new position has a lot of elements that would be familiar to WHSTEPers. The program is dedicated to organizing and delivering programs that bring together marine scientists and educators in presentations, courses, and field studies.

Pat says, "WHSTEP can rest assured that I won't be a permanent resident of southern California. The weather is very pleasant, but the area is extremely urban. I look forward to returning to Falmouth in a year or two, and to reconnecting with WHSTEP people and projects."

Suzanne Avtges, Mashpee High School, and Debbie Scanlon, MBL, long-time liaisons and Executive Committee members, have taken over as Co-Chairs. New Executive Committee members for 2010-2011 are Lynn Parks, former science teacher at the Lawrence School in Falmouth and current coordinator of the Cross-Age Science Teaching program (CAST, see related article in this issue) and Jeff Schell, oceanography faculty at SEA. We would like to thank outgoing board member Cheryl Milliken from Falmouth High School for her many years of dedicated service on the board.

For the 2010-2011 school year, WHSTEP welcomes the following new liaisons: Debra McCurdy and Kathy Bowker (North Falmouth Elementary) and Nate Twichell (SEA). We would like to thank Sam Slarskey, Janet Wessling, and Phyllis Downey for their time and dedication as liaisons.

An Evening of Oil Spill Science for Students, Teachers, and Families

-Lee Campbell

On October 13, 2010, WHSTEP sponsored *Oil Spill Forum for Students and Families*, a family science program about the *Deepwater Horizon* oil spill at Falmouth High School auditorium. The panel of five speakers included scientists who either worked on the spill or who do research on related topics: John Pohlman of the US Geological Survey in Woods Hole, Rich Camilli, Dana Yoerger, and Chris Reddy, from Woods Hole Oceanographic Institution (WHOI), and Barbara Dougan of the National Park Service.

Four of the five speakers were directly involved in the aftermath of the spill, researching the fate of the oil or involved in the clean-up of beaches and marshes in the Gulf region. Several of the panel members were marine engineers who use new technologies to design instruments that help them collect data and solve problems. Because the study of technology is now part of the curriculum at most Massachusetts middle and high schools, this was of special interest to teachers.

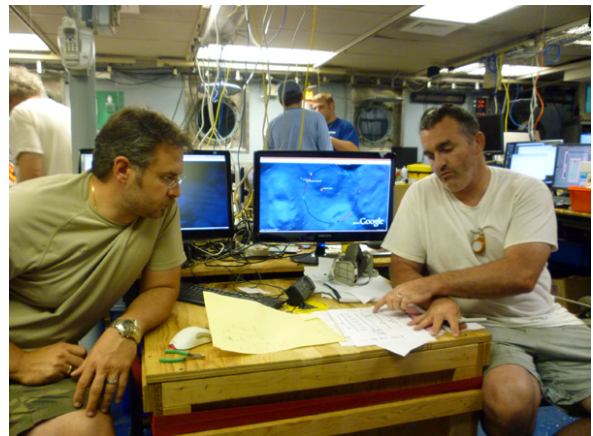
The audience was an appreciative group from a variety of backgrounds: marine science and AP biology students from Mashpee High School, fourth and fifth graders from the Webelos Cub Scout Pack 43, Den 6, and many other parents and children, teachers, high school students, and WHSTEP members.

As most in the audience were well aware, an offshore oil drilling platform, *Deepwater Horizon*, exploded in the Gulf of Mexico near Louisiana on April 20, 2010. Eleven workers lost their lives, and the well itself was left gushing crude oil into the water. The rig, owned by Transocean Ltd, was under contract to British Petroleum (BP). Along with BP's specialists, many US federal, state and other agencies were called upon in response to the event. The *Deepwater Horizon* oil well was finally capped 120 days later, on July 15, 2010. The accident is now considered the largest offshore oil spill in U.S. history. With an estimated five million barrels of oil spilled, it was one of the worst human-induced environmental catastrophes in modern history.

John Pohlman is a biogeochemist in the gas hydrate research group at the U.S. Geological Survey. Although he was not involved in researching this spill, he provided background on oil and other components of the seafloor sediments in places like the Gulf of Mexico. This includes methane, the primary constituent of gas hydrates present in the deep ocean, including the Gulf of Mexico. His main research interest is determining if methane from gas hydrate and other sources is entering the atmosphere and affecting climate change.

Pohlman described the special features of the Gulf of Mexico that played a role in oil formation. He explained that the Gulf is a "restricted basin" that has collected a huge amount of sediment and organic matter over time. Comparing the Gulf to a kitchen, he described how heat and pressure affect buried sediments like an oven, causing the organic matter to transform into oil and natural gas.

The three panelists from WHOI, Richard Camilli, Dana Yoerger, and Christopher Reddy, along with other researchers from WHOI and other research institutions and universities, embarked on a joint research cruise in July 2010 to conduct a multidisciplinary study of the effects of the *Deepwater Horizon* oil spill.



Courtesy WHOI

Panelists Rich Camilli (left) and Chris Reddy, WHOI, on board RV *Endeavor* in the Gulf of Mexico in July 2010. They were part of a "rapid response" research cruise to study the oil spill.

Rich Camilli, the first of the three to speak, is an Associate Scientist in WHOI's Deep Submergence Lab whose expertise includes sensor and instrumentation design, Autonomous Underwater Vehicle (AUV) design, chemical oceanography, intelligent control systems, remote sensing, high-resolution and concurrent mapping and deep water archaeology.

One of his concerns was why the Blow-Out Preventer Vent failed, leading to the oil rig explosion. This vent is about 32 feet long and 67 tons and was designed to work under 15,000 pounds per square inch of pressure from the waters above. Its failure enabled crude oil to gush up from the well head on the sea floor. Camilli explained that the main problem in turning off the well was the rising of gas hydrates from the surrounding sediments. The methane and water, under such great pressure, began to freeze and form hydrate crystals.

Camilli went on to describe the team's use of an underwater robot, an AUV, to examine the well head. The vehicle, named *Sentry*, was built by a team of

(Oil Spill Forum, cont.) engineers at WHOI, and is capable of exploring the ocean down to 4,500 meters (14,764 feet) depth and of analyzing the chemistry of the water without commands from the surface. *Sentry* was deployed to the *Deepwater Horizon* well head carrying sonar imaging and Doppler acoustic velocity measurement tools. These sensors, mounted to the outside of *Sentry*, were able to measure the flow rate of oil rising to the surface with the gas hydrates. The process, known as acoustic flow rate analysis, gave an estimated flow rate of about 53,000 barrels of oil leaking per day. The researchers could then calculate the cumulative leaking day after day, and estimated that 4.2 million barrels of oil had been spilled.

Dana Yoerger is a senior scientist in WHOI's Deep Submergence Lab. His research interests include applying principles of automation to remotely-operated and autonomous underwater vehicles to add capability and ease of use, design of vehicles including the *Medea/Jason* remotely operated vehicle system and the *Autonomous Benthic Explorer* (ABE), *Sentry*, and *Nereus*. His presentation was about using underwater robotics to map the oil spill.

To respond to the *Deepwater Horizon* disaster, Yoerger modified technology that had been previously used to detect



hydrothermal vents on the seafloor. He worked with Rich Camilli to mount a special sensor, *Tethys*, an underwater mass spectrometer, on the AUV *Sentry*. According to Yoerger, spectrometers can “sniff out” tiny amounts (measured in parts per billion) of petroleum and other chemicals in sea water instantly, somewhat like an artificial dog’s nose! The data collected by *Tethys* is then relayed back to the researchers on the ship. Yoerger knew the students in the audience would understand when he described this process as similar to text messaging.

Yoerger explained that the instruments discovered and mapped a plume of hydrocarbons, a layer of degraded oil, in the water near the well head. Carrying *Tethys*, *Sentry* criss-crossed the plume boundaries over and over again. Once the boundaries of the plume were known, water sampling bottles designed to sample at a specified depth were positioned in arrays and lowered from the ship. The plume measured 1.2-mile-wide, at least 22

miles long, 650 feet thick and was suspended at a depth of more than 3,000 feet below the surface.

Yoerger described a busy scene at the *Deepwater Horizon* site with 50-60 ships surrounding the *RV Endeavour* each day. They were all together in an area about 20 miles long and a mile wide. Some were skimming the surface for oil, others ships were burning oil off the water’s surface, while others were spreading chemicals to help disperse the oil. He said it was quite humbling.

Christopher Reddy is an Associate Scientist in WHOI's Marine Chemistry and Geochemistry Department and Director of WHOI's Coastal Ocean Institute. His research interests focus on oil spills, which he has studied for more than 15 years, as well as marine pollution, and marine natural products.

Reddy spoke of the fate of oil in the Gulf of Mexico. He began by asking the audience “Where did all the oil go?” When no answers were offered, he explained that oil spills have personalities – they exhibit different structures and different tendencies based on the compounds that make up the oil. This knowledge can help scientists predict where spilled oil will end up. Reddy and his colleagues on the *RV Endeavour* analyzed the water samples collected from specific locations and different water depths to get a clearer picture of where the oil is in the Gulf. He said that the discovery of the plume was an amazing result. Reddy asked his audience, “Because oil is lighter than water, we all think oil floats, right?”

Reddy said it may be many months of laboratory analysis before they know the entire inventory of chemicals in the plume. He said the results from this study, and more samples yet to be analyzed, eventually could refine recent estimates about the amount of the spilled oil that remains in the Gulf.

Barbara Dougan spoke on the effect of the spill on animals and people. She is an Education Specialist with the National Park Service, based at the Cape Cod National Seashore. She also is a trained Public Information Officer for the Park Service; as such, she serves at hazard incidents throughout the country. Dougan was a key figure in the beach and marsh clean-ups related to the *Deepwater Horizon* oil spill. She coordinated this effort for the Gulf Islands National Seashore, the largest National Seashore in the country.

The National Parks throughout the Gulf of Mexico began immediately after the spill to document water quality and environmental conditions for plant and

(Oil Spill Forum, cont.) animal life. When oil started washing up at the Gulf Islands National Seashore, more scientists answered the call to help direct clean-up crews in the best methods to remove oil without causing further harm to plants, animals, historic buildings or buried artifacts.

The sands of the Gulf Islands National Seashore could not be altered because these beaches provide nesting areas for large numbers of sea turtle species, most of which are considered endangered or threatened. National Park Service personnel along with trained specialists from other agencies collected about 14,000 sea turtle hatchlings that were later relocated and released off the coast of Florida.

Once the sea turtle and shore bird nesting cycles were complete, the volunteers could begin to address the problem of buried oil.



Courtesy NPS
Tar balls on Ship Island beach, MS.

Dougan described the arrival of oil on the beach, about a month after the blow out, in the form of tar balls, tar “patties”, and very small tar “raisins”. The goal of the time-sensitive clean-up was to get all the tar out of the surface sediments, and to do so before a coastal storm might come through and bury the tar or push it higher into the dunes. For the sake of birds and other beach wildlife, the task had to be done by hand.

As a follow up to the talks by panel members, students in the audience were invited to approach the microphone and ask a question. There was little hesitation as hands were raised all around the auditorium. The questions showed deep concern and solid understanding among the students. Answers from the scientific panel members demonstrated the same.

WHSTEP is indebted to Judy Fenwick, a Research Administrator in the WHOI Deep Submergence Laboratory and former member of the WHSTEP Executive Committee (1998-2005) for moderating the panel discussion, and for her help in planning the event. We also gratefully acknowledge the panelists’ wealth of knowledge, and their willingness to share it with students and the community.

Oil Spill Resources

BRIDGE – Marine education resources maintained by the Virginia Sea Grant Marine Advisory Program and sponsored by NOAA Sea Grant and the National Marine Educators Association:

http://www2.vims.edu/bridge/search/bridge1output_menus.cfm?q=spill

NOAA Education Resources - With sections on Multimedia, Lessons & Activities, Real World Data, Background Information, Career Profiles and Frequently Asked Questions (FAQs) about Oil and Chemical Spills:
http://www.education.noaa.gov/Ocean_and_Coasts/Oil_Spill.html

Windows to the Universe – from the National Earth Science Teachers Association:

http://www.windows2universe.org/teacher_resources/main/teach_oil_spill.html

WHOI’s Involvement in the Deepwater Horizon Oil Spill, including a description of the Sentry AUV and other technology:

<http://www.whoi.edu/dwhresponse/page.do?pid=43715>

MIT Soapbox Lecture given by Christopher Reddy, WHOI, “Mixing Oil and Ecosystems”, November 10, 2010:

<http://mitworld.mit.edu/video/862>

MIT Soapbox Lecture given by Richard Camilli, WHOI, “Probing the Plume”, November 17, 2010:

<http://mitworld.mit.edu/video/865>

Restore the Gulf

Official U.S. Government site, classroom resources:

<http://www.restorethegulf.gov/task-force/education-resources/classroom>

The Encyclopedia of Life - Oil spill resource with information on species affected by the oil spill, as well as links to more information:

http://www.eol.org/content/page/oil_spill_2010

Smithsonian’s Ocean Portal

<http://ocean.si.edu/ocean-and-you/gulf-oil-spill/>



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KC Coombs School (Mashpee; K-2)
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Lawrence School (Falmouth; 7-8)
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