Dear MAMEA members:

I am proud to be your current President, and appreciate your support and belief in my ability to lead this great organization. I want to thank all of the 2009 Conference Committee members once again—without their help the conference could never have happened. From all of the evaluations and comments I have received, the conference was a great success. We had over 60 participants from 7 states, and I am particularly proud to have had so many MAMEA Past-Presidents in attendance. I have already been in contact with Ruth Gourley, President-elect, several times as she is actively planning the 2010 Conference in Wilmington, NC. Interestingly, although we live in the northern and southernmost reaches of MAMEA territory, respectively, Ruth and I are alumni of the same high school in Newark, Delaware, and their staff was thrilled to hear about this coincidence!

My goals for the coming year include:
- Surveying our membership to determine ways to increase participation on the Board,
- Increasing our efficiency and green practices by investigating electronic methods of paying for membership and for registering for conferences, and
- Increasing participation in MAMEA events by educators who have not historically been a part of our organization

If you are interested in helping with any of these efforts or in being involved on the MAMEA Board, please contact me.

Tami Lunsford
MAMEA President 2009

MAMEA Awards Two Mini-Grants
by Carol Hopper Brill, MAMEA Past-President

Each year, MAMEA supports its members’ innovative marine and aquatic education projects through its Educational Project Grant Program. Two grants are available annually, one for formal educators (classrooms, K-16) and one for informal educators (museum, aquarium, zoo, science center, government agency staff). Grant awardees are announced at the annual conference in October.

This year, the grant for informal education was awarded to Kathy Fuller, Youth Programs Coordinator at the National Aquarium, Baltimore. Her project, “Watershed Wonders Henry Hall Program Water Quality Testing Equipment,” will use the MAMEA funding to purchase scientific instrumentation for a long-standing program. The Henry Hall Program, established in 1982, provides opportunities for youth from Baltimore City Public Schools to participate in activities that expose them to careers in aquatic sciences.

Students from the Henry Hall Program at the National Aquarium, Baltimore, get hands-on experience sampling water quality from kayaks. Credit: Kathy Siegfried Fuller
The MAMEA Board of Directors meets twice a year. If you are interested in serving on the Board, please visit http://www.mamea.org and click on “Board.”

## 2008-2009 Officers & Committee Chairs

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<tr>
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<tbody>
<tr>
<td>President</td>
<td>Tami Lunsford</td>
<td>Howard High School of Tech. and MATE Center</td>
<td>(302) 731-3035 (home) <a href="mailto:tami.lunsford@gmail.com">tami.lunsford@gmail.com</a></td>
</tr>
<tr>
<td>President-Elect</td>
<td>Ruth Gourley</td>
<td>NC Aquarium at Fort Fisher</td>
<td><a href="mailto:ruth.gourley@ncaquariums.com">ruth.gourley@ncaquariums.com</a></td>
</tr>
<tr>
<td>Past-President</td>
<td>Carol Hepper Brill</td>
<td>VA Sea Grant/VIMS</td>
<td><a href="mailto:chopper@vims.edu">chopper@vims.edu</a></td>
</tr>
<tr>
<td>Secretary</td>
<td>Kathy Fuller</td>
<td>National Aquarium in Baltimore</td>
<td><a href="mailto:jfuller@aqua.org">jfuller@aqua.org</a></td>
</tr>
<tr>
<td>Treasurer</td>
<td>Jackie Takacs</td>
<td>MD Sea Grant/UMCES</td>
<td><a href="mailto:jakacs@ch.umd.edu">jakacs@ch.umd.edu</a></td>
</tr>
<tr>
<td>NMEA Representative</td>
<td>David Christopher</td>
<td>National Aquarium in Baltimore</td>
<td><a href="mailto:dchristopher@aqua.org">dchristopher@aqua.org</a></td>
</tr>
<tr>
<td>Awards</td>
<td>Allison Besch</td>
<td>NC Maritime Museum</td>
<td><a href="mailto:alison.besch@ncmail.net">alison.besch@ncmail.net</a></td>
</tr>
<tr>
<td>Beth Jewell</td>
<td></td>
<td>West Springfield High School</td>
<td><a href="mailto:jn221jude@hotmail.com">jn221jude@hotmail.com</a></td>
</tr>
<tr>
<td>MAMEA Grants</td>
<td>Carol Hepper Brill</td>
<td>VA Sea Grant/VIMS</td>
<td><a href="mailto:chopper@vims.edu">chopper@vims.edu</a></td>
</tr>
<tr>
<td>Conference Scholarships</td>
<td>Amy Sauls</td>
<td>Jones Senior High School</td>
<td><a href="mailto:islandamy@coastalnet.com">islandamy@coastalnet.com</a></td>
</tr>
<tr>
<td>Mentoring</td>
<td>David Christopher</td>
<td>National Aquarium in Baltimore</td>
<td><a href="mailto:dchristopher@aqua.org">dchristopher@aqua.org</a></td>
</tr>
<tr>
<td></td>
<td>Dawn Sherwood</td>
<td>Highland Spring High School</td>
<td><a href="mailto:dshewrod@henrico.k12.va.us">dshewrod@henrico.k12.va.us</a></td>
</tr>
<tr>
<td>Standing Rules Chair</td>
<td>Ruth Gourley</td>
<td>NC Aquarium at Fort Fisher</td>
<td><a href="mailto:ruth.gourley@ncaquariums.com">ruth.gourley@ncaquariums.com</a></td>
</tr>
<tr>
<td>MAMEA Webkeeper</td>
<td>Lisa Ayers Lawrence</td>
<td>VA Sea Grant/VIMS</td>
<td><a href="mailto:ayers@vims.edu">ayers@vims.edu</a></td>
</tr>
<tr>
<td>Masthead Editor</td>
<td>Chris Petrone</td>
<td>VA Sea Grant/VIMS</td>
<td><a href="mailto:petrone@vims.edu">petrone@vims.edu</a></td>
</tr>
<tr>
<td>Publications</td>
<td>Kathy Fuller (Chair)</td>
<td><a href="mailto:kfuller@aqua.org">kfuller@aqua.org</a></td>
<td></td>
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<tr>
<td></td>
<td>Lisa Lawrence (Website)</td>
<td><a href="mailto:lisa.lawrence@vims.edu">lisa.lawrence@vims.edu</a></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Chris Petrone (Masthead)</td>
<td><a href="mailto:petrone@vims.edu">petrone@vims.edu</a></td>
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<tr>
<td></td>
<td>Andrew Wilson (Facebook)</td>
<td>Under the Sea</td>
<td><a href="mailto:ivaknitt@mcps.org">ivaknitt@mcps.org</a></td>
</tr>
<tr>
<td>Archives</td>
<td>David Christopher</td>
<td>National Aquarium in Baltimore</td>
<td><a href="mailto:dchristopher@aqua.org">dchristopher@aqua.org</a></td>
</tr>
<tr>
<td>Delaware</td>
<td>John Lunsford</td>
<td>Hodgson Vocational Tech HS</td>
<td><a href="mailto:johnlunsford@harryscrab.com">johnlunsford@harryscrab.com</a></td>
</tr>
<tr>
<td>Maryland</td>
<td>Karen Mattingly</td>
<td>Green Holly Elementary</td>
<td><a href="mailto:kmattigingly@vims.org">kmattigingly@vims.org</a></td>
</tr>
<tr>
<td>District of Columbia</td>
<td>Bill Simpkins</td>
<td>National Aquarium in DC</td>
<td><a href="mailto:bsimpkins@mail.nationalaquarium.com">bsimpkins@mail.nationalaquarium.com</a></td>
</tr>
<tr>
<td>Virginia</td>
<td>Chris Witherspoon</td>
<td>Virginia Aquarium &amp; Marine Science Center</td>
<td><a href="mailto:cwitherspoon@VirginiaAquarium.com">cwitherspoon@VirginiaAquarium.com</a></td>
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<td>Amy Sauls</td>
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<td><a href="mailto:islandamy@coastalnet.com">islandamy@coastalnet.com</a></td>
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**From the Editor**

Greetings MAMEA! I hope this issue finds you all well and keeping pace with this roller coaster weather. In this issue of *The Masthead*, you will find wrap-ups of Board initiatives; a great start-up recycling program partially funded by MAMEA; and of course, the fantastic annual conference in Delaware. Speaking of the conference, we had yet another invigorating, educational and fun meeting, which included a full-tilt dance party. Great job Tami and the Conference Committee! Thank you to those that contributed to this edition of *The Masthead*. I encourage members who have programs or experiences that might inspire or benefit the membership to submit an article for the next issue. Enjoy *The Masthead* and Happy Holidays!

- Chris Petrone

To submit an activity, lesson plan, event, or other feature, please email the piece to petrone@vims.edu.

**About the Cover Ship**

Each issue of *The Masthead* features a different Mid-Atlantic (usually) sailing ship in the cover banner. This issue’s banner features a photo taken by Masthead editor Chris Petrone while visiting Bermuda in June.

This summer, tall ships from around the world participated in a 7,000+ nautical mile race around the North Atlantic, stopping at several ports of call. Petrone and his wife just happened to be vacationing in Bermuda during the Tall Ships Atlantic Challenge stop in Hamilton. The banner features two U.S.-flagged ships, the *USCG Eagle* (foreground), and the *Bounty* (background).

To find out more on the Tall Ships Atlantic Challenge 2009 and future tall ships races, visit www.tallshiraces.com/atlanticchallenge.

*The Masthead* is the official newsletter of the Mid-Atlantic Marine Education Association (MAMEA) and produced quarterly with support from:

[BRIDGE](http://www.marine-ed.org)

[William & Mary Sea Grant](http://www.marine-ed.org)

MAMEA is one of 17 regional NMEA chapters. To become a member of NMEA, please visit [www.marine-ed.org](http://www.marine-ed.org).
2009 Board Activity Wrap-up
by Carol Hopper Brill

MAMEA Board Operations
In 2009, the Board moved ahead with initiatives designed to upgrade MAMEA operations, to communicate with members more effectively and provide you with meaningful and accessible benefits. With the Business Meeting at the October’s Annual Conference, MAMEA members validated several important initiatives begun by Board Members early in 2009.

To effect the following two proposals, the Board voted to change related MAMEA Standing Rules. Standing Rules amendments require only Board approval. The 2009 changes are highlighted in the Standing Rules document on the MAMEA website at: www.mamea.org/mins/MAMEAStdgRules.pdf.

• MAMEA Representation at NMEA
  In March 2009, the Board voted to change MAMEA’s representation at NMEA from a one-year term (previously served by the Past President) to a two-year term, managed by a Committee Chair. This change is intended to give our chapter representative more time to “learn-the-ropes” of Board function at the national level. David Christopher will serve as the first Chair to the NMEA Representation Committee. He brings more than a year of experience with the NMEA Board to the job.

• New Roles for MAMEA Past President
  Instead of providing NMEA representation for a year, the Past President will take on new duties, serving as the Chair of both the Mentorship and Nominating Committees. These tasks – that facilitate the Board’s service to membership and membership’s service on the Board – draw on the Past President’s experience and familiarity with MAMEA programs, operations and members.

The third Board initiative of 2009 was to update MAMEA’s operations for Board elections. At the October Business Meeting, members voted to make changes to By-Laws that would allow electronic voting for MAMEA officers and shift voting earlier in the year. New officers will be identified at the summer NMEA Conference, but won’t take office until the Fall MAMEA Conference. The electronic (paperless) voting will allow greater participation by MAMEA membership. With earlier identification of incoming officers, we assure more time for familiarization with tasks of the office and communications with outgoing officers. And, the incoming President-Elect will gain additional time for their Conference planning and fund raising.


Initiatives in Member Services
Board efforts in 2009 also included several initiatives designed to serve MAMEA’s most important resource, its members.

We moved to paperless communications with: a new electronic Masthead newsletter; more consistent official communications via email; streamlining of the Email Discussion List; and a Facebook page.

The Board created a Mini-Conference Grant Program to help state representatives offer relevant and affordable professional opportunities. And, at the year’s three mini-conferences, we surveyed members to find out what kinds of offerings are needed.

Funding for project Grants and conference Scholarships increased. The two annual Educational Project Grants increased to $1,000, and there are now four Scholarships offered each year. Visit the website for the most current application information.

The Board developed a new identity flier to help us communicate MAMEA’s many benefits. And, a new fresh look for the Association website is in planning.

Email Discussion List to be Reset
by Carol Hopper Brill

On December 15, we will be cleaning out MAMEA’s email discussion list, removing defunct email addresses that have accumulated over the years.

The discussion list is a great place for members to exchange marine education questions and answers, and share new resources or opportunities of interest in the Mid-Atlantic. This voluntary email list includes both members and non-members. It is like NMEA’s Scuttlebutt, but focused on our Mid-Atlantic region.

If you want to stay on the MAMEA e-mail discussion list, please check-in at www.mamea.org/communications.html by Monday, December 14. All other e-mails will be deleted. You can always sign-up or remove yourself from the list – it’s easy using the instructions on the MAMEA website (www.mamea.org/list.html).
Our goal in MAMEA is to provide economical and outstanding professional development and networking opportunities to our members. The 2009 Conference at the University of Delaware (UD) Virden Center in Lewes did just that! We had over 60 participants from 7 states who received “New Inspiration in Marine Education.”

From all of the evaluations and comments received (and if you found your evaluation form in your conference bag when you got home, please feel free to send it in now!), the conference was a great success. Thanks to all the Committee members whose hard work resulted in a fun, educational, and inspirational weekend!

The keynote presentation on Friday night by Gary Kreamer was fantastic. Gary has learned a lot of “Lessons from Limulus” over the years and his talk reminded us all of the unique aspects of the Delaware coastline and our favorite animal, the horseshoe crab.

Saturday morning began with an excellent poster session and share-a-thon and continued with three first-rate plenary talks that shared some of the latest marine and aquatic research projects. First, Dr. Rodney Cluck from the Mineral Management Service (MMS) discussed some of the MMS projects in the Mid-Atlantic region, including offshore wind energy. Dr. Matt Oliver from the UD spoke about ocean deserts and using satellite technology to monitor their growth and changes over time. Finally, Dr. Art Trembanis (UD) and Dr. Doug Levin (NOAA) talked about their use of marine technologies in the education of students from young children to the graduate level.

Saturday afternoon showcased 12 concurrent sessions presented by MAMEA members and included hands-on activities, lesson overviews, and reviews of successful programs. Attendees learned a lot and took home inspiration and concrete ideas to use in their classrooms and programs.

The conference was also a financial success due to an incredible auction (thanks to Ruth Gourley!) and support from NOAA and the Delaware, Virginia, and North Carolina Sea Grant programs. The final figures are not yet calculated, but we did bring in a profit for MAMEA which will help us provide even more opportunities for members in the future.

Coast Day wrap-ups from the UD Marine Public Education Office, including the winning Crab Cake Cook-Off recipe, are available at www.ceoe.udel.edu/coastday/media.html
2009 MAMEA Auction Donors

Acorn Naturalist
Barbara Bayer
Be the Bay
Bull Frog Films
The Buttery Restaurant
Carol Hopper Brill
Phyllis Butler
Calypso Creations
Chesapeake Bay Oyster Company
Vicki Clark
Consortium for Ocean Leadership
Creighton Creations
Jane Dodge
Kathy Fuller
Judy Hensley
Helter Skeleton
Houghton Mifflin Harcourt
Hotel Blue
Indian River Life-Saving Station
Terri Kirby Hathaway
Beth Jewel
Gary Kreamer
Helen Kuhns
Lisa Lawrence
Matt Lettrick

Lynnhaven River Now
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Maryland Sea Grant
Carol McCormack
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Outer Banks Center for Wildlife Education
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JoAnne Powell
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Amy Sauls
Savannah Inn, LLC
Dawn Sherwood
Jackie Takacs
Virginia Aquarium and Marine Science Center
Wilmington Blue Rocks
Andy Wood

Thank you!

Save the Date! Plan Now!
July 19-23, 2010

National Marine Educators Association Annual Conference

*Within driving distance of the Mid-Atlantic
*Scholarships available

www.nmeaweb.org/gatlinburg2010/
2009 MAMEA Board Election Results
by David Christopher

MAMEA held its 2009 Board elections on October 3rd during its annual conference. Below are the results of this year’s election.

**President Elect:** Ruth Gourley, NC Aquarium at Fort Fisher
**Secretary:** Kathy Siegfried Fuller, National Aquarium-Baltimore
**Delaware Representative:** John Lunsford, Paul M. Hodgson Vo-Tech High School
**Maryland Representative:** Karen Mattingly, Green Holly Elementary
**North Carolina Representative:** Amy Sauls, Jones Senior High School

I would like to thank all those who nominated candidates and all those who ran for election.

Get a Jump on '10 Board Nominations
by Carol Hopper Brill

With October’s member-approved changes to MAMEA election procedures, we want to begin recruiting Board nominees and Committee chairs now! Our first electronic election will be held in May/June 2010. New officers will be announced at the NMEA Conference in July, and then take office at the MAMEA annual Conference in October 2010. We’re looking for some motivated, energetic and creative members to join the Board team.

In 2010, we will be accepting nominations for President Elect, Treasurer, DC Representative and VA Representative. For an outline of Board officer duties, see the outlines on the MAMEA website at [www.mamea.org/board.html](http://www.mamea.org/board.html).

NMEA Update
by David Christopher

Hello. NMEA and MAMEA are proud to be a part of an exciting opportunity for high school students. National Ocean Sciences Bowl is hosting its second annual *Living on the Ocean Planet* video competition in partnership with the Census of Marine Life the National Marine Educators Association and the Encyclopedia of Life. The goal of this contest is to showcase student-developed original videos that educate the general public about marine technology and address the Ocean Literacy Essential Principles. This contest is open to any student enrolled in high school in the United States. Deadline for submission is Monday, January 25, 2010. For more information please visit the National Ocean science bowl website at [www.nosb.org](http://www.nosb.org).

MAMEA has also been asked to assist with *Living on the Ocean Planet* video competition. MAMEA will be responsible for judging and rewarding a prize for video submissions from Delaware, District of Columbia, Kentucky, Maryland, North Carolina, Virginia, and West Virginia. If you are interested in being a judge please contact me at dchristopher@aqua.org.

Finally, it is never too early to start planning for the 2010 NMEA Conference. The 2010 conference will be held in Gatlinburg, Tennessee on July 18-23. The conference website is now online at [www.nmeaweb.org/gatlinburg2010](http://www.nmeaweb.org/gatlinburg2010).

MAMEA has a new address!

In order to increase efficiency and further streamline communications to MAMEA, we now have an official mailing address. Please make note of it!

MAMEA
P. O. Box 272
Tracys Landing, MD 20779

MAMEA TechCorner
by Chris Petrone

By now, you have probably taken at least one, or fifty, online surveys via Survey Monkey, but have you ever *administered* your own survey using the powerful, *free* survey website?

Creating your own Survey Monkey survey requires no special software or web page coding ability, just a little creativity and some questions to which you are interested in getting answers. Subscription-based commercial accounts are available, which allow you to ask more questions, receive more responses and customize your survey with logos, etc. But if free is more your style, and within your budget, the basic account allows 10 questions and 100 responses per survey, with no limit on the number of surveys you create. So, check out [www.surveymonkey.com](http://www.surveymonkey.com)!
**MAMEA Mini-Grants** (con. from cover)

In this four-day immersion experience, 12 students – 10 to 12 years old – learn about the Chesapeake Bay watershed, its waters and wildlife via the Aquarium’s exhibits and staff. They are introduced to water quality parameters important for a healthy watershed and, while exploring natural areas, they compare and contrast freshwater and brackish habitats, logging data and observations and identifying wildlife. The MAMEA grant allows Fuller to invest in water quality sampling equipment that is closer to “industry standard” for an environmental scientist. Through this intensive program, students apply science as they learn it, contributing to their interest and confidence in the subject, and building a greater sense of watershed stewardship. The equipment that Fuller purchases this year will be re-used in future years of the program, contributing to the education of more inner city youth.

Beth Jewell of West Springfield High School in Virginia was awarded the grant for a classroom teacher. Beth’s project, intriguingly titled “West Springfield High School Goes LiMPETS,” will engage high school students in a monitoring project using the LiMPETS protocol (Long-term Monitoring Program and Experiential Training for Students, limpetsmonitoring.org). Students from two schools will be involved, approximately 30 of Jewell’s Springfield High students and 30 students from Katie Neller’s class at First Flight High in North Carolina. The students, guided by their teachers and NC Sea Grant educator Terri Kirby Hathaway, will survey selected beach sites on the Outer Banks, collect data on mole crab abundance and distribution and analyze results to generate a “base-line” for future study years. Jewell expects that the project will help students enhance their problem-solving skills, gain experience using tools and methods employed by field scientists, and learn to analyze and present data. Once this MAMEA-funded pilot year has been completed, Beth plans to repeat the monitoring annually, with fall and spring surveys tracking changes in mole crabs as an indicator of beach ecosystem status.

To be eligible for a MAMEA Educational Project grant, applicants must be current MAMEA members with at least one year’s membership. Find further information about the Grant application process on the MAMEA website: www.mamea.org/minigrant.html.

**MAMEA recognizes Jen Durkin Aiken as 2009 Informal Marine Educator**

by Allison Gleason Besch

It was with great pleasure that MAMEA presented the 2009 Informal Marine Educator Award to Jennifer (Durkin) Aiken of the National Aquarium in Baltimore. The presentation took place at the 2009 annual conference in Lewes, Delaware. Jen is currently the School Programs Coordinator and oversees the Aquarium’s onsite programs for students and teachers.

Jen also manages to remain an active MAMEA member and leader. She was an asset to Past President David Christopher in planning the 2007 Annual Conference in Baltimore. She also serves as Coordinator of the annual Maryland mini-conference held as an overnight at the National Aquarium. Her programs are very successful and have helped to promote MAMEA events and encourage membership to area teachers and marine science enthusiasts.

What further sets Jen apart is her personal commitment to conservation or “green” practices. As chair for the Aquarium’s Internal Conservation Committee she helped inspire the Aquarium to recycle 200 pounds of techno-trash, 9 tons of paper, and 21,832 lbs of cardboard while saving 11,853 gallons of water. She believes that we must act as a model for the public in order to lead others to conserve resources.

With this award, MAMEA is proud to acknowledge Jen’s commitment to marine science, education, and conservation. Congratulations to Jen for her hard work and dedication!
Species Spotlight

Common group name: Barnacles

Selected individual scientific and common names:
- Balanus improvisus (bay barnacle)
- Balanus subalbidus (white barnacle)
- Balanus eburneus (ivory barnacle)
- Chthamalus fragilis (little gray barnacle)

Range: (general)
- Western Atlantic Ocean from Nova Scotia to Florida, westward to Texas; West Indies

Habitat: Intertidal to subtidal; 10-35 ppt (species dependant)

Size: Less than 1cm to 2.5cm

Diet: Plankton and detritus

Field identification: white/gray; occasional longitudinal purple or brown stripes; six overlapping plates of shell

Interesting factoids: spawn in mid- to late spring; individuals have both male and female reproductive organs, but eggs must be cross-fertilized by another barnacle; fertilized eggs stay inside adult barnacle until they hatch; larvae are important food source for juvenile fish; flatworms are the predominant predator of adults; barnacles are crustaceans that grow by molting their exoskeleton and adding calcium carbonate to shell plates (makes them susceptible to ocean acidification)

Additional Resources
- Chesapeake Bay Program Bay Field Guide
- Lippson and Lippson, Life in the Chesapeake Bay

Mid-Atlantic Research Update

How does your barnacle stick?

You've seen barnacles attached to all sorts of objects pulled from the sea: pieces of wood; bottles; the bottom of your boat; blue crabs! But have you ever wondered how barnacles adhere to surfaces so strongly that even the hardest crashing waves can’t knock them loose?

A research team from the Duke University Marine Lab (DUML) in Beaufort, NC (home to the 2005 MAMEA conference!) has discovered that an enzyme in barnacle cement, which helps bind barnacles to substrates, is strikingly similar to Factor XIII, a clotting agent found in human blood.

DUML researcher Dr. Gary Dickinson, and his team were able to remove the cement from the barnacles as it was secreted and utilize atomic force microscopy and mass spectrometry to analyze its contents. They found a Factor XIII-like enzyme, which is a trypsin-like serine protease, in the cement. This find was surprising to the research team, but as Dr. Dickinson points out, the result makes evolutionary sense, “Virtually no biochemical pathway is brand new. Everything is related and really important pathways are used over and over.”

Obviously this highly-binding cement has many practical purposes, but the DUML team also hopes that additional research will lead to better solutions to the problem of biofouling. Currently, anti-fouling paints are used to keep underwater structures free from organisms. Unfortunately, most of these paints tend to be toxic to the environment.

For more information on this project, please visit www.nicholas.duke.edu/marinelab.

*Reader’s Review

What do you think of this issue of The Masthead so far? Submit your comments or ideas for the next issue, due out in February 2010!
2008 MAMEA Grant Update
Highland Springs High School Recycling Program
by Dawn Sherwood, Highland Springs High School, Highland Springs, VA

A year ago, I was a recipient of a MAMEA Educational Project Grant. My goal was to start a recycling program at our school, preferably for plastic bottles. The kick-off event was the International Coastal Cleanup, which takes place every September. This was a way to educate students, but to also begin our Environmental Club. Instead of traveling to the coast, we did a schoolyard clean-up to allow more participation and teach the students that everything in a watershed is connected.

Back in school, recycling paper was the easy part. Our local paper recycling plant provides free bins for newspaper and white paper. Considering how much paper I had seen being wasted, this was huge. Recycling plastic, on the other hand, provided plenty of difficulties. There was not much choice in plastic-recycling bins and at a cost of over $1200 a year, this was not an option. When we tried to collect bottles at lunch, we got lots of trash in the receptacles because we were not able to have people standing by guarding them. Next, we put paper boxes (big boxes our copy paper comes in—Reusing!) in the classrooms. We asked students and teachers to put paper and plastic in these bins. This worked fairly well, except we still did not get a lot of plastic bottles. The receptacles were picked up twice a week, once during the day and once after school, by both one of the science classes and the recycling club. Teams typically consisted of 3-4 students.

In year two, things are going a lot better! I had new students wanting to make a difference. Many of the students that came out for the International Coastal Cleanup this past September have joined the Environmental Club and want to do more! I regularly have 12-20 students showing up after school to empty the recycling boxes and they are eager to better tackle the plastic bottle issues. One of these issues is transporting the collected bottles. Students are currently volunteering to take home plastic bottles or drop them off at community recycling stations. They are also discussing ways to educate the other students and get the word out about how to better recycle our plastic.

For teachers looking to start recycling programs, here are a few suggestions:

- Have PATIENCE!! The first year is tough—getting bins and a pickup schedule, and most importantly getting students and faculty involved. Don’t give up!
- The International Coastal Cleanup (www.oceanconservancy.org/site/PageServer?pagename=icc_home) is a great way to teach students about the trash in their backyard. You don’t have to go a beach and you don’t have to wait for September! We are all connected to the ocean and evaluating the types of trash students find around their school helps them realize how most trash gets into the ocean. Any day is a good day to clean up the environment. It is also a great opportunity for students to obtain community service hours and they are definitely looking for them these days!
- Instead of spending a lot of money on fancy bins for the classroom, reuse large boxes:
  - Have students decorate them and make signs to go on them
  - Put room numbers on them—that way boxes go back to their correct homes
- Buy a few bigger bins for copy rooms and large events like football and basketball games
- Use a dolly or cart to empty a few classrooms in one trip
- Create a pick-up schedule and stick to it. Collect recycling on the same day and around the same time, if possible. Consistency will help the teachers, volunteers, and operations staff.

Good luck with your recycling program!!
NC Aquarium receives NOAA grant
by Peggy Sloan, NC Aquarium at Fort Fisher

The National Oceanic and Atmospheric Administration’s (NOAA) Office of Education recently awarded the North Carolina Aquarium Society $580,000 for the Aquarium at Fort Fisher’s proposal “Using marine mammals to communicate solutions to ocean issues.” The North Carolina Aquarium at Fort Fisher (NCAFF) intends to increase public understanding and appreciation of the interconnectedness of people and the environment, with a focus on climate change impacts, through statewide outreach and an on-site exhibit upgrade. New programs will engage youth through immersive technology in a portable, inflatable GeoDome theater. NCAFF will work in collaboration with the North Carolina Museum of Natural Sciences (NCNMS), the Elumenati LLC, University of North Carolina Wilmington (UNCW) and Duke University Marine Laboratory (DUML) to develop marine mammal and climate change programs for GeoDome presentations. Ultimately, teenagers aged 14-17 will become engaged in climate and ocean literacy through a better understanding of marine mammals.

Help Shape the Chesapeake’s Future

On May 12, President Obama issued Executive Order 13508 on Chesapeake Bay Protection and Restoration, the first-ever presidential directive on the Bay and the first environmental Executive Order by President Obama. The order established a Federal Leadership Committee, chaired by the U.S. EPA, and with senior representatives from the departments of Agriculture, Commerce, Defense, Homeland Security, Interior and Transportation. These agencies generated seven draft reports in September 2009 that contained recommendations for addressing key challenges facing the Chesapeake Bay and watershed.

These draft reports were integrated into a draft strategy that was released on November 9. The draft strategy contains a package of federal initiatives to restore clean water, conserve treasured places, protect fish and wildlife, and adapt to the impacts of climate change.

The seven reports that support the draft strategy have been revised since September and will be available at http://executiveorder.chesapeakebay.net. These revised reports provide many of the specific details for the federal initiatives that appear in the draft strategy. Comments on these reports will be accepted via that website and will be used as supplemental input for revisions to the draft strategy.

A series of public forums will be held throughout December on the recently released draft strategy for restoring the Chesapeake Bay, a document required by a Presidential Executive Order issued in May 2009. The public forums will feature officials from multiple federal agencies including the U.S. Environmental Protection Agency, U.S. Department of Agriculture, U.S. Department of the Interior and the National Oceanic and Atmospheric Administration.

To see a list of the public forum locations, or to submit a comment or video question, please visit http://executiveorder.chesapeakebay.net. The public comment period runs through January 8, 2010. The final strategy will be published in May.
Take a Whale to School!
by J. Michael Williamson, Wheelock College and WhaleNet

I have been teaching about the oceans and marine sciences since 1973, and I have been researching blue whales since 1980. In that capacity, I visit schools, make presentations, and spread the word about whales and the importance of the marine environment. Among other various questions like “How close have you been to a whale?” students always ask “How big is a whale?” I tired of the same mundane answer of “They are a big as a school bus.” So one day I decided to make a model that I could take to schools to show students how BIG a whale is. While stuck in one of Boston’s notorious traffic jams, I made a prototype of the model using an extra piece of paper and my Swiss army knife. I then enticed my Senior seminar class at Wheelock College in Boston, Massachusetts to develop this project as part of a class activity on problem solving. The challenge was “to make a life-sized whale model that fits into a duffle bag and can be carried by one person. Eventually “Lucy,” named for the founder of Wheelock College, was born. Actually, the original “Lucy” was born. Since that time hundreds more “Lucy” models have been fabricated. I not only made “Lucy the Inflatable Whale” for myself, but I also developed an instruction booklet that allows anyone who wishes to make his or her own Inflatable Whale. Classes, community groups, churches groups, and museums all over the country and world have constructed their own whales. Institutions such as the Boston Museum of Science and the Bermuda Underwater Exploration Institute have exhibited their own inflatable whale models.

In the beginning, I had no idea the impact that “Lucy” would have on students of all ages, but watching the students eyes get a large as the whale as it inflates is an experience in itself. I now have “Lucy III”. The first two saw at least 20,000 students pass through their interiors. One day while visiting a school in Connecticut, a teacher came running up to me, grabbed my arm, and said, “You can’t believe what just happened!” At this point in the day, after what seemed like the 200th fifth grade class, I had no idea what might have happened. Excited and seemingly breathless, the teacher said that they had an autistic student who hadn’t uttered a real word, much less a sentence in two years, who saw “Lucy” and the other students and said to her teacher “I want to go in the whale.”

Science Teaching: A State of Mind
In addition to teaching about whales, I instruct teachers that science really isn’t “scary.” It can be fun and exciting to teach science if you aren’t afraid to answer a student’s question at times with, “I don’t really know, but I do know how we can find out.” Within the instruction booklet, I include some seed activities that can lead to more investigations. I help launch the boat, and the class and the teacher then sail off on their own adventures.

Creating “Lucy”: You can do it!
The learning experience begins with the problems of constructing the whale. Where do I begin? How do I interpret the instructions and organize the crew? It usually takes four or five adults about 5 hours to construct the whale. The more students you have helping the longer it takes, but that is part of the adventure.

The construction is like sewing with plastic and tape instead of fabric and thread. The instructions in the booklet have been field tested, and I have had relatively few questions by phone and email on construction, which I’ve been glad to answer.

The crew uses some math, some materials, some problem solving, some organizational skills, and some ingenuity, but the project gets completed. The first time the whale inflates is a real show stopper. The inflation of the finished whale is usually a media event for the school and the local papers. Seize the opportunity.
Take a Whale to School!  (con. from previous page)

Educational units on life science (whale anatomy), physical science (air pressure), and mathematics are included in the booklet. Students can research questions such as:

- How does the whale stay inflated?
- What are the surface area and volume of the whale?
- Why is the surface area to volume ratio (SA/V) so important to a whale?
- How is the SA/V ratio different from that of plant plankton (phytoplankton)?
- Why is the SA/V ratio different?

The students use proportions (Table 1) to determine the placement of the eye, the flipper and the dorsal fin using data taken from actual whales. They use mathematics to calculate the surface area to volume ratio of the whale (Figure 3).

The eye is about 22% of the whales length back from the tip of the snout. How long is the whale model? So where does the eye go? The flipper is about 35% of the whales length back from the tip of the snout, so where does the flipper go? The breadth of the flukes is about 23% of the whale's length (wow!!), so, how wide do we make the flukes?

![Surface Area Diagram](image)

![Volume Diagram](image)

The Adventure

The voyage of learning should never be complete. “Lucy” offers one more leg of the journey. “Lucy” The Inflatable Whale offers a hands-on, minds-on, multidisciplinary adventure that most students and teachers never forget. The inflatable whale models have been used as reading rooms where upper class students read stories to lower classes, as senior projects in biology, as temporary classroom areas to study scientific concepts, as bible school’s Jonah and the Whale activities, and other unique learning experiences. Remember, “Lucy” should be the launching point not the destination to your learning journey.

Table 1: The Anatomical Proportions of a Blue Whale (balaenopterid)

<table>
<thead>
<tr>
<th>Measure</th>
<th>14</th>
<th>19</th>
<th>3</th>
<th>4</th>
<th>1</th>
<th>9</th>
<th>20</th>
<th>12</th>
<th>21</th>
<th>22</th>
<th>24</th>
<th>Avg.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Length (feet)</td>
<td>77</td>
<td>75</td>
<td>74</td>
<td>74</td>
<td>72</td>
<td>72</td>
<td>70</td>
<td>67</td>
<td>65</td>
<td>66</td>
<td>61</td>
<td>69.8</td>
</tr>
<tr>
<td>Tip of Snout to eye</td>
<td>21.8</td>
<td>21.7</td>
<td>21.6</td>
<td>22.1</td>
<td>20.9</td>
<td>21.5</td>
<td>20.3</td>
<td>21.6</td>
<td>20</td>
<td>21</td>
<td>22</td>
<td>21.2</td>
</tr>
<tr>
<td>Tip of Snout to blowhole</td>
<td>18.9</td>
<td>18.8</td>
<td>17</td>
<td>18.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tip of Snout to post. base pectoral</td>
<td>34.4</td>
<td>34.7</td>
<td>34.1</td>
<td>35.4</td>
<td>33.8</td>
<td>35.5</td>
<td>34.4</td>
<td>36.2</td>
<td>34</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tip of Snout to post base of dorsal</td>
<td>76.9</td>
<td>77.3</td>
<td>78.9</td>
<td>72.0</td>
<td>75.7</td>
<td>76.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Length of pectoral from post base</td>
<td>10.6</td>
<td>11.1</td>
<td>10.3</td>
<td>10.8</td>
<td>9.0</td>
<td>10.5</td>
<td>10.0</td>
<td>11.0</td>
<td>10.9</td>
<td>10.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Length of pectoral fr hd of humerus</td>
<td>15.2</td>
<td>15.4</td>
<td>14.9</td>
<td>15.8</td>
<td>13.9</td>
<td>15.3</td>
<td>15.5</td>
<td>15.9</td>
<td>15.8</td>
<td>15.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Greatest breadth of pectoral</td>
<td>4.1</td>
<td>3.8</td>
<td>3.8</td>
<td>3.7</td>
<td>3.6</td>
<td>4.1</td>
<td>3.8</td>
<td>3.9</td>
<td>4.1</td>
<td>3.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Height of dorsal</td>
<td>1.1</td>
<td>1.1</td>
<td>1.0</td>
<td>0.9</td>
<td>1.4</td>
<td>1.1</td>
<td>1.9</td>
<td>0.9</td>
<td>1.4</td>
<td>1.2</td>
<td>1.2</td>
<td></td>
</tr>
<tr>
<td>Breadth of flukes</td>
<td>23.3</td>
<td>24.4</td>
<td>25.6</td>
<td>24.1</td>
<td>20.3</td>
<td>20.4</td>
<td>19.6</td>
<td>22.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Use the average body dimensions in percent body length of YOUR model.

Anatomical Dimensions for your whale

The Adventure

The voyage of learning should never be complete. “Lucy” offers one more leg of the journey. “Lucy” The Inflatable Whale offers a hands-on, minds-on, multidisciplinary adventure that most students and teachers never forget. The inflatable whale models have been used as reading rooms where upper class students read stories to lower classes, as senior projects in biology, as temporary classroom areas to study scientific concepts, as bible school’s Jonah and the Whale activities, and other unique learning experiences. Remember, “Lucy” should be the launching point not the destination to your learning journey.
Take a Whale to School! (con. from previous page)

You can visit WhaleNet at [http://whale.wheelock.edu](http://whale.wheelock.edu) to download more educational resources and information on the marine mammals that inhabit the oceans of the world. WhaleNet offers real-time satellite tagging data on marine animals. You can find active and archived satellite tracking data on over 100 other whales, dolphins, porpoises, seals and sea turtles. The “Lucy” page is at [http://whale.wheelock.edu/whalenet-stuff/LucyPage.html](http://whale.wheelock.edu/whalenet-stuff/LucyPage.html). Log on and reap the educational rewards of the deep.

J. Michael Williamson is the Director of WhaleNet and an Associate Professor of Science at Wheelock College in Boston, Massachusetts. He is also the Associate Director of the Mingan Island Cetacean Study ([www.rorqual.com](http://www.rorqual.com)), and he has 30 year of experience in whale research.

Chesapeake Bay Bowl Share-a-Thon

The Chesapeake Bay Bowl, a regional competition of the National Ocean Sciences Bowl ([www.nosb.org](http://www.nosb.org)), will sponsor a Share-a-thon during its annual competition on March 6, 2010 at American University. The Share-a-thon will provide a venue for teachers, families, event volunteers, and students to get information on ocean and water-related academic resources, scholarships, field trips, undergraduate programs, and family activities that are available in the surrounding area. If you and your organization would be interested in participating from 11am-2pm on March 6, 2010, please contact Staci Lewis, Chesapeake Bay Bowl regional coordinator, by email at [chesapeakebaybowl@hotmail.com](mailto:chesapeakebaybowl@hotmail.com). The deadline for the Share-a-thon registration is January 6, 2010.

State Rep Reports

**D.C.**

The "Aquatic and Marine Science For Today's Classroom Teacher" workshop is being offered at the National Aquarium, Washington, DC. The workshop is sponsored by the Toyota USA Foundation and teachers receive a stipend and classroom materials. Workshop sessions are scheduled for 2 consecutive Saturdays: January 23 & 30; February 13 & 20; April 10 & 17; and May 15 &22. The 2-day workshop is designed to: help teachers become more familiar with ocean literacy and learn how to incorporate ocean literacy components into their existing curriculum; review biological classification and diversity; explore aquatic and marine ecosystems such as rivers, swamps, coral reefs and estuaries; and examine major animal groups such as sharks and boney fish. Space is limited and is filled on a first come, first served basis. Registration materials are on the Aquarium's website ([www.nationalaquarium.org](http://www.nationalaquarium.org)). For more information, please contact Bill Simpkins at (202) 582-0852 or [bsimpkins@aqua.org](mailto:bsimpkins@aqua.org).

**North Carolina**

North Carolina Aquariums at Pine Knoll Shores

The Aquarium’s winter camps combine fun and learning into unforgettable adventures during school holidays. Campers enjoy outdoor activities, discovery labs, crafts, videos, behind-the-scenes action and more. Each camp is limited to 12 participants. Advance registration and payment is required. The camps run 8:30 a.m.-2:45 p.m. each day. Contact the Aquarium Registrar at [pamela.pitmman@ncaquariums.com](mailto:pamela.pitmman@ncaquariums.com) for more information.

- **Aquatic Adventurers Camp** (grades 2-3) - Monday, Dec. 28 - Wednesday, Dec. 30, 2009
- **Coastal Explorers Camp** (grades 4-5) - Monday, Jan. 18 - Wednesday, Jan. 20, 2010

Get Hooked! - March 13, 2010. Experts in a variety of fishing techniques present workshops throughout the day. Four sessions of instruction plus raffles, giveaways and a catered lunch are included. Sponsored by the Aquarium and Sea Striker. Advance registration required beginning January 2, 2010. Call toll-free 866-294-3477 or visit [www.ncaqariums.com](http://www.ncaqariums.com) for fees and other details.
Mid-Atlantic Marine Education Association

NC Report continued

Fort Macon State Park
North Carolina's most visited state park opened its new education visitor center the last weekend of October. Situated on the east end of Bogue Banks, this Civil War Fort is a beautiful place to visit at the beach, with spectacular views of Beaufort Inlet and surrounding sounds and beaches. www.ncparks.gov/Visit/parks/foma/main.php

NC Wildlife Resources Commission
Sarah Falkowski, Wildlife Education Specialist with the NC Wildlife Resources Commission, is working with Katie Neller's AP Biology class at First Flight High School on a really exciting project this fall. It is called the Virtual Field Trip Project and will be taking place at the Alligator River National Wildlife Refuge. The students will be profiling a habitat and creating a 5-minute film on the plants, animals, soil, and water present at the site. Three other schools across the state are also creating their own virtual habitat videos and all will be hosted on the NC WRC website (www.ncwildlife.org) for viewing by students and teachers. This group will be working together with the Digital Media class at the high school for the video production and editing portion of the project. Several students are enrolled in both classes, in fact. All of the students are really excited to create something that will be seen by their peers as well as see what kinds of plants and animals live in the mountain and piedmont region habitats.

Albemarle-Pamlico National Estuary Program Division of Natural Resources Planning & Conservation
North Carolina Dept. of Environment & Natural Resources

Request for Proposals from the Albemarle-Pamlico National Estuary Program
The Albemarle-Pamlico National Estuary Program (APNEP) is seeking proposals for demonstration projects. Grants will be awarded by APNEP, which protects water quality and other natural resources in a 36-county area of northeastern North Carolina and southeastern Virginia. Schools, government agencies, nonprofit organizations and institutions in the APNEP region are eligible to apply for grant money.

The projects must have a direct environmental benefit and occur on public lands in the APNEP region. They also must have a constructed component or vegetative planting on-site, feature a strong public outreach or education element, allow for permanent public access and have methods that may be applied in other locations. Past projects included outdoor classrooms, nature trails, rain gardens, green roofs and schoolyard wetlands.

Each project may receive up to $20,000 in funding from APNEP. The APNEP Citizen’s Advisory Committee will select the proposals to be funded and determine funding amounts. Prospective grant recipients are encouraged to partner with others to leverage additional funds. The application deadline is Dec. 31. Awards will be announced in January. All awards are contingent upon the availability of funds.

For more detailed information or to download an application, visit the APNEP Web site at http://www.apnep.org, and click on “What's New - Request for Proposals.” If you have questions about the application or eligibility requirements, contact Lori Brinn at (919) 715-4196 or lori.brinn@ncdenr.gov.

Ocean Awareness Day Workshop: Focus on Climate Change
Middle and high school science teachers from the southeast gathered for a climate change workshop sponsored by the Albemarle-Pamlico National Estuary Program (APNEP), the Center for Ocean Sciences Education Excellence - Southeast Region (COSEE-SE) and the Rocky Mount Children’s Museum & Science Center on Nov. 11.

The workshop covered a variety of topics related to climate change including the difference between weather and climate, climate change impacts in North Carolina, effects that climate change could have on human health, activities to help teachers incorporate climate change into the curriculum and getting the most out of your museum. Workshop presenters included representatives from APNEP, COSEE-SE, NC Sea Grant, Environmental Health Perspectives, UNC Institute for the Environment, NC State University and East Carolina University. Staff from the Rocky Mount Children’s Museum & Science Center provided a tour of the museum and a planetarium show.

continued on next page
**NC Report continued**

Workshop participants reported that this workshop made them feel more confident in their ability to integrate ocean sciences research into their classrooms, and all participants who attended would recommend an Ocean Awareness Day workshop to their colleagues. This event was funded by the S.C. Sea Grant Consortium. APNEP would also like to thank all workshop partners, the NC Museum of Natural Sciences and the NC Division of Water Quality for their assistance and participation. APNEP and the Rocky Mount Children’s Museum & Science Center hope to offer this workshop again in spring 2010. Please check www.apnep.org for workshop announcements and additional information.

**NC Outdoor Classroom Symposium**

More than 100 teachers and environmental educators attended North Carolina’s first Outdoor Classroom Symposium, held Oct. 23-25 at the NC Botanical Garden in Chapel Hill. The symposium focused on techniques for creating, maintaining and using outdoor classrooms and strategies for integrating outdoor learning into the curriculum. Session topics included how to create specific types of school gardens and natural areas, how to start farm-to-school programs, and how to design and use your school grounds to enhance learning across the curriculum.

The symposium was a partnership between the NC Botanical Garden at the University of North Carolina Chapel Hill, the Albemarle-Pamlico National Estuary Program, the Environmental Education Fund, the NC Office of Environmental Education and the Natural Learning Initiative at NC State University. Classroom teachers, teacher assistants, school administrators, parent volunteers, non-formal educators and those involved in design of outdoor play and learning areas from across the state came together for this inaugural event. The NC Office of Environmental Education hopes to offer this symposium annually. Please visit www.eenorthcarolina.org for additional information.

**VIRGINIA**

**2010 MAMEA Mini-Conference in Virginia – Saturday, February 13 – High Impact on a Low Budget**

All MAMEA members are invited to join us at the Virginia Aquarium for a day of activities and discussion focused on making an impact with marine science content when budgets are tight and time is limited.

Learn about:

- Affordable hands-on activities, field trips, and action-based projects
- Free resources available to educators
- Grants and sponsorships

The mini-conference also will include a content enrichment session on sea turtle biology, a behind-the-scenes tour above the Sea Turtle Aquarium, an optional afternoon field trip (TBD), and lunch.

**Registration Information:**

$25 for MAMEA members; $35 for non-members (includes MAMEA membership)

For more information or to register, contact the Virginia Aquarium Guest Services office at 757-385-0300 or at vamscgso@VirginiaAquarium.com.

Registration deadline – Monday, February 8 at 4:30 p.m.

Ask us about nearby hotel options and whale watching opportunities!

The **VA Dept of Environmental Quality and VA Resource Use Education Council** is currently conducting a statewide evaluation of the "Meaningful Watershed Educational Experience" classroom grants program. Virginia educators have received these grants for 6 years, through an on-line application process at Virginia Naturally (www.vanaturally.com) Factors which enhance sustainability (of the MWEE projects) is our main focus. Current and former recipients who complete the on-line survey will be helping shape future criteria for the classroom grants program. More information is on the Virginia Naturally homepage under "What's New" or contact Kris Jarvis at Kristine.Jarvis@deq.virginia.gov.