

HEADWATERS

PUBLICATION OF MARYLAND SEA GRANT EXTENSION WATERSHED EDUCATORS

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DEAR READERS:

Water captured major headlines across the country this summer as an unprecedented and devastating drought drove West Coast salmon to the brink of extinction, uncontrolled wildfires, and water wars between users.

Meanwhile, Colorado's Animas River stole the spotlight as we watched, in amazement, the river turn orange from top to bottom following a massive spill of toxic heavy metals from the Gold King Mine.

Humans' reliance on water to help us clean, dilute, cool, warm, irrigate, and even drink, forever binds us to its conservation and protection. I think you will find reasons for hope in this issue. Eric Buehl paddles us into the headwaters of the Choptank, and Amanda Rockler bring us along on her trip to Ethiopia. Jen Dindinger and Jackie Takacs offer optimistic stories on reaching audiences in new and exciting ways. Finally, Emily Russ and her colleagues are gumshoes tracking sediment in the Susquehanna Flats.

Please enjoy and remember that the best news sometimes doesn't make the news.

For more information on how we support Chesapeake Bay restoration, please visit our website, www.extension.umd.edu/watershed.

Sincerely,
The Maryland Sea Grant Extension Watershed Educators Team

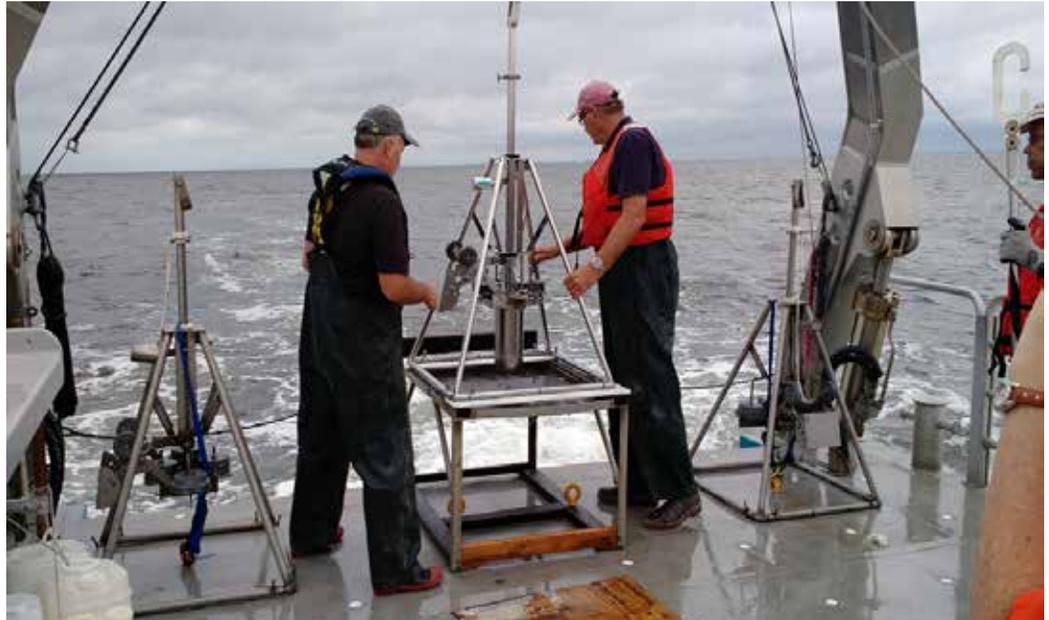




THE SUSQUEHANNA FLATS: EPICENTER OF RESEARCH

+ KRISZTIAN VARSA

+ THE SUSQUEHANNA
FLATS ARE A PLACE
WHERE AQUATIC
VEGETATION,
FISH, BIRDS, AND
HUMANS INTERSECT
IN ASTOUNDING
ABUNDANCE.



The Susquehanna River ceases to exist where the Chesapeake Bay starts. It is a particularly unique place in the watershed, where 50% of the freshwater that enters the Bay stops flowing downhill and becomes a tidal estuary. As a result, the Susquehanna Flats are a place where aquatic vegetation, fish, birds, and humans intersect in astounding abundance. And consequently, scientists are very interested in understanding everything about this special environment.

One of those scientists is Emily Russ, a doctoral researcher working with Dr. Cindy Palinkas at the University of Maryland Center of Environmental Science's Horn Point Laboratory. Emily is in the nascent stages of her research in which she will use data collected on seagrasses and sediments built-up behind the Conowingo Dam to improve our understanding of sediment movement in the water. During the "warm months"





“Using clues and tricks to track the sediment back as far as possible!”



Emily will visit the Susquehanna Flats and take samples, or cores, of the sediments at the bottom of the Bay. Using these samples, Emily will try to determine the source of the sediment like a detective, using clues and tricks to track it back as far as possible!

Emily is a Maryland Sea Grant Coastal Resilience and Sustainability Fellow, and her [blog](http://geronimo.hpl.umces.edu/emilyruss/) will be regularly updated to share her adventures and findings! Don't forget to bookmark the site and watch her progress!

Using effective communication tools, Emily's research will help natural resource managers better understand the sources of sediment that cause water quality issues in the Chesapeake Bay.

Photos Courtesy of Emily Russ @ <http://geronimo.hpl.umces.edu/emilyruss/>





LANDLOCKED

+ AMANDA ROCKLER

+ DEVELOPING A STUDY
ABROAD COURSE IN
ETHIOPIA



After about 24 hours of travel, I touched down at Bole International Airport in Addis Ababa, the capital of Ethiopia. The population is over three million people, just a fraction of the country's entire population of 96 million. It is the most populous landlocked country in the world and is considered by many to be the birthplace of the modern human*.

sleeping and waking at strange hours in Addis, I was bound for Debre Berhan (Elevation 9,320 feet). Upon arrival in Debre Berhan, I dropped my bags at what would be my homebase for the next two and a half weeks, and headed for Debre Berhan University (DBU). There, I met the DBU students and the Public Health Without Borders (PHWB) students from UMD, who had arrived a week earlier under the direction of

After two jet-lagged days of





“The next two weeks were filled with the highs and lows of working in a new environment.”



Dr. Stephanie Grutzmacher. The two student groups were just starting a collaborative two-week community needs assessment. So, you might wonder, why was a Sea Grant Extension agent working with the UMD PHWB students and the DBU public health students? Well, in addition to the natural connection between public health, agriculture, and water, Dr. Grutzmacher and I were developing a study abroad short

course, to be offered in 2016. The three-week short course will be transdisciplinary, and will be offered to students from both the School of Public Health and the College of Agriculture and Natural Resources.

The next two weeks were filled with the highs and lows of working in a new environment and the growing pains of creating a new program. The





“Other adventures included wrestling with mosquito netting in the extreme heat.”



six PHWB students from UMD were amazing, smart, always positive, ever resourceful, and extremely thoughtful about their work and experiences. Their positive attitudes were critical for facing the many adventures we encountered. For example, our bus got a flat tire and after it was fixed, the brakes failed, leaving the group stranded in small town for an entire day. Remarkably, other adventures included wrestling with mosquito

netting in the extreme heat, bed bugs, and visits to the rural emergency clinic!

While the students completed their community needs assessment, I met with faculty and administrators from across the campus departments. We discussed opportunities for research and outreach on watershed management, restoration, climate resiliency, slope stabilization, potential





“The food was outrageously good.”



demonstration pilot projects, and public health initiatives ranging from access to clean drinking water and waste management. DBU’s young and amazingly energetic faculty has helped DBU grow from roughly 4,000 students to over 14,000 in seven years!

The country was beautiful, the people were amazingly welcoming and kind, and the food was outrageously good. We are already planning our return in 2016! Please stay on the lookout for our short course listing to appear in a future course catalog and please encourage motivated, bright, and adventurous students to apply.

*We did make a stop to see ‘Lucy’ (Australopithecus) at the National Museum of Ethiopia.

Be sure to check out the UMD School of Public Health’s website for more information on the PHWB Ethiopia trip: <http://sph.umd.edu/news-item/public-health-without-borders-develops-nutritional-curriculum-rural-ethiopian-community> 💧





THE RIVER SELDOM SEEN

+ ERIC BUEHL

+ LEARNING ABOUT
THE LESSER-KNOWN
CHOPTANK



To some visitors of the Eastern Shore, their only perception of the Choptank River is the mile and a half wide expanse of brackish water replete with workboats and sailboats, quickly glimpsed as they speed toward Ocean City. To others, the Choptank is a narrower, freshwater river with exposed mudflats, carpeted by a green blanket of emergent wetland plants. Far fewer people get to see the river near Greensboro, where the river is sinuous and hidden by the trees that line its banks. The small creeks and streams that

feed into the Choptank are essential to its life, but as they flow toward the Bay, they have a knack for picking up almost anything in their path including trash, sediment, nutrients, oil, and bacteria. Some sediment and nutrients are necessary for a healthy ecosystem, but too much can lead to poor water quality. Rivers reflect how we treat the land they drain.

In early August, two teams of researchers working together on the Upper Choptank River, led by Dr. Paul Leisnham from





“Some of the smaller creeks and streams are still in good health.”

the University of Maryland-College Park and Dr. Tom Fisher from the University of Maryland Center for Environmental Science, updated residents on the research being conducted in the watershed. Their research collects data on water quality, modeling the impacts of climate change, the effectiveness of certain best management practices (BMPs), public perceptions, and watershed health and sustainability. Presenters offered data on the long-term trends in water quality and in-stream habitat, and these downward trends can seem rather disheartening. But each speaker shared positive news that some of the smaller creeks and streams are still in good health, which offered hope and optimism.

Dr. Fisher’s project is aptly titled People Land Water, and to better understand how certain BMPs are functioning in the Upper Choptank River watershed, they have enlisted the help of residents and farmers. They are also

measuring people’s perceptions about the land and water resources they touch in their daily lives. To learn more about this research, visit the People Land Water website at <https://peoplelandwater.wordpress.com/>.

If you spend enough time on the Eastern Shore, there is a good chance you might find yourself on one of its unique river networks. On the Choptank, if you go far enough upstream, you will find a stronghold, a place of hope and redemption. It is a place where the floodplains are still connected to the river, where giant trees straddle the banks, where fallen trees lie half-submerged in the water, and where an intact canopy means you can take your sunglasses off. With a little perseverance and a trusty canoe or kayak, it is a place where you can get a closer look at the river seldom seen. 💧





PROJECT BASED LEARNING WITH CHESTNUTS AND AQUACULTURE

+ JACKIE TAKACS

+ SEA GRANT TEAM OFFERS PROFESSIONAL DEVELOPMENT FOR TEACHERS



Emerging education standards drive a need for research and natural resources organizations to partner with school systems, administrators and teachers. To successfully meet these standards, strong education programs begin with high quality teacher professional development connected directly to current University research that advances project-based learning (PBL) and extends outside the classroom and into the school campus and community. Making a direct and well-interpreted connection

between educators and University research is a unique strength of Maryland Sea Grant (MDSG) and the University of Maryland Extension (UME). This past spring, MDSG/ UME was fortunate to receive two separate grants that will enable us to create a network of school systems, administrators, teachers, students and resources that are focused on modeling STEM (science, technology, engineering, and mathematics) and E-Lit (environmental literacy) standards through PBL.





“It is essential for teachers and students to have support.”



The American Chestnut
Support from the Chesapeake Bay Trust will enhance the Carroll County public school’s (CCPS) American Chestnut spiral curriculum, allow for the expansion into Allegany County Public Schools (ACPS), and provide the resources to create 3 new chestnut groves on school grounds. This summer, 16 CCPS and ACPS teachers and administrators participated in a curriculum-writing workshop and professional development training. As the school year now

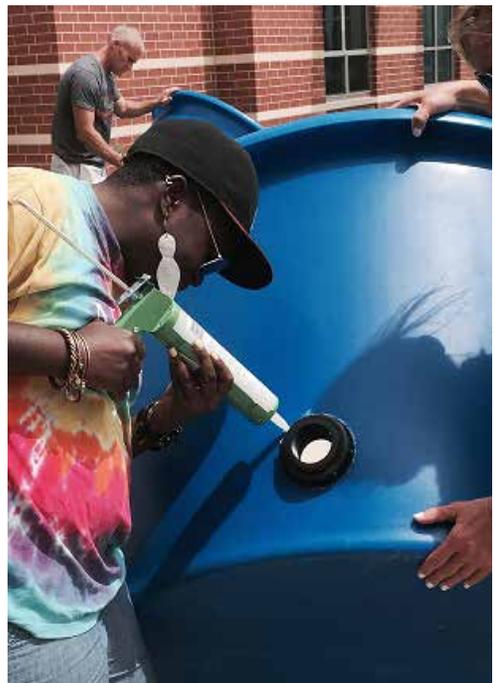
begins, these individuals, with support from MDSG/UME, will implement both curriculum and chestnut grove student-driven projects. An analysis of effectiveness of the curriculum and projects in meeting the each county’s STEM and E-Lit plan will occur throughout the academic year.

Aquaculture in Action
It is essential for teachers and students to have support to make connections between classroom research and field





“Teams constructed six 210-gallon recirculating aquaculture systems.”



experiences. Two-years of NOAA Bay Watershed Education and Training program funding will expand our Aquaculture in Action (AinA) program to support the reintroduction of two key species (yellow perch and shad) into the classroom coupled with student-driven projects and meaningful watershed education experiences (MWEE). This past July, teams of teachers from Allegany, Baltimore City, Carroll and Harford Counties

participated in a week-long, hands-on workshop where they learned the various aspects of aquaculture including: biological filtration, current university research, water quality, and restoration efforts. Teams constructed six 210-gallon recirculating aquaculture systems for use in their classrooms. These aquaculture systems will support implementation





“These aquaculture systems will provide native fish for the restocking into local waterways”

of the AinA curriculum in these counties, offer unique opportunities for student-driven research, and provide native fish for the restocking into local waterways.

For more information about either program, go to <http://www.mdsg.umd.edu/our-education-programs> or contact Jackie Takacs, takacs@mdsg.umd.edu or Adam Frederick, frederic@mdsg.umd.edu. 💧





ADVENTURES IN TEAM TEACHING

+ JENNIFER DINDINGER

+ EXTENSION EDUCATORS
SHAKE THINGS UP AND
ENLIVEN THE GREEN
YOUTH SUMMER
PROGRAM



Last year I gave a presentation in Greensboro, Maryland to the Green Youth Summer Program, a month-long employment and employability program hosted by the Maryland Rural Development Corporation. I was asked to speak to the attendees, whose ages ranged from 14 to 21, about practical skills they could use to install conservation practices and complete neighborhood beautification projects.

“No sweat,” I thought. “I’m good at teaching practical skills. I’ll just modify my trusty PowerPoint

presentation and I’ll be all set.” Wow, was I wrong! I sweated the whole way through because I could tell my lecture-based approach did not excite the class. I heard how boring and technical I sounded and I saw that reflected back to me by the audience. Things got a little better when we took a short fieldtrip outside to see a bioretention practice in the parking lot, but I left that day feeling like I had missed the opportunity to meaningfully connect with the attendees.





“I count myself lucky to be working with Eric.”



In 2015, the Maryland Rural Development Corporation invited me back! This time, though, I had a secret weapon...my new Eastern Shore teammate Eric Buehl. Most team-teaching environments are more fun and effective, and this was no exception. Eric and I brainstormed ways to be interesting, engaging, and above all see that we were connecting with the community. I count myself lucky to be working with Eric, because he had creative ideas and really made our time with the class effective. For example,

he built a small demonstration house that used food coloring, straws, and sponges to illustrate how runoff moves across impervious surfaces and how rain barrels can help. But even better than that – he mapped a short walking route through Greensboro to highlight real world examples of stormwater management and why they were important. During the walk, we talked about the wide variety of jobs one could get in the conservation world and how to make a difference.





“The class asked questions and offered ideas.”

This time, the class asked questions, offered ideas of their own, and stayed engaged through the end despite 95 degree heat. We were even invited to the culmination of the program, the Green Expo, where each of the teams created posters and spoke about the conservation and beautification projects they worked on during the month. Rain barrels were mentioned more than once...success!



Hurry, Registration for the **Chesapeake Watershed Forum** is closing Sept. 4!

Hope to see you there! Register [here](#). Friday lodging is full but a few rooms are still available on Saturday. 💧

Don't miss your chance to attend the region's premier gathering of watershed professionals on September 25-27 at the National Conservation Training Center in Shepherdstown, WV. Hosted by the Alliance for the Chesapeake Bay, this 10th annual Chesapeake Watershed Forum offers opportunities for education, network building, and inspiration to improve the protection and restoration of the Bay watershed.



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Headwaters is a publication providing information and resources for Extension and watershed protection professionals. It is a joint production of the University of Maryland Extension and Maryland Sea Grant Program. If you have any comments, questions, or ideas for Headwaters, please contact the Editor:

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Special thanks to our Production Supervisor, Rhonda Barnhart, for her ongoing support to layout and design Headwaters every quarter!

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Southern Maryland Cluster
Pop. 1,725,000

Upper Shore Cluster
Pop. 243,850

Lower Shore Cluster
Pop. 205,550

For more information on related publications and programs, visit extension.umd.edu/watershed. Please visit <http://extension.umd.edu/> to find out more about Extension programs in Maryland.

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