



Stream of Consciousness

Newsletter of the Alliance for Aquatic Resource Monitoring

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Progress of a Pipe Dream Mully Grub Celebration and Clean-up

by Pete Enderlin

On November 9th, 2003, ALLARM staff, Dickinson College students, a member of Trout Unlimited, and local community members gathered in the LeTort Park in Carlisle, PA. What gathered this collection of environmental enthusiasts was more than a simple stream clean-up or tree planting: this event was a celebration to come together and marvel at the improvement of stream health that has occurred thanks to the restoration project ALLARM began with the LeTort Regional Authority (LRA) three years earlier.

The event began at 1 p.m. with a presentation entitled "Progress of a Pipe Dream," given by ALLARM staffers Laura Walters (coordinator of the event), Andrew Schwerin (co-coordinator of the event), Micah Weintraub, and Becki Walker. The talk began with a brief introduction to ALLARM. Next came the history of the Mully Grub restoration project. This included research done by Candie Wilderman's aquatics class that led to the stabilization of the

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Interview with Julie Vastine, Assistant Director of ALLARM

by Adam Wickline

As a new member of ALLARM, it is difficult to imagine anyone other than Julie as the assistant director. Working with her these past weeks has made me realize that it would be hard for someone to fill the role that she provides. As a previous ALLARM student staff member, she has an excellent vantage point and good perspective on where ALLARM is and where it needs to go.

To begin, we discussed her beginnings and what effects her childhood had on her current career. She grew up in Salisbury, Maryland, which is the major metropolitan area on the eastern shore of Maryland. The Chesapeake Bay was her back yard and the Atlantic Ocean was her front. With this location, she grew up with the Bay culture and participated in many Bay programs, and gained a heightened environmental awareness. Another big factor in her current career was her mother. Being a teacher, her mother always emphasized going out into the environment to learn

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Ever wonder what it's like to be SMART?

What do Sherman's Creek Youth Day, Lower Dauphin High School, various teacher workshops, and Cumberland Valley High School all have in common? They are all SMART (Students Monitoring Aquatic Resources Together) projects. SMART encompasses all ages in an effort to increase the management of aquatic resources. Over the past five months ALLARM staff members helped to present a workshop for teachers in the Chesapeake Bay watershed, the third annual Sherman's Creek Youth Day, and a PowerPoint presentation about the inner workings of ALLARM in two very different classroom settings.

Although ALLARM's staff works throughout the academic school year, it does not simply shut down during the summer months! ALLARM continues throughout May, June, and July, with one full time undergraduate student, two directors and an assistant director. This past summer, two of the main projects that SMART was involved with included a teacher workshop at Penn State's main campus and the Sherman's Creek Youth Day.

Role Reversal: Students Teaching the Teachers



Penn State hosted a week-long conference over the summer for teachers in the Chesapeake Bay watershed. The conference discussed stream and water issues with a focus on possible ideas which the teachers could take into their classrooms. At the end of the week, the SMART crew was invited to present a workshop to the teachers. After a presentation on what ALLARM is all about, the crew (staff member

By Meghan Klasic

Colleen Haney, Assistant Director Julie Vastine, and Director Lauren Imgrund) took the teachers on a field

trip to a local waterway. Upon arrival at Spring Creek the teachers were trained to properly clean glassware, collect samples, and use chemical testing kits. While at the Creek, samples were collected and tested for pH, alkalinity, nitrates, and phosphates. The activity was completed in the hope that the teachers would use it with their students in the upcoming school year.

What Better Way to Spend a Sunny Summer Day Than Outside in a River?

The other summer activity was the Shermans Creek Youth Day. With the help of SCCA members (particularly Linda Seiber), community parents, and the SMART crew, a youth day was set up, based in Perry County, along Shermans Creek. The day was advertised in the 4-H newsletter and the local newspaper. The day was completely free and all the children were asked to bring was a bagged lunch. On a hot sunny day in mid-July, kids ages 6-12 arrived at the Lion's Club Park in Perry County along Shermans Creek. The day commenced with a lesson on the water cycle, including topics such as "Where Does Water Come From?" and "What Happens to Water After We Use It?".

The second part of the morning included a more in-depth look at watersheds. In order to visually show the effect of non-point source pollution on bodies of water, paper mâché watershed models were used. On each model, different types of non-point source pollution were represented by various colors of food coloring. After each type was identified and located, "rain" was applied (a stream of water from a spray bottle), to show what happens to the pollution when it rains. All of the colors ran together, down into the stream, producing a murky body of water.

After a break and lunch, the second part of the day began. The kids were split into two different groups of varying ages to complete a hands on activity. The first group had the task of collecting macro-invertebrates. They completed this mission by first conducting a macro kick, which entailed two people holding a large seine across the stream, while two other people kicked up the streambed in an effort to loosen up macro-invertebrates which would be caught by the net. After

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successfully 'catching' macros, the group separated them by type, with the help of the SCCA members and SMART crew.

The second group was deemed the "chemistry group". This group did a pH activity. In an effort to explain what exactly pH is, the group looked at various color indicators by testing common household liquids, such as milk and vinegar. After identifying the differences between acidic pH levels and basic pH levels, the group collected a water sample from Shermans Creek and tested its pH level. When each group had completed their tasks, they switched so that everyone was able to participate in the macro kick and the pH activity.

All in all, the day went very well. The program ended with a re-cap of what the children had done that day and a discussion of which activities were their favorites.

The Big Change: from Shorts and Tanks to Jeans and Sweaters

So what's going on now? This semester, SMART has worked with Lower Dauphin High School and Cumberland Valley High School to show students what exactly that ALLARM does, why it is such an amazing opportunity for undergraduate students at Dickinson College, and how it provides hands-on learning to all ages, both in the classroom and in the field.

No Class is Too Big or Too Small

We have been working with Lower Dauphin High School for quite some time. Through contact Ron Yerger, SMART has completed a presentation each fall for his AP Environmental Science Class. His class then proceeds to monitor a stream for about 6 months, sending us all of the collected data. ALLARM compiles all of the collected data and analyzes it for the class. In late March/ early April, SMART presenters return to Ron's AP Environmental Science class and present the graphs, tables, and charts which were compiled. The class then helps to brainstorm areas that need to be improved, and how better management techniques could help out with this.

This year, for the first time ever, Ron Yerger's class will be traveling to Dickinson College to see first hand; the laboratory, the office, and the inner workings of ALLARM. This will probably occur in mid-April and is made possible by the fact that he has a much smaller

class this year. The ALLARM staff is already excited and can hardly wait for the students to arrive!

Keeping the Connections: Alum of ALLARM

The other school that SMART attended was Cumberland Valley High School. Contacted by recent ALLARM alum and now high school teacher, Jessica Spencer, ALLARM staff members put together a PowerPoint presentation and traveled to her school on Thursday, October 10, 2003. The presentation included background



information of ALLARM and SMART, examples of hands-on projects completed in the recent past; and personal experiences in regard to both college courses and extra-curricular activities. What started out as a bad day -- only getting one car from Dickinson Public Safety, getting lost in a HUGE school, and not being able to get the Power Point presentation to work, ended up going extremely well. The technical problems were taken care of and the car situation was figured out. The classes seemed very interested in the presentation and several of the students requested more information. SMART will be returning to Cumberland Valley High School in the next month or so to present for another teacher's class, and also be re-visiting Jessica's classes in the spring to provide a follow-up presentation.

As the year progresses, SMART will continue to be involved both in the classroom and in the field. There is talk of presenting in other area schools, a Dickinson College freshmen seminar, and helping to plan a youth day or community carnival for the spring. Lastly, SMART is very excited for the year and has been making contacts, in an effort to increase SMART awareness. If you have any ideas, comments, or suggestions, please don't hesitate to contact us via email at allarm@dickinson.edu or via phone at 717-245-1565.

Purple Loosestrife: A Beautiful Killer

By Becki Walker

Picture a wetland full of beautiful purple flowers that seems to expand without limits beyond the line of the horizon. Everywhere you look, purple flowers. Sounds almost utopian, right?



Wrong. The “purple flowers” are an invasive species classified as a noxious weed in Pennsylvania. Known commonly as Purple Loosestrife and scientifically as *Lythrum salicaria*, the plants exist in almost all of the 50 states – only Florida and Hawaii are exempt from the reign of this ecological terror.

Loosestrife is a perennial flowering plant that can grow as tall as seven feet, and makes its home in freshwater wetlands of all types. The plant blooms from July until early September, and a single plant can drop as many as 2.7 million seeds throughout the summer. This fecundity is threatening the biodiversity of wetlands across the country.

Loosestrife’s home range is in Eurasia, where there are natural controls that help keep the plant in check. However, when loosestrife was introduced to North America in the 1800’s, it found no such foes. The plant has grown rampantly in wetlands across America, crowding out native vegetation and animal populations. It may appear to make marshes and gardens more aesthetically pleasing, but the plant is essentially useless. Birds refuse to eat the seeds of the plant, it grows in compact monocultures that prohibit usage

as cover, and the thick, tough roots form a dense mat on the soil of the wetland, preventing the growth of native plants. As loosestrife crowds out native flora, animals may find they need to make their homes in other areas, as normal food and cover sources have been out-competed by the loosestrife.

How do we prevent this ecological apocalypse? Controlling loosestrife presents several challenges. Of course, the best control method is simply to not plant any varieties of loosestrife. Though some species are said to be “sterile,” *L. salicaria* has the ability to cross-pollinate the plants. Also, some seed packages of mixed wildflowers may contain loosestrife, so be sure to check the label before purchasing.

If loosestrife has already started growing, small patches can be pulled out by hand, but the person removing them must use the utmost caution, placing the flower-heads in a plastic bag. Loosestrife seeds are extremely small and often travel from place to place in the mud of shoes or stuck to clothing, so those that remove loosestrife can often facilitate expansion of the plant’s range. In older stands of well-established loosestrife, mowing or burning the plant can be an option. However, neither of these two methods of control are recommended, as they damage native flora and fauna. Loosestrife seeds also have the ability to lay dormant for as many as three years, making a mown patch prime ground for producing another generation of the plant. Chemical controls are not recommended, as loosestrife grows in the extremely sensitive aquatic environment, making the possibility for human and animal harm great.

The most successful method of loosestrife control to date has been the use of biological agents. In Eurasia, there are as many as 127 insect species that feed on loosestrife, and three of them are now being used widely in the United States: *Galerucella californiensis*, *G. pusilla*, and *Hylobius transversovittatus*. *G. californiensis* and *G. pusilla* feed on the leaves of the loosestrife, while *H. transversovittatus* attacks the root of the plant. Though the insects are a long-term solution, progress has already been seen in areas affected by the plant.

I spent my past summer working as a research assistant to a doctoral candidate researching the effects on *G. spp.* on the competitive ability of purple loosestrife at the Pymatuning Laboratory of Ecology in Linesville, Pennsylvania. The Pymatuning Laboratory is a facility owned by the University of Pittsburgh that serves as both research station for doctoral students and summer classroom for undergraduates from the University. Most of my summer was spent not at the facility, however, but in a field full of 1000-liter cattle tanks about 5 miles away from it. These mesocosms contained monocultures of loosestrife, monocultures of cattail, or a bi-culture of loosestrife and cattail. Throughout the summer, I and my co-workers applied or removed various amounts of *G. spp.* to the plants and took note of herbivory damage, maximum heights of plants in each tank, and performed a census of each stem in a selected quadrat of the tank in which we measured height and basal diameter. Why all this measuring? The doctoral student I was working for was researching resource competition theory as it applies to loosestrife and cattail to determine at what level the herbivory damage would make it possible for cattail to out-compete loosestrife by absorbing more nitrogen and sunlight. This data would provide the scientific community with an estimate of approximately how many beetles it would take to effectively bring an area of loosestrife under control, thereby helping prevent nightmarish visions of purple flower monocultures and making wetlands everywhere safe for native plant and animal species.

For more information about the research described in my article, visit this website: www.epa.gov/glnpo/fund/2000/guidreview/136.pdf

Bobs Creek Group: The Stream Guardians

by Rob Berns

One needs only to consider the large amount of work put forth by the Stream Guardians of the Bobs Creek Watershed before partnering with ALLARM in order to understand the importance that the community places on it. In just 2002, the Guardians planned and executed two dump cleanups and held a Watershed Meeting and a Watershed Day, along with mailing information about Bobs Creek to 1,100 landowners (to inform them about the creek and to ask for participation). All told, before Bobs Creek officially joined up with ALLARM, 550 volunteer hours were logged in cleaning up the creek.

Bobs Creek became an ALLARM partner group in June 2003. The Stream Guardians, the group associated with Bobs Creek, is a sub-committee of the Pavia Sportsmens Club, Inc. Steam Guardians is chaired by Chris Ickes and co-chaired by Tim Clingerman. The Stream Guardians' mission is to protect and rehabilitate the watershed on private and public lands, so that it will be available for future generations at a high-quality level. Some goals the Stream Guardians listed for the Bobs Creek project include clean up of water within the watershed, developing a newsletter about the watershed, monitoring water quality, and educating the public on both watersheds and nutrient issues.

The Bobs Creek watershed is located primarily in northwest Bedford County, and expands into parts of Blair and Cambria Counties, encompassing sixty-five square miles. More than 45% of the Bobs Creek watershed is forested and managed by the Bureau of State Parks or PA Game Commission. The rest of the watershed is composed of agricultural land that includes a few small communities.

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Catawissa Partnership

by Andrew Schwerin

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The Stream Guardians chose to monitor for several reasons. First, monitoring will allow them to determine the ecological conditions of the watershed. They then can prioritize areas for restoration and protection projects. Second, the Stream Guardians are interested in improving and protecting the water quality for wild trout. Finally, water monitoring allows the Guardians to cooperate with local schools on education programs, which is one of the many goals they hope to achieve through the project.

While deciding which parameters to monitor, the Stream Guardians first had to decide which water quality issues were most important for Bobs Creek. The Guardians considered sedimentation, illegal dumps, and nutrients to be of paramount concern. Parameters to be monitored in Bobs Creek are temperature and turbidity as physical indicators and pH, alkalinity, nitrate, dissolved oxygen, and orthophosphate as chemical indicators.

The Stream Guardians have a three-year plan for the cleanup of the Bobs Creek watershed. One main focus of the Stream Guardians is to conduct this project "at no cost to the landowner". The Guardians have received funding from the Western PA Conservancy, the Blue Knob State Park Staff, and the Pavia Sportsmen. The group also recently received funding from the Cold Water Heritage Program to conduct assessments of Rhodes and Ickes Runs, tributaries of Bobs Creek. They also received a Growing Greener grant to conduct an assessment of the entire watershed and to launch partnerships with local school districts. Through C-SAW, ALLARM has helped the group develop their study design, and provided chemical kit training and quality control. We will continue to work with them to help with their new projects. The Stream Guardians hope that this project will keep the natural resources of Bobs Creek safe for the next generation of landowners and recreational users in the watershed.

The Catawissa Creek watershed is nearly pristine, encompassing mostly wooded areas. Ed Wytovich, of The Catawissa Creek Restoration Association (CCRA) assured us, "It's just a drop-dead gorgeous stream."

The main problem in this pristine watershed has been acid mine drainage, (AMD) from many abandoned coal mines. AMD is formed from a series of geochemical and microbial reactions where iron disulfide (pyrite, "fool's gold", or FeS_2) reacts with water and oxygen to generate Iron (III) hydroxide, the sulfate ion (SO_4^{2-}), and acidity, or free protons (H^+). These products are involved in the oxidation of pyrite: the reactions are self-perpetuating and will continue until all of the pyrite has been reacted. The sulfuric acid produced, which lowers the acidity degrades the life of the stream in two ways. First, the acidity creates a medium where the fundamental intra-organism biochemical reactions that sustain life cannot take place. Second, the acidity generated can dissolve metals. Sometimes these metals are necessary nutrients (like iron and zinc) and are brought to unhealthy levels of concentration. In other cases, the metals dissolved have toxic effects, such as cadmium, lead, arsenic, and aluminum.

CCRA began tackling this problem in 1998, beginning with a survey by the Fish Commission. This survey found about 10 tributary streams that are high value or exceptional quality cold-water fisheries. As a result of five abandoned mine drainage tunnels with AMD, the streams are not meeting their high value or exceptional quality cold-water fishery standards and are on the 303d Impaired Waters list. In response to these issues, the Catawissa Creek Restoration Association was formed with the mission to remediate the impacts of AMD on the Catawissa. CCRA's major programs are 1) restoration design, implementation, and evaluation, 2) water quality monitoring, 3) education and outreach, and 4) partnering with other organizations to meet water quality goals. CCRA was helped by the National Resource Conservation Service (NRCS) to design their first treatment system for an abandoned mine drainage tunnel entering the stream, the Oneida 1 drainage tunnel. This treatment

system was a test project in the middle of a residential development designed to treat low pH and excess dissolved aluminum entering the water.

Recently, CCRA received a \$1.4 million grant from the Pennsylvania DEP Growing Greener Program through the Federal Clean Water 319 Fund. The group wrote the grant to establish a passive treatment system for the Audenreid tunnel, the largest of the five abandoned mine drainage tunnels. It supplies 80% of the acid and aluminum load to the stream. This passive treatment system will consist of three concrete storage tanks that will hold a total of about 20,000 tons of high calcium carbonate limestone through which the water will flow in order to be neutralized. The acidic drainage water in these tanks will dissolve the limestone, neutralizing the acid by adding carbonate ions, which increases the stream's buffering capacity to acid influxes, or alkalinity. CCRA hopes that the system will treat 24 or more miles of stream threatened by high acidity and hopes to have construction underway by early 2005. The long-term goal of the treatment is to restore the creek to a healthy ecosystem.

CCRA began monitoring about 5 years ago to collect baseline data on the creek (flow, iron concentration, temperature, free acidity and pH), to evaluate changes in these parameters over time, and to compile and share this data with other organizations involved in the watershed. The watershed has seen a lot of interest from governmental organizations such as: the USGS, the Bureau of Abandoned Mine Reclamations (BAMR), the DEP, and the Eastern PA Coalition for Abandoned Mine Reclamation (EPCAMR).

In collaboration with Stephanie Singer from the Columbia County Conservation District (CCCD), one of our new C-SAW partners, we are working with CCRA on their Monitoring Study Design. Although, the group has been collecting data for about 5 years they are revisiting their study design to document the work they are doing and possibly incorporate some new monitoring facets.

This collaboration with CCRA and CCCD presents a unique opportunity for ALLARM. Working with groups focused on AMD will broaden our ability to develop study designs for increasingly complex aquatic problems.

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about it. Her interests lay in physical geography, so even when the family would travel around the country, the children would get a lesson in the rock formations that they passed along the way. However, as Julie grew and entered high school, her interests changed and she lost touch with her environmental roots.

When it came time to choose a college, Julie chose Dickinson, not because of its environmental opportunities, but for its languages and extensive study abroad opportunities. It was not until she took Environmental Science 131 with Professor Candie Wilderman that she reconnected herself with the Bay culture and decided to major in environmental science. In her sophomore year she became a student staff member, and now, after graduating from Dickinson with honors, she has made her way to Assistant Director.

When asked about the change from student staff to an administrative position, she could definitely sense a difference. "It is a challenging one... It's nice in some ways because I get to take a lot more ownership in the organization than I was able to do as a student." She talked about how it was rewarding to now be a core member, and that the ideas and thoughts she had as a student could now be translated into changes in the group. With this change, she has an opportunity to refine her professional skills. "Any professional qualities I have right now probably are a direct result of my involvement with ALLARM." As Assistant Director, she exercises her public speaking skills in study design meetings as well as training workshops. Because of her experience here, she has a strong facilitating capacity. "It's the longest position I've had working, besides being a newspaper carrier for eight years."

One experience that changed her views on environmental issues was her study abroad program. When she spent a semester at Madurai, India through the South India Term Abroad (SITA) program, she learned to shift from a science/reason-oriented perception of the world to a more cultural/anthropological view. "India seriously impacted what I brought to my environmental education." When she first looked at a stream in India, she thought about sediment impact, bacteria, etc., but later she learned to see the people living around the stream, and what their story is. Why are they living there? What are their perceptions of water quality? Are they able to address their concerns? All these ideas

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taught her that when you are dealing with a mitigation plan, you must be sensitive to the cultural values of the area. After India, she felt a deeper connection between the science that we do and the people with whom we work. They do not have to be two separate fields. "It really can be interrelated, and that is the philosophy behind environmental science. You're not just based in science."

Although her time here at ALLARM has been valuable, Julie plans to move on eventually, but plans to remain within the field of aquatic resources somehow. "I am interested in branching out, but it will most likely be in the umbrella world of water." When she is not working for ALLARM, she will never forget the experience and ideas it has given her. "When you work for ALLARM, there are certain ideologies that become ingrained in your way of thinking. One of them is community-based participatory science. I like the idea of engaging the community in any research I would do, and seeing a tangible outcome of what I do and seeing how that plays out into the community. I guess you can see where my experience with ALLARM has definitely shaped how I think about things. I'm 21, and I'll be 22. I still have the world open to me, and what I want to do changes on a day-to-day basis. After working with a watershed group and being able to feel the energy of a group of people moving together and working together to make things happen provides you with energy to want to continue doing things like that. I don't always see myself based out of Dickinson College doing this kind of work but I do see myself taking it to the next level, whether it be nationally or internationally." When asked what exactly she would do, she said, "I would love to teach. You teach everyday in ALLARM. I would like to be able to follow the path of the people who most impacted me."

As we finished up the interview, I asked Julie if ALLARM will be an important factor in future environmental issues. She enthusiastically stated, "Yes!" She reminded me that what ALLARM is doing now, is a very progressive, innovative thing. This type of work is not being done around the country. She believes, though, that soon enough our role of a "service provider" will be duplicated around the country. She strongly believes in the grass roots movement that ALLARM condones, and is happy to be a part of it. And ALLARM is happy to have her.

Greenpeace Student Activist Training: Using Direct Action to Make a Difference

by Laura Walters

As I meandered through the heated August streets of Washington D.C., I slowly made my way to the Greenpeace Student Activist Network Training in China Town. The next five days would be devoted to activities, workshops, inspiring conversations, and intense moments, all shared with other college students who were equally passionate about saving the environment. Our session started at the Greenpeace D.C. Office, where we got a tour of the eco-friendly facilities and chatted with Greenpeace employees over a delicious vegan spread. We then made the journey to Camp Frasier. It was about an hour drive from the Capital yet the atmosphere and scenery made us feel like we were hidden from the problems of the world.

Our first day began at 7:30 a.m. with an amazing homemade breakfast to power us for what would be a long day of exciting activities. Our first session was Non-Violence Training taught by Nadine Bloch. Nadine has been an activist working for peace and justice issues since 1980. Her energy and enthusiasm awoke our bunch of tired college students. We were split into two groups, police officers and protestors. The protestors had the challenge of reaching their "protest site" which was blocked by the group of police officers. The most difficult hindrance was that they could not touch the police officers; it could be considered assault against a police officer that could result in jail time. After many different failed tactics that resulted in "arrests" and bruises, the protestors realized the best plan of action was to stick together, linking arms, and to sit when confronted by the group of police officers. This was a valuable tactic that we could apply in future events and reinforced the non-violence principles.

Later in the day, we learned about the two main campaigns that Greenpeace was working on: "Clean Energy Now!" and "Endangered Forests, Endangered Freedoms." The "Endangered Forests, Endangered Freedoms" campaign is highlighting problems with the

Bush Administration's plan for the National Forests. The Roadless Area Conservation Act was passed by President Clinton to protect 58.5 million acres of forest from industries such as logging, mining and drilling. President Bush has been delaying the execution of this act while pushing for amendments that favor industry. Bush is also pushing for the "Healthy Forest Act" which further benefits the logging industry by allowing logging under the pretence that this will help prevent forest fires. Scientist are saying that the clear-cut type of logging that is being proposed will only cause more forest fires while destroying our old growth forests.

Our group was going to use all of the skills we had learned over the week to plan a direct action focused around the "Endangered Forests, Endangered Freedoms" campaign. We were briefed by a scout who had assessed the security situation and taken pictures of the Department of Agriculture, where the action would take place the following day. We decided that we wanted to focus our action on educating the public about the forest crimes that were taking place while bringing the message that we wanted the national forests to be protected to Mark Rey. Mark Rey is a former timber industry lobbyist and current U.S. Under Secretary of Agriculture. We composed and sang chants such as "ONE, they're taking our taxes, TWO to cut our forests, THREE for corporate profit, FOUR no more NO MORE!!" while dressed in "Greenpeace Forest Crimes Unit" shirts. To draw attention to our action, we also had a person dressed as a tree who was being chased and chopped by a fake President Bush. Other members of our group represented the twelve national forests currently endangered. We were wearing grave stone signs including the forests' name, location, and amount of acreage endangered.



Our last real day of the training session was consumed by personal campaign planning for our corresponding colleges. We decided which campaign to bring back to our own campuses and how we could effectively implement it. I chose to run the Clean Energy Campaign at Dickinson because the college is already buying 9.2% wind energy through Community Energy. The campaign is working to increase the amount of energy that Dickinson buys from wind farms and is proposing the introduction of on-site solar or wind power.

“Cowardice asks the question: is it safe? Expediency asks the question: is it politic? Vanity asks the question: is it popular? But conscience asks the question: is it right? And there comes a time when one must take a position which is neither safe, nor politic, nor popular - One must take it simply because it is right.” ~Martin Luther King Jr.

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banks along the Mully Grub to minimize runoff and erosion. Additional restoration measures included the installation of stone and brush deflectors along the Letort Spring Run to speed up stream velocity and the creation of a storm water runoff retention wetland above the confluence of the Mully Grub and the LeTort Spring Run.

This introduction was followed by the stream walk and clean-up. People split into small groups and armed themselves with trash bags and stream waders. Each group was led by two ALLARM staff who were able to give a more personalized tour of the restoration attributes along the streams as garbage was collected. People were given an up-close-and-personal look at the stone deflectors installed into the LeTort (to narrow the channel width and increase velocity of the water) while removing the trash that had been discarded by careless polluters. The tours also allowed for questions about the different stages of the restoration project.

The group then gathered at 2 pm at the storm water retention wetland (part of the second phase in the restoration) for the highlight of the day: dead tree removal and tree planting. All the trees were purchased from a local nursery. All were native species, such as willows, serviceberries and redbuds, which are fast-growing, moist-soil loving and adaptable to acid and alkalinity. The increased number of plants

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along the wetland should help to decrease the metal concentration from the storm water runoff. Trees were also planted along the bank of the Mully Grub to maintain bank stability and establish a riparian buffer zone, which slows the runoff from the sports fields. After the planting of the trees the patrons slowly began to make their ways home.

Although it appeared that only these two hours on Saturday were needed for this event, the event organizer Laura Walters and co-organizer Andrew Schwerin each put in countless hours to ensure a successful day. Despite the chilly weather, the event yielded a great turnout with tremendous success: we left the stream cleaner and the attendees were left more educated about one of their local waterways and the efforts put forth for remediation by ALLARM.



Exciting Partner Update: The Conodoguinet Creek Watershed Association

by Micah Weintraub

The Conodoguinet Creek flows 101 miles through the Cumberland Valley from its head waters on Kittatinny Mountain to its confluence with the Susquehanna River. The creek provides drinking water to many of the municipalities of eastern Cumberland County including Carlisle. Eight million gallons of water are pumped from the creek each day and much of that water is returned to the creek through six sewage treatment plants. The Conodoguinet is also valued for its picturesque beauty. Many anglers, canoeists, and nature lovers find refuge in and along its waters.

The Conodoguinet is being impacted by the steady influx of people to Cumberland County. With the increase in population, there is an ever growing need for concerned citizens to act on behalf of the creek. Since 1988, this role has been filled by the Conodoguinet Creek Watershed Association (CCWA). The association was originally formed in response to an application by Pennsylvania-American Water Company to increase its withdrawals from the creek. People from the community joined together because they wanted an opportunity to express their concerns regarding the health of the watershed. Since then, the group has engaged in a variety of projects including restoration projects, school grants, a river conservation study, water quality monitoring and a dam removal project.

Volunteer monitors trained by ALLARM collected monthly water samples from fifteen sites along the Conodoguinet from 1998 to 2002. The volunteers measured dissolved oxygen, water temperature, air temperature, nitrates, and phosphates. ALLARM maintained a database of the information from each site. The goal of the monitoring program was to assess the overall state of the Conodoguinet Creek. By 2002, CCWA had collected five years of baseline data and many of the Association's members felt that it was time to start interpreting what they had collected.

ALLARM saw this as a good opportunity to help the Association build its capacity. Staff member Pam

Cowher used the database to create box-and-whisker graphs for the monitors. Next, a group of ALLARM staff members including Pam Cowher, Clare Froggat, Heather Friedmann, and Colleen Haney along with director, Lauren Imgrund and Coordinator Candie Wilderman prepared a workshop to train CCWA members to interpret their own data. The workshop was held in October 2002. The monitors were presented with the graphs and encouraged to look for trends and to identify hot spots (specific sites that had consistently extreme measurements) and hot moments (specific points in time that had consistently extreme measurements). The workshop was successful, but CCWA requested that ALLARM prepare a formal report on the state of the creek. On April 24th, 2003, ALLARM presented the report. Together, the two groups narrowed their concerns to four hot spots: two point discharges and two non-point discharges at sites along the creek and its tributaries.

Having selected four areas of concern, the association needed to decide what action they intended to take. A six-person Study Design Committee was formed of CCWA members. Committee members Diane Hollinger, Susan Perry, Chuck Schaefer, Don Seiple, Holly Hosford Smith, and Wilbur Wolf met once a month for a three-hour design session and potluck dinner. At the conclusion of the study design, the Committee had outlined a complex, three-phase plan to move their water testing program from monitoring to action.

The first phase consists of an education and outreach program. The basic goal of this program will be to make the baseline monitoring data and conclusions available to the public. CCWA plans to achieve this by disseminating information about the results of their 5-year baseline monitoring program via fact sheets, public presentations, letters to the editor, press releases, news articles and meetings. This project will be headed up by CCWA Volunteers Holly Hosford Smith and Kelly Donaldson.

The second phase consists of continued investigation of the four hot spots identified through examination of the baseline data. These four sites include two sites along the Conodoguinet Creek, Big Spring (in the vicinity of the Newville Sewage Treatment Plant), and the LeTort Spring Run in Carlisle. Each site will be monitored for a specific set of parameters based on the concerns identified in the study design. For example, the LeTort will be tested for heavy metals because run off from motor traffic is a major concern

in this area. Likewise, one of the Conodoguinet Creek sites will be monitored for pesticides due to its proximity to the Silver Spring Golf Course. All of the sites will be monitored for nitrates, orthophosphates, benthic macroinvertebrates, temperature, and flow. The CCWA volunteers will be trained by ALLARM and the United States Geological Survey. The reagents, kits, and equipment will be provided by ALLARM and quality control will be done by CCWA volunteers in the R.F. Shangraw Jr. Community Aquatic Research Laboratory. The research coordinators will be CCWA volunteers Wilbur Wolf and Ron Freed.

The purpose of this continued monitoring is two fold. First it will serve to confirm whether or not a problem exists at each of the four sites. Second, the data will be used to design an action plan for each site. The hope is to identify the sources and degrees of impact and then to use the data to approach the responsible parties, and officials to discuss ways to reduce and/or mitigate the damage to the watershed. CCWA will form an action committee that will work hand in hand with the CCWA Education and Outreach Committee. Together, the two committees will be responsible for presenting the results of this investigation to the public.



The third phase consists of a new monitoring project and ongoing case study of a proposed development in Middlesex Township. The goal of this project is to obtain data on the impact of the new 1,000 home development during and after construction. Also,

['CCWA Update' continues on the next page](#)

'CCWA Update' continued from the previous page

the monitors will act as public watchdogs during development. They will do routine spot checks and visual assessments of the site to make sure that the developers and township officials are acting in strict accordance with the approved plans and existing laws. Monitors intend to collect a full year of baseline data from three sites along the Conodoguinet Creek adjacent to the development. This data collection will start in the spring of 2004. Monitoring will continue throughout the construction process and beyond. For this assessment, water temperature, flow rate, nitrates, total suspended solids, herbicides and pesticides, and presence of macroinvertebrates will be considered. This study has the potential to be very valuable because the final report will illustrate the condition of the stream before, during and after construction. By comparing the baseline data with that collected during and after construction, CCWA will be able to determine the extent of the subdivision's impact on the stream at each stage of the development process. Again, monitor training and assistance will be provided by ALLARM and the USGS. Susan Parry will be responsible for recruiting volunteer monitors from Middlesex Township.

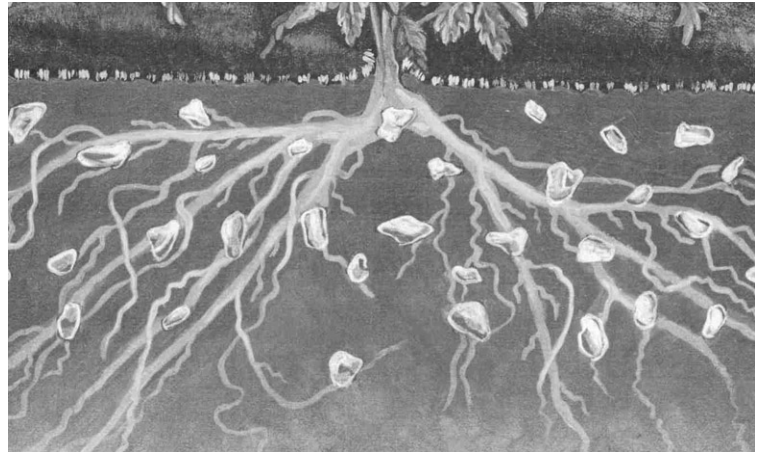
The study design was presented by Susan Parry and Holly Hosford Smith and approved at the Conodoguinet Creek Watershed Association's annual meeting on Thursday, October 23, 2003. The first monitor training workshop for the new study design took place in the ALLARM office at Dickinson College on Wednesday, October 29, 2003.



CCWA member, Wilbur Wolf (above center) commented on the new study design, saying, "I think it's great... the new project is exciting and hopefully it will stimulate people to get involved."

Super-Absorbent Polymers and Water Conservation

by Claire Foster



If you look carefully at potting soil for sale in lawn and garden shops, you may notice a new ingredient aimed at making it necessary to water your plants less often. They are often labeled as "water absorbent formula," "moisture control" soils, or containing a "wetting agent to help absorb moisture." These ingredients are cross-linked polymers (CLP). CLP is used for many different purposes, including a protective insulation coating for underground cables and meat packing absorbents. It can absorb between 200 and 400 times its weight in pure water the first time it absorbs water. Among its commercial uses as an absorbent, CLP is also marketed for application to soil and potting mixes as a water storage enhancement amendment with a manufacturer-claimed soil life of 2 to 6 years.

In the west, recent and recurring drought and watering restrictions have caused people to become more interested in things you can add to the soil that may be helpful for storing additional water in soils. Super absorbent CLP is being aggressively marketed by a number of manufacturers for this purpose.

This past summer, I did research at Colorado State University in the Crop and Soil Sciences Department, with Drs. Greg Butters and Grant Cardon. The research project I was working on involved evaluating

the effectiveness of super absorbent polymers to reduce the amount of watering necessary on crops and greenhouse plants.

A miracle additive?

From the initial description, these polymers seem to be some sort of miracle additive to soil. Just a couple of grams and you don't have to water your plants as often. The problem is that scientific studies have found the effectiveness to be mixed and unpredictable. It seems to be more effective when added to containers than when added to fields, but still not consistent. Growers, extension agents, and water conservation districts continue to advise the use of CLP despite conflicting findings regarding the water storage benefits of it.

Our Research

The research that I participated in this summer involved testing the effectiveness of CLP to reduce water stress during periods of drought and determining environmental conditions leading to the failure of CLP as a water storage material. There were three parts of the study: laboratory, field, and greenhouse. In the lab, we looked at how the water holding capacity of CLP was affected by exposure to salt solutions of sodium chloride and calcium chloride. In the field, two varieties of pinto beans were planted with varying amounts of CLP added to the soil. Half of them were fully irrigated, and the other half were irrigated 50% as often. As the plants were growing, several parameters that indicate plant stress and health were measured. In the greenhouse, the same varieties of pinto beans were planted in small containers with varying amounts of CLP and were watered at varying rates.

Results so far

When the CLP was exposed to salt solutions, its water holding capacity decreased dramatically, especially with calcium chloride. This may be one of the reasons why CLP has not been consistently effective in other field tests. Small amounts of salts present in the soil significantly change CLPs ability to hold and release water. In semiarid regions where CLP would most often be used, salinization of soils is also a common problem.



The preliminary data from the field experiment shows that CLP does not seem to be helping to reduce stress on the 50% irrigation treatment. Production data for the field and greenhouse experiments are currently being compiled and analyzed.

What does this mean?

Super absorbent polymers or products that contain them are being heavily marketed as something that helps maintain healthy crops and plants much more easily. However, they are often expensive, and their success can be contingent on many different things, including soil texture, moisture, and salt contents. In some situations they may prove to be a great benefit to plant growth and health, but all conditions necessary for success are not currently defined.

Adventures in Arizona

by Nicole Vecchione

Last year I received yet another generic “Apply for this Scholarship” email buried among the “Young Girls” and “Best Mortgage Deal” emails. This particular email was from my boss at ALLARM (you may know her, Lauren Imgrund). I don’t really know what possessed me, as I regularly delete a dozen emails a day without reading them, but I replied to this one.

The email was regarding the Morris K. Udall Scholarship. The scholarship is granted to students who show potential in fields concerning environmental or Native American issues. Each year eighty students are selected from the scores who apply for the scholarship.

Lauren and I sent my application in last fall and I did my best to forget about it. I figured that I wouldn’t be too disappointed if I couldn’t remember. To my great surprise (well not so great, I wasn’t as successful as repressing as anticipated), one day I walked into the ALLARM office to an outburst of: Congratulations!

Prior to filling out the application I did not know anything about Morris K. Udall. As it turned out, however, I had heard quite a bit of his work without actually knowing he was the man behind the scenes. For example, Udall was in large part responsible for helping preserve the Artic National Wildlife Refuge in Alaska. Today the act to permanently preserve the refuge from oil development bears the Udall name as a memorial.

The highlight of this experience was by far the Scholarship Orientation weekend in Tucson, Arizona during August. All eighty scholars as well as most of the large Udall family congregated at a beautiful desert resort and the farthest from my New Jersey home I had ever been. While the speakers and discussions were intellectually stimulating, I must admit that it was all enhanced by the desert landscape and wild cacti, both of which were new experiences for me.

The federal US Institute for Environmental Conflict Resolution, which is run through the Morris K. Udall Foundation prepared one of the weekend talks. The members of the Institute explained Environmental

Conflict Resolution (ECR) to the scholars. ECR involves a variety of alternative methods to resolving conflicts regarding the environment, natural resources and public lands. This range of methods used to meet resolution includes mediation, facilitation, arbitration, consensus building and conflict assessment. The premise of the Institute is not only to promote ECR as a cost effective and fair approach to solving complex environmental dilemmas, but also to put ECR into practice.

The unique blend of experiences I have received during my practical education at Dickinson College and my work with ALLARM have made me particularly receptive to the idea of ECR. The Institute represented a theory put into action. Not only were the members committed to the idea of efficiently and effectively resolving environmental dilemmas, they were putting the theory to practice.

I was forcibly reminded of all my coworkers at ALLARM as well as all of the community members with which we work. Part of the ALLARM mantra is to support holistic community movements and to encourage community defined problems and community defined solutions. The Institute, therefore, shares this common thread with ALLARM. ECR in its own right is holistic as well. While a form of litigation, ECR does not declare a winner, instead it brings all the parties of interest to the table and creates an arrangement that benefits all.

My exposure to ECR and the Institute was a significant experience in my life. Cherie Shantean, Senior Mediator and Project Manager at the Institute, took the time to sit with a few aspiring lawyers, including myself. At that point in my life I was slowly becoming disillusioned with the field of environmental law. However, because Cherie was so passionate about her work, she, so to speak, “showed me the light.” ECR was not only a theory for me to admire, it is a practice that is applicable to my future.

I left Arizona feeling inspired about ECR, proud to be part of the Morris Udall legacy, and with a pet cactus I named Humphrey Bogart (who, by the way, is flourishing quite nicely in my dorm room).

Incorporating the *Future* of the Chesapeake into the Classroom

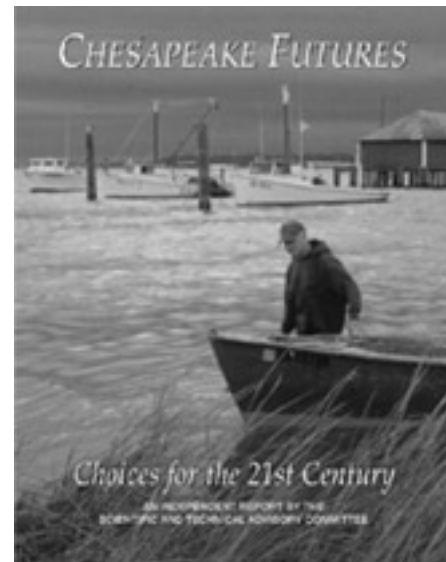
by Colleen Haney

What will the Chesapeake Bay look like in the future? How will the choices we make today affect its health? Are we doing enough to protect our nation's largest estuary? These are all questions that face policy makers, government officials, environmental advocates, and citizens of the Chesapeake Bay watershed. Although these questions remain unanswerable until we reach the future, the Scientific and Technical Advisory Committee (STAC) to the Chesapeake Bay Program has provided some insight into these questions in the recently released report *Chesapeake Futures: Choices for the 21st Century*.

During my first semester at ALLARM last fall, I applied for the position of Pennsylvania Young Delegate to the Citizen's Advisory Committee (CAC) to the Executive Council of the Chesapeake Bay Program. CAC provides a citizen perspective on Bay clean-up efforts and Bay Program policies to the Executive Council of the Chesapeake Bay program, which is composed of the Governors of Maryland, Pennsylvania, and Virginia, the Administrator of the U.S. Environmental Protection Agency (EPA), the Mayor of the District of Columbia and the Chair of the Chesapeake Bay Commission. There are four Young Delegate positions within CAC, one for each state represented in the Executive Council and one for the District of Columbia. I was selected to be the PA Young Delegate, which presented me with the opportunity to attend the four annual meetings and contribute to the group from a Pennsylvania and youth perspective.

The first meeting I attended was held in February in Dorchester, Maryland. During this meeting a presentation was given by Jack Greer, the Assistant Director for Public Affairs of Maryland Sea Grant. This presentation was about the release of a report published by STAC called *Chesapeake Futures: Choices for the 21st Century*. The purpose of this report is to outline scenarios for the future of the Chesapeake Bay based on the decisions that we make today. It provides a glimpse into the future of the Bay based on current knowledge and projections made using various sets of data and methodological tools. Specifically, the report provides three scenarios for what the Bay will look like

in the year 2030. The first scenario is based on the continuation of recent trends of land use, development, deforestation, etc. in the Chesapeake watershed. The second scenario is based on us meeting the current objectives set forth by agreements such as the *Chesapeake 2000 Agreement*. The third scenario is based on the implementation of feasible alternatives in terms of development, forests, and agriculture.



The information contained in this report completely captured my attention. Having the projected future aspects of the Bay right in front of my eyes truly made me realize the impact that our current actions may have on a valuable natural resource. Myself and the other Young Delegates at this meeting, Melanie Allen (VA), Jayni Shah (MD), and Stephanie Quaranta (D.C.), realized that it is today's youth that will have to face the possibility of the reality of these future projections. Thinking along these lines we found it imperative to educate our peers about the consequences of our actions to avoid the possibility of more harm to the Chesapeake Bay. We thought that if other students our age saw this type of information they too would recognize the role that today's actions and policy decisions will play in the future of the Bay.

Since that meeting, it has been the personal mission of the current CAC Young Delegates to incorporate the *Chesapeake Futures* report into the classroom.

['Chesapeake Futures' continues on the next page](#)

Current Events

A Look at Water Resource Issues Making Headlines

by Danny L. Blum

'Chesapeake Futures' continued from the previous page

Being a full-time student and working for ALLARM part-time however does not allow much time for on-the-side projects such as this. Fortunately, I was able to combine this goal with a project for my Environmental Policy class during the Fall 2003 semester. As part of this project I transformed the *Chesapeake Futures* into a classroom-ready, teacher-friendly PowerPoint format so that it is readily usable by teachers. This project was done in the hopes that students who are exposed to the information provided in the report will become educated on the topic and be capable of making informed decisions in terms of policy changes and daily life.

The goal of my *Futures* report project mimics one of the main goals of ALLARM, which is to empower communities and citizens with the knowledge to make meaningful contributions to the decision-making processes concerning the protection of natural resources. Hopefully making the report more readily available to students will empower them and inspire them to share their knowledge with parents and other peers. The PowerPoint classroom presentation of the *Chesapeake Futures* report should be available, pending approval of STAC themselves and the other members of CAC, in the early Spring 2004.

If you are interested in viewing the full copy of the report, STAC has made it available to the public at the following website address, <http://www.chesapeake.org/stac/futreport.html>

Cutting Evaporation at Water Reservoirs

Water reservoirs are used around the world to control water levels during wet seasons and provide a source of supply water during dry seasons. Water utilities constantly lose large amounts of water to evaporation during the dry season and with water resources scarce, they are expensive to replace. This is especially true in less developed countries where demand is already near completely inelastic and other means of water acquisition are non-existent. A newly refined technology utilizing monolayers of biodegradable "fatty alcohols" might now provide an inexpensive way to significantly reduce evaporation in reservoirs and other forms of open water storage. By spreading a very thin layer of the molecules on the surface of reservoir water, scientists at Flexible Solutions, the Canadian company leading the way in technology, have been able to reduce evaporation by 30 to 45%. A single two-week test carried out in a 1600-acre reservoir saved over 52.5 million gallons of water. Conservation such as this would not only be hugely significant ecologically, but also economically valuable as replacing water lost to evaporation can be more than twice as expensive as employing the monolayer technology.

Dirty Water No More

"While nuclear waste and biochemical terrorism steal headlines, water pollution quietly continues its noxious business." A near-perfect quote by "Popular Science's" Alex Lash as he notes that toxic water leads to the deaths of more than 15 million children worldwide each year. In an effort to clean up some of the world's most contaminated water supplies, scientists are developing "pollution-eating" nanoparticles which would be used to safely and harmlessly digest and dissolve pollutants at contaminated sites. These green nanoparticles work because they are composed of extremely small iron particles which react with pollution and break it down into hydrocarbons and chlorides. While this work is being carried out by Professor Wei-xian Zhang at

Lehigh University, NASA is pursuing a water filter that it hopes will be able to trap viruses and bacteria. Unlike Zhang, NASA is planning to use aluminum hydroxide for its long-life, clog-free filter. Both technologies are in their infancy but look quite promising, especially when compared to the archaic pump-and-treat method currently in use.

Flooding FEMA's Maps

The Federal Emergency Management Agency has announced that it will soon begin a major project to redraw flood maps across the nation. The effort comes at a time when the maps are increasingly in demand, but nearly seventy-five percent of the 100,000 flood maps of the U.S. are more than ten years old. The National Weather Service reports that flood damage has risen from \$3.3 billion a year in the 1980s to almost \$6 billion a year today. The new mapping project will have a huge impact on insurance, construction, and lending companies, as well as the government's own National Flood Insurance Program (NFIP). While the price tag for the effort is being put at approximately \$1 billion over seven years, modernization of the information is essential. Ground-measuring laser pulses emitted from small aircraft will carpet the nation, computing where floodwaters collect. Michael Baker Corporation of Pittsburgh is managing the massive task of collecting the data and creating new maps. While FEMA does not involve itself in the financial implications of its maps, it is clear that any new mapping effort will have some effect, as developments where flooding is determined to be a risk are expensive to insure. Aside from natural changes in aquatic systems, many communities notice the direct impact development has on floodplains. Development of as little as eight per cent of a natural system's floodplain can drastically reduce its ability to handle increased amounts of water.

A Watershed Initiative

In response to the growing water crisis in the American West, the Department of the Interior (DOI) has launched an initiative known as Water 2025: Preventing Crisis and Conflict in the West. Through this initiative, DOI plans to work towards balancing the ever-growing water needs of development, agriculture, and wildlife. An example of this tension can be found in California where farmers in the Imperial Valley are being forced to transfer much of their water to municipal water suppliers in southern California. This is partly the result of an October 16 agreement between the

federal government and seven western states that receive water from the Colorado River. California has been using far more Colorado River water than originally allotted and as a result, the state is now being forced to significantly reduce its dependence on the river. As currently envisioned, DOI does not intend to regulate the Water 2025 effort. Instead it plans to act as facilitator while encouraging leadership and cooperation among the affected states, local governments, and Native American tribes. A centerpiece of the plan is the recognition of five realities: (1) populations are continuing to grow rapidly in the West where water is already scarce; (2) water shortages occur frequently in the West; (3) water resources that are over-allocated can cause crisis and conflict; (4) water facilities are aging, and (5) crisis management is not effective when dealing with water conflicts. Along with the five realities, DOI has established six guiding principles and four key tools that will be utilized. Eventually, Water 2025 will lead to more open and forward-focused discussion, strengthen the local economies while protecting water supply and the environment, and minimize the impact of future water crises through the establishment of a balanced and practical water management agenda.

Interesting Water Facts from Around the World (BBC/Water Partners International)

- Each day, the average American uses 100 to 176 gallons of water
- The average African family uses 5 gallons of water each day
- Residents of developed countries use ten times more water than poor ones
- Agriculture currently consumes 70% of water resources worldwide
- Water systems fail at a rate in excess of 50%
- For every \$1 invested in water resources, \$7 is saved in public health service costs
- Of the 37 major diseases in the third-world, 21 are water resource related
- Diarrhea is the leading cause of child mortality worldwide
- Water-related diseases affect half the people in the developing world at any given time
- Currently, 1.5 billion people lack access to reliable water supplies, this is projected to increase to 2.3 billion by 2025

News Flash: the U.S. Supreme Court rules 7-2 for Virginia in a Potomac River water rights case, more next issue!

ALLARM Around the World: Our Year At UEA, Norwich, England

by Danny L. Blum & Laura Walters

This past year we studied at one of Dickinson's abroad programs at the University of East Anglia (UEA) in Norwich, England. Norwich is located approximately two hours northeast of London. Dickinson has two programs at UEA, one focusing on the sciences and the other focusing on the humanities.

Our semester began with a mid-August arrival in London where we spent the next fortnight. While in the Capital we visited a myriad of sites, our favourite being Charles Darwin's Down House. This house served as his residence during most of his adult life and it is there where Darwin

wrote his famous "Origin of Species." London is undoubtedly the cultural, scientific, and historical centre of the United Kingdom.

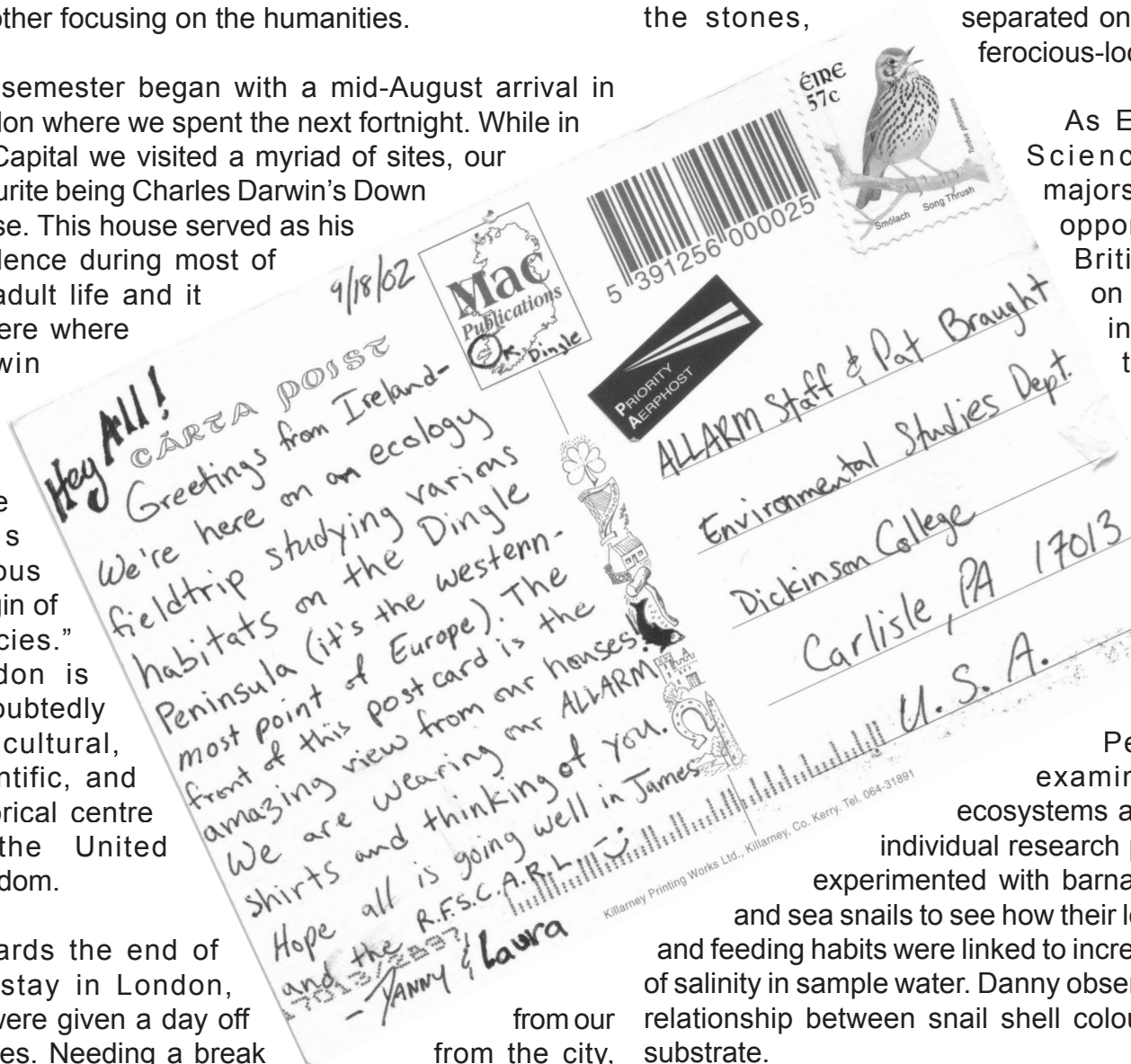
Towards the end of our stay in London, we were given a day off from our studies. Needing a break from the city, we decided to embark on a spontaneous journey to Stonehenge. To call this journey "spontaneous" is an understatement at best; we had no idea where Stonehenge was or how to get there. Nearing midnight and after many hours of travel by Tube, train, bus, and foot, we eventually happened upon an ominous and massive stone structure which we were delighted to discover was Stonehenge! A surprised guard directed us to an adjacent country road that he said campers

frequent. Upon arrival we were startled to find that the other "campers" were asleep in their cars while our gear consisted solely of sleeping bags. Notwithstanding our equipment, spending the night at Stonehenge was truly memorable as we slept a mere fifty yards from the stones, separated only by a herd of ferocious-looking sheep.

As Environmental Science/Studies majors, we had the opportunity to join British students on a field course in Ireland prior to the start of the regular autumn semester. During our two weeks on the

Dingle Peninsula we examined various ecosystems and engaged in individual research projects. Laura experimented with barnacles, muscles, and sea snails to see how their levels of activity and feeding habits were linked to increasing amounts of salinity in sample water. Danny observed the spatial relationship between snail shell colour and chosen substrate.

Back at UEA it was time to begin our university experience and be further immersed in British culture. In the fall we took courses together in Population and Community Ecology, Aquatic Ecology, and a Dickinson-sponsored course, the History of Science. During the spring semester we had more flexibility to focus on our individual interests. Laura took courses in energy resource issues and climate change at UEA's world-



renowned Tyndall Centre for Climate Change Research. Danny's spring courses included modern European history, waste management, and the Quaternary. We encountered many differences between the academic program at Dickinson and UEA, but in their own way both are challenging.

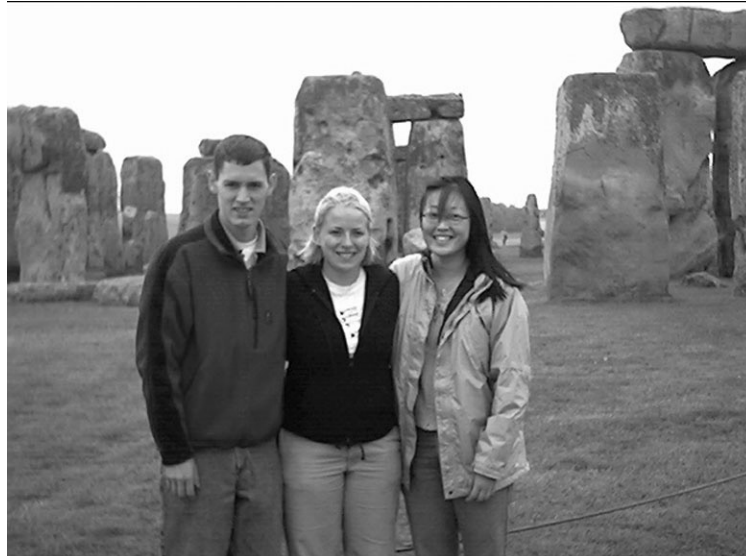
As with all Dickinson study abroad programs, the college sends along a professor to act as program coordinator and help students with any problems that they may have. Some of our most enjoyable memories of Norwich were spent at the home of the Tesman family during weekly "teas" and holiday events. Professor Barry Tesman, his wife Johanna, and their daughters Emma and Lucy, became our surrogate family in Britain. Norwich would not have been the same without them and we are forever grateful.

One of the great aspects of studying in England is its close proximity to continental Europe. Norwich is an especially good location because there is easy access to Stansted Airport, the hub of UK budget travel. Throughout the year we travelled many places, both together and separately. Laura's favourite excursions included hitch-hiking throughout Iceland and mastering Venice's seemingly limitless maze of canals. Danny especially enjoyed touring Scotland, experiencing Eurostar, and an Aegean Sea cruise through Greece and Turkey. One trip we took together was to Prague (*Praha*) and despite many difficulties including the loss of Laura's luggage and Danny's recently broken arm we had a brilliant time.

Overall, spending the year abroad gave us both excellent opportunities to expand our global perspectives. We learned first-hand how the rest of the world perceives Americans and were able to debate these issues with our new British friends. The University of East Anglia and our Norwich adventure have prepared us for a more global future and will remain fond memories for the rest of our lives.



NORWICH
A FINE CITY OF CULTURE



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Claire Foster, '04, Bridgewater, VA
Andrew Schwerin, '04, Cherry Hill, NJ
Laura Walters, '04, West Newbury, MA
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