

## Spotlight on Delaware State University Water Resources Education & Research

*Delaware State University (DSU) Department of  
Agriculture and Natural Resources Contributors:  
2004 - 2005 DWRC Undergraduate Internship  
Advisors Dr. Maria Labreveux (DWRC Advisory  
Panel), Dr. Dewayne Fox, and Dr. Dennis McIntosh,  
and also department chair Dr. Richard Barczewski.*

<http://cars.desu.edu/faculty/mreiter/resource.htm>

*Photos by Maria Labreveux and Amy Boyd*

Delaware State University's (**DSU's**) Department of Agriculture and Natural Resources is making waves in aquatics studies and research. According to Department Chair Richard Barczewski, in recent years the program has grown in diversity and numbers of faculty, students enrolled, courses of study, and research partnerships.

This summer, two **DSU** undergraduates will embark on **DWRC**-funded internship projects under the advisement of three **DSU** faculty. Encouraged by new **DWRC** Advisory Panel member Dr. Maria Labreveux, they are the first from **DSU** to apply to participate in the program, now in its fourth year (see article, page 3).

**Water resources curriculum and student enrollment:** **DSU's** Department of Agriculture and Natural Resources offers ten degree programs in basic and applied resources management designed to meet the needs of pre-professionals, management and field science majors, and practitioners. At present 90 undergraduates and 12 graduate students are enrolled.



## 4<sup>th</sup> Annual Statewide Water Resources Conference Oct. 13, 2004 UD Clayton Hall

Details TBA. Co-sponsors: University of Delaware Water Resources Agency, Delaware Water Resources Center, Delaware Geological Society, Delaware Dept. of Natural Resources and Environmental Control.

### **DSU faculty advisors for DWRC undergraduate interns during 2004 - 2005:**

- **Dr. Maria Labreveux** (Agricultural Science and Plant Science): Courses taught include Biometrics, Crop Production and Sustainable Agriculture. Her research focuses on sustainability of crop and grazing systems; currently she is working with beef cattle and goat mixed grazing systems to control pasture weeds. [mlabreveux@desu.edu](mailto:mlabreveux@desu.edu) (302) 857- 6414
- **Dr. Dewayne Fox** (Fish Ecology/Biology, Aquatic Ecology): Courses taught include Conservation Issues in Fisheries, and Life History and Migration of Fishes. [dfox@desu.edu](mailto:dfox@desu.edu) (302) 857-6436
- **Dr. Dennis McIntosh** (Aquaculture Research & Extension): His research focuses largely on aquatic species that have commercial potential for Delaware aquaculture. In addition, he is collaborating with Dr. Fox (**DSU**) and John Clark (**DNREC**) on a weakfish tag retention study. [dmcintosh@desu.edu](mailto:dmcintosh@desu.edu) (302) 857-6456

**Other DSU Ag and water resources faculty:** A new faculty member will be hired in the near future specializing in Soil and Water Quality. Other **DSU** Natural Resources Program faculty and their areas of expertise include: *(continued next page)*

**In this Issue, on the web at:** <http://ag.udel.edu/dwrc/news.html>

Statewide Water Forum Oct. 13, 2004 Clayton Hall	1	Annual <b>DWRC</b> Meeting and Poster Session	6
Spotlight on <b>DSU</b> Water Resources Educ. / Research	1-3	<b>DWRC</b> Fellow Lipina Zhana and Virus Removal	6-7
Two <b>DSU</b> Undergrads Win 2004 <b>DWRC</b> Internships	3,5	Water News You Can Use	7
2004 <b>DWRC</b> Undergraduate Interns Announced	4-5	<b>DWRC</b> History, Goals, Advisory Panel, Contacts	8



New 2004-2005 DSU undergraduate intern advisors  
Dr. Dewayne Fox, Dr. Maria Labreuveux, Dr. Dennis McIntosh

**(DSU Ag and water resources faculty, cont.)**

- Dr. Richard A. Barczewski, Chair: Sustainable Animal Production. [rbarczew@desu.edu](mailto:rbarczew@desu.edu) (302) 857-6410
- Dr. Cyril E. Broderick: Plant Biotechnology and Physiology. [cbroderi@desu.edu](mailto:cbroderi@desu.edu) (302) 857-7416
- Dr. Chunlei Fan: Marine Ecology, GIS, Statistical Modeling. [cfan@desu.edu](mailto:cfan@desu.edu) (302) 857-6479
- Dr. Robert Naczi: Plant Taxonomy, Wetland Plants [rnaczi@desu.edu](mailto:rnaczi@desu.edu) (302) 857-6450
- Dr. Gulnihal Ozbay: Marine Biology, Aquaculture, Nutrient Management, Algae Identification and Culture, Fisheries, Shellfish-Algae Dynamics, Water Quality and Pond Management. [gozbay@desu.edu](mailto:gozbay@desu.edu) (302) 857-6476
- Dr. Randy A. Peiffer: Sustainable Agriculture. [rpeiffer@desu.edu](mailto:rpeiffer@desu.edu) (302) 857-6418
- Dr. Michael Reiter, Director, graduate program: Aquatic Ecology, Environmental Science, Wetland Ecology, Resource Management, Environmental Education. [mreiter@desu.edu](mailto:mreiter@desu.edu) (302) 857-6412
- Dr. Arthur O. Tucker: Herbs & Essential Oils, Plant Biochemistry and Taxonomy. [atucker@desu.edu](mailto:atucker@desu.edu) (302) 857-6408
- Dr. Kevina Vulinec: Wildlife Ecology and Conservation, Tropical Ecology, Plant/Animal Interactions. [kvulinec@desu.edu](mailto:kvulinec@desu.edu) (302) 857-6457

**Aquaculture facilities:** *DSU* maintains 34 ponds ranging in size from 1/8 acre to 2-1/4 acres as a zero discharge, environmentally compatible site for the purposes of aquaculture research and demonstration. Each pond is a separate experimental unit permitting replicated research. Students have “hands on” access, seining ponds to estimate fish, crayfish, and shrimp production, among other tasks. *DSU Aquatic Sciences photo*



**DSU Water Resources Research**

“Our faculty has established a number of ongoing research relationships with federal water resources organizations, other universities, and local agribusinesses,” says Barczewski. “Summer is an especially busy time for our faculty and student researchers.” Two partnerships are highlighted here.

**NOAA research:** *DSU* is one of four universities comprising National Oceanographic and Atmospheric Administration’s (**NOAA’s**) “Living Marine Resources Cooperative Science Center” (**LMRCSC**), housed at the University of Maryland Eastern Shore. The Center’s mission is to “conduct ecological research on marine and estuarine systems in order to promote and improve opportunities for equal educational, research and advancement opportunities for all students who aspire to pursue careers in the marine sciences”. One of the main goals of the Center and the primary focus at *DSU* has been to prepare students with both undergraduate and graduate degrees focused on fisheries with special emphasis on quantitative data management and analysis. Two marine fisheries research labs have been established at *DSU*, now under the leadership of Dr. Dewayne Fox, and are in use for a graduate research project investigating patterns of habitat use by American eels in the St. Jones River. Just underway is a collaborative project between *DSU*, Rutgers, and **NOAA’s** National Marine Fisheries Service examining the impact of invasive grasses (*Phragmites australis*) on marsh fish communities in the mid-Atlantic.

**DNREC research:** *DNREC* and *DSU* collaborate in two joint programs that are linked with the Interdisciplinary Environmental Association (**IEA**), an international organization of academics, practitioners, professionals, and concerned citizens addressing environmental issues from multiple perspectives. The first is the *DSU* / Delaware Natural Estuarine Reserve (**DNERR**) outreach program initiated by *DSU’s* Dr. Michael Reiter and Mark DelVecchio, **DNERR** Reserve Manager. The program addresses issues of importance to coastal resources management in Delaware while training the next generation of resource managers. Students conduct research in coastal ecology, environmental science, and interdisciplinary resource management, and taking related field courses on campus or on-site by *DSU* faculty in conjunction with site staff, and present their research results via regional programs, conferences,

and publications. There is also an outreach component that helps distribute new information to the public via programs and related education efforts. This collaboration forms a strong partnership for addressing questions of ecological concern. Present research involves the taxonomy of marsh grasses, population studies of key species such as horseshoe crabs and sea birds, flow and sedimentation studies, nutrient enrichment research, and similar topics. Support funds are from **NOAA's** grant to the Environmental Cooperative Science Center (**ECSC**) comprised of six universities, including **DSU** and led by Florida A&M University, addressing coastal resource issues involving integrated scientific and social resource models. By linking the **DSU** Natural Resources and **DNERR** relationship with this project, students gain a significant source of academic support, access to governmental and university expertise, financial support for their research, and a potential source of employment upon graduation. For more information on this program visit the website: <http://cars.desu.edu/faculty/mreiter/dnerr.htm>.

The second **DSU/DNREC** IEA program is the Trap Pond State Park (TPSP) Program which aims to provide a valuable source of management data for the park, enhance the preparation of **DSU** resource management students, and create new community and agencies ties for the university, through three components:

- K-12 education and public outreach
- student research component, and
- a future summer residential program in interdisciplinary resource management.

Students in any major may become involved in the development of management plans and programs at Trap Pond under supervision of **DSU** and park staff, giving them exposure to the day-to-day operations and issues facing natural resources professionals. In return, TPSP and the surrounding region receive an inexpensive source of manpower to provide data, analysis, and programs for topics that might normally not be addressed due to time or financial considerations. The university gains new community and agency links as well as enhanced exposure within the region from projects within this service-learning program. Results from the various projects in this program are made available to park personnel, state resource management agencies, regional conferences, publications, departmental seminars and honors programs, community education efforts, and the internet. For more information, visit: <http://cars.desu.edu/faculty/mreiter/trappond.htm>.

## Two from Delaware State University Win **DWRC** 2004 – 2005 Internships

Two of nine undergraduate students selected in April to participate in the 2004 – 2005 **DWRC** internship program are enrolled at Delaware State University. [See related article, next page.]

Third-year **DSU** Environmental Science major Alicia Revis of Milford will explore methods of "Assisting Small and Underserved Farmers in Meeting Water Quality Objectives", advised by Dr. Dennis McIntosh, **DSU** Natural Resources Program Assistant Research Professor and Extension Specialist in Aquaculture.



*Alicia Revis in the DSU Baker Building Lab*

Alicia will conduct a survey in all Delaware counties, working directly with **DSU** Small Farm Extension agents John Clendaniel and Dwight Meyer and **DSU** microbiologist Dr. Andrew Lloyd to evaluate farm drinking water samples for possible contaminants. Educational workshops will be developed to report results and explain assistance programs available to help small, underserved farmers address any water quality problems identified.



*Trevor Knight on the DSU Campus*

Third-year **DSU** Fisheries Management major Trevor Knight of Magnolia will study "Fish" (**cont. page 5**)

## **DWRC Announces 2004 - 2005 Undergraduate Interns**

---

Nine undergraduate students were chosen in April based on criteria set by the **Delaware Water Resources Center (DWRC)** Advisory Panel to participate in the 2004 **DWRC** undergraduate internship program. Now in its fourth year, the **DWRC's** unique program permits students, faculty, and other water resources professionals from a variety of disciplines to work together in research and education programs addressing water resource related issues of critical importance to Delaware and the Mid-Atlantic region. Students at all Delaware institutions of higher learning are eligible to apply for these internships; two of the nine winners this year, **Trevor Knight** and **Alicia Revis**, were the first applicants to the program from **Delaware State University** (see their projects' descriptions, page 3).

The **DWRC** again expanded the number of internship opportunities for the coming year through new co-sponsor support from the **University of Delaware's (UD's)** College of Arts and Sciences (**CA&S**). Other internship co-sponsors include: the **UD** College of Agriculture and Natural Resources (**CANR**), College of Engineering (**CENG**), College of Marine Studies (**CMS**), Department of Plant and Soil Sciences (**PLSC**), Water Resources Agency (**WRA**), and also the Delaware Division of Natural Resources and Environmental Control (**DNREC**). The two internships awarded to Delaware State University students this year were fully funded by the **DWRC**.

**UD** third-year Plant Science major **Carol Carlson** will study "*Monitoring and Assessing the Nutrient Status and Overall Health of Freshwater Wetlands*" under the advisement of Dr. Bruce Vasilas of the **UD** Department of Plant and Soil Sciences. Carol recently published her findings from her project last summer analyzing legumes as a Delaware Biotechnology Institute research assistant and **UD** Undergraduate Research Program Science and Engineering Scholar. Her new **DWRC/PLSC** co-sponsored internship project will establish baseline levels and of nitrogen and phosphorus in freshwater wetlands, monitor their dynamics over time and varying conditions, and thereby discover parameters for wetland health assessment with respect to water quality standards.

**Matthew DeSanctis**, a **UD** second-year Geography and Political Science double major, will be researching aspects of "*Delaware and Beyond: A Water Resource Threat Analysis*" for his **DWRC/UD CA&S** co-sponsored project. His internship advisor is

Dr. Janet B. Johnson of the **UD** Department of Political Science. Matt will investigate how Delaware and other Mid-Atlantic region states are implementing post-9/11 water supply protection security measures and standards, then use the information to construct a comparative risk assessment analysis of this situation.

"*An Evaluation of the Economic, Social, Environmental, and Recreational Benefits of the Christina Basin*" is the title of **Steven Ernst's** proposed **DWRC/UD WRA** co-sponsored research project. A **UD** second-year Resource Economics major, Steve has worked recently with agriculture and land use planning as an undergraduate research assistant for both the **UD** Office of Academic Programs and Research and **UD** Department of Food and Resource Economics. For his **DWRC** internship, he will evaluate the synergy and scope of current and proposed conservation programs and policies in the Christina Watershed. His advisors are Dr. Steven Hastings of the **UD** Department of Food and Resource Economics and Mr. Gerald Kauffman of the **UD** Water Resources Agency.

**Jason Graham**, a **UD** first-year Entomology and Wildlife Conservation major, plans to study biological controls impacting the "*Effects of Purple Loosestrife on Freshwater Wildlife Habitats*." Jason will survey and monitor invasive stands of *Lythrum salicaria* weeds at the Chesapeake and Delaware Canal area Flat Pond and Jesse Mitchell Pond before and after releases of loosestrife-targeting beetles. Jason has also worked on an experimental project feeding butterfly pupae this year in the **USDA** Beneficial Insect Laboratory. In a related project entitled "*Biological Control of Purple Loosestrife: Preventing Wetlands Degradation by an Invasive Plant*," **UD** second-year Wildlife Conservation major **Jamie Poole** will evaluate behavior of *Gallerucella pusilla* and *G. calmariensis* beetles with respect to their purple loosestrife preferences in a controlled greenhouse study. He will also release and monitor these beetles at loosestrife stands at the Ashland Nature Center. Both projects are **DWRC/CANR** co-sponsored internships advised by Dr. Judith Hough-Goldstein of the **UD** Department of Entomology & Wildlife Ecology. Additional funding is provided through the **UD** Office of Undergraduate Research.

**Matthew King**, a third-year Mechanical Engineering major, will be working with advisor Dr. James Glancey of the **UD** Depts. of Bioresources Engineering and Mechanical Engineering on his **DWRC/CENG** co-sponsored internship project,

"*Design and Field Testing of Advanced Surveillance Systems for Delaware's Shallow Depth Estuaries*". Matt will extend work begun by 2003 **DWRC** intern Kerrie Smith in cooperation with **DNREC** developing a low-cost device that monitors whole water column water quality data throughout the entire depth of a water body. In addition to collecting water quality data, he aims to design and test a GPS-guided, self-propelled water sampling watercraft using the same technology. Both efforts will support Matt's senior Degree with Distinction thesis.

"*Evaluation of Land Application of Wastewater as a Nutrient Reduction Control Strategy for the Chesapeake Bay*" is the research topic for **Erin Zimich's DWRC/CENG** co-sponsored project advised by Dr. William Ritter of the **UD** Department of Bioresources Engineering. Erin is a **UD** third-year Bioresources Engineering major. Her project goal is to determine whether land application of wastewater is a suitable and desirable method for reducing nutrient loads into the Chesapeake Bay presently caused by effluent discharge. She will inventory current and prospective land application sites in order to explore the potential for further nutrient reduction and to establish costs for future capital, operations, and maintenance of application facilities.

### **USGS Intern Completes Map Project**

The U.S. Geological Survey (**USGS**) annually provides funding for undergraduate research internships coordinated by state Water Resource Institutes. During 2003 – 2004, Marie Stewart, Hydrologist and Judith Denver, Supervisory Hydrologist for the Dover, Delaware **USGS** Sub-District, advised University of Delaware senior geology major Eric Lang in an internship coordinated by the **DWRC**. Eric assisted with field data collection of ground water, surface-water, and rainfall samples, and with development of geologic cross sections for a drilling project. As a special project for a geology class, Eric mapped the base of Kent County's unconfined surface aquifer (comprised mostly of Columbia Sands). The project required Eric to review over 400 drillers' logs and gamma logs to determine the base and thickness of the underground clay confining unit. Surfer, contour mapping computer software, and Grapher, graphing software, were Eric's mapping tools. The Department of Natural Resources and Environmental Control (**DNREC**) will use the information in a Kent County groundwater availability assessment project and also when issuing various drilling or water supply permits. A **USGS** report on Eric's project will be published within the year.

### **2004 DWRC Annual Meeting and Undergraduate Interns Poster Session**

The 16-member **DWRC** Advisory Panel convened at the U. of D. for lunch and their annual meeting on April 23<sup>rd</sup>. **DWRC** Director Tom Sims described the Center's plans for 2004 with regard to research funding and new public education outreach efforts such as statewide water forums and **UD** Ag Day water conservation training. The Center's 5-year report covering its activities spanning 1998-2002 is complete and will soon be posted at <http://ag.udel.edu/dwrc/reports.html>.

Following lunch with the Advisory Panel, the **DWRC's** ten 2003 undergraduate interns were invited to present posters of their project findings with their advisors at an informal session sponsored by the **UD** Undergraduate Research Program. Over one hundred **UD** Science and Engineering Scholars joined the **DWRC** interns to present to a crowd in excess of 500 visitors.



*At the poster session:  
2003 DWRC Intern  
Andrew Joslyn  
with UD  
Undergraduate  
Research Program  
Coordinator  
Dr. Joan Bennett*

### **DSU DWRC 2004 - 2005 Interns (Trevor Knight, continued from page 3)**

*Communities as Indicators of Water Quality: Quantifying the Response of Aquatic Systems to Pollutant Inputs in Delaware Headwaters.*" His advisors are Dr. Dewayne Fox, **DSU** Assistant Professor (Fisheries) and Dr. Maria Labreuveux, **DSU** Assistant Professor (Plant Science) and member of the **DWRC** Advisory Panel since 2003.

Trevor plans to measure fish growth and abundance in three areas: the relatively pristine Blackbird Creek in New Castle County, more urbanized St. Jones River in Kent County, and high agriculture and urban use Indian River watershed in Sussex County. The project goals are to determine if indicators such as population, species, and health of fish groups or "assemblages" may be used for water quality assessment and also to learn how Delaware streams water quality changes through the summer as reflected by fish growth response.

---

## Removal and Inactivation of Water-borne Viruses Using Elemental Iron

---

**Liping Zhang, DWRC 2003-2004 fellow  
Advisors at the University of Delaware:  
Dr. Yan Jin, Plant & Soil Sciences  
Dr. Pei Chiu, Civil & Environmental  
Engineering**

*Photo by Danielle Quigley*

Drinking water safety and the growing demand for potable water are two critical water resource issues facing Delaware. The mission of **DWRC** includes supporting research, education, and outreach programs that focus on water supply, water management, and water quality. The research of **DWRC** fellow Liping Zhang, advised by Dr. Yan Jin of the **UD** Department of Plant and Soil Sciences and Dr. Pei Chiu of the **UD** Department of Civil and Environmental Engineering, will evaluate the feasibility of using elemental iron to remove and inactivate waterborne viruses. The purpose of this research is to ultimately develop an effective and economical technology that can be used to remove pathogens from water.

Microbiological contamination of drinking water continues to be one of the greatest challenges in public health risk management in the 21<sup>st</sup> century. Among the different classes of microbial pathogens, viruses are of particular importance, as they are smaller than bacteria and protozoa, far more mobile in subsurface environments, and also more resistant to currently available water treatment technologies. The United States Environmental Protection Agency (**USEPA**) in the proposed Ground Water Rule (**GWR**) identifies viruses as critical target organisms to control because they are responsible for approximately 80% of water-borne disease outbreaks for which infectious agents were identified.

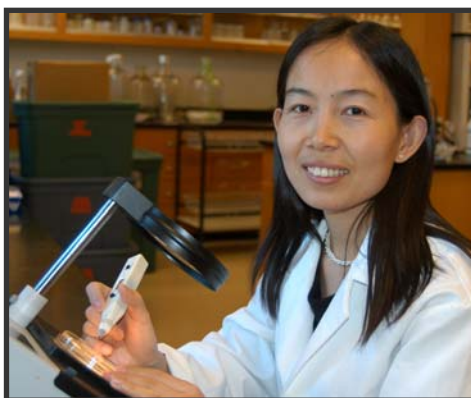
Disinfection is the most important water treatment process for preventing the spread of infectious diseases. While mostly effective for removing bacteria, classical disinfectants such

as chlorine have been shown to be less effective against viral and protozoa pathogens. High doses of chlorine also produce excessive amounts of disinfection by-products (**DBPs**) such as trihalomethanes and haloacetic acids. Many **DBPs** are known or suspected human carcinogens and are themselves subject to **EPA** regulations. Balancing the risk of infectious agents in water supply against the cost of treatment and the risk of **DBPs** is a challenging task.

This study represents the first attempt to evaluate elemental iron for removing pathogens from water. Although elemental iron has been used in permeable reactive barriers (**PRBs**) to remove chemical contaminants in groundwater for the past decade, it has never been shown to remove viruses. "My study will help to understand how viruses are adsorbed and inactivated by iron and to determine whether it is feasible to develop elemental iron-based technologies for removing waterborne viruses. Two bacteriophages, MS2 and  $\phi$ X174, as representative viruses, will be used in a series of laboratory column experiments. "I will investigate the factors affecting virus removal and inactivation by iron, such as residence time, iron type, pH, etc. The long-term performance of iron will also be evaluated. My research will also provide information on

the interactions between virus particles and iron mineral surfaces involved in virus removal. This information will form the basis for understanding the mechanisms for virus inactivation and retention by iron and iron oxides - a process that is important in both natural systems, such as soils, and at municipal wastewater treatment facilities," Liping explains.

Liping received her M.S. in environmental science and engineering and has two and half years of experience in water quality research. She has a keen interest in her Ph.D. project, stating, "Dr. Jin and Dr. Chiu are creative persons and have extensive experience on in virus fate and transport in porous media and using elemental iron to treat environmental pollutants. Under their direction, I hope to



*Liping Zhang studying water pathogen removal*

provide a scientific understanding of the interactions between viruses and elemental iron and iron oxides and the factors that influence these interactions." Liping is very excited about her research, which she hopes to yield an innovative, effective, robust, and low-cost technology that can be used to remove viruses (and potentially other pathogens) in drinking water, wastewater, and groundwater, and ultimately contribute to Delaware's water quality. Other potential benefits of the iron technology may include lower disinfectant dosage and cost and reduction in disinfection by-product formation.

---

### Water News You Can Use

---

**Free "Smartyards" in the Appoquinimink Watershed:** Middletown, Odessa, and Townsend area residents may apply by July 16, 2004 for one of 20 **DNREC**-funded "Smartyards" landscaping packages from the Delaware Nature Society (**DNS**) and Appoquinimink Tributary Action Team. "Smartyards" provide habitat for diverse wildlife, reduce or eliminate the need for fertilizer and pesticide applications, and conserve water resources more than traditional turf grass landscapes. The free packages include native plants from Gateway Garden Center; a bird feeder, nesting box, and bird bath provided by Wild Birds Unlimited; Backyard Habitat certification; one-on-one technical assistance from **DNS**-trained Habitat Stewards; planning and installation guidelines to ensure proper placement and maintenance of the plant materials; and a rain barrel to help conserve water resources. Reach **DNS** at (302) 239-2334 or [smartyards@dnsashland.org](mailto:smartyards@dnsashland.org)

**Boy Scout Soil and Water Conservation Merit Badge Training** was provided to 32 scouts by **DWRC** and **UD** Institute of Soil and Environmental Quality staff at **UD** Ag Day April 24. Visit [ag.udel.edu/dwrc/publications.html](http://ag.udel.edu/dwrc/publications.html), click "Public Programs" link for highlights.

#### Upcoming Local Water Conferences:

- **Sept. 26-30, 2004:** "Managing Nutrient Inputs and Exports in the Rural Landscape". **USEPA** 12th National Nonpoint Source (NPS) Monitoring Workshop, Ocean City, MD. Visit <http://www.ctic.purdue.edu/NPSWorkshop/NPSWorkshop.html> or call 765-494-1814.
- **Oct. 13, 2004:** 4<sup>th</sup> annual Delaware Water Resources Statewide Forum, **UD** Clayton Hall. Details TBA: <http://ag.udel.edu/dwrc/>.
- **April 2005:** White Clay Creek Symposium.

Details TBA in Fall 2004's WATER NEWS and White Clay Creek Watershed Management Committee's site [http://mercury.ccil.org/~wcc\\_ws/](http://mercury.ccil.org/~wcc_ws/) Mr. Rick Darke (see [www.rickdarke.com](http://www.rickdarke.com)), nationally recognized author/ photographer of White Clay subjects, will deliver the keynote speech "The Liveable Landscape."

- **Jul. 19-22, 2005:** "Managing Watersheds for Human and Natural Impacts: Engineering, Ecological, and Economic Challenges": 9th American Society of Civil Engineers (**ASCE**) Watershed Management Conference, Williamsburg, VA. Local point of contact: Dr. William Ritter ([william.ritter@udel.edu](mailto:william.ritter@udel.edu)). Visit <http://ag.udel.edu/www.asce.org/conferences/watershedmanagement2005/>

#### New Reports from U.S. / DE Geological Surveys:

Results of a recent 3-year study of nutrients' and pesticides' impact on local wells, streams, and groundwater are now available in **USGS** Circular 1228, "Water Quality in the Delmarva Peninsula, Delaware, Maryland, and Virginia, 1999-2001" by phone at 1-888-ASK-USGS or [http://water.usgs.gov/nawqa/nawqa\\_sumr.html](http://water.usgs.gov/nawqa/nawqa_sumr.html) Findings of regional and national interest are highlighted in a separate **USGS** report "Water Quality in the Nation's Streams and Aquifers-- Overview of Selected Findings, 1991-2001." Visit <http://water.usgs.gov/nawqa/> for these and other publications, national data sets, and maps. **From Delaware Geological Survey:** "Ground-Water Recharge Potential Mapping in Kent and Sussex Counties, Delaware", Report of Investigations No. 66, 2004, 20 pages, by A. Scott Andres [asandres@udel.edu](mailto:asandres@udel.edu). Also new from **DGS**: Hydrographs and brief discussions of daily ground-water levels from two shallow wells at Newark and Trap Pond, with daily groundwater temperature data for the Newark site, is now available for viewing on the **DGS** site at <http://www.udel.edu/dgs/hydro.html>.

#### Thank you Dr. Kent S. Price, Jr.

Dr. Kent Price has stepped down from the **DWRC** state Advisory Panel after many years of service. He retired from the **UD College of Marine Studies** in Feb. 2000 after a 33-year faculty career, during which he conducted research on fisheries and the ecology of the Delaware Inland Bays, and now continues to head the Scientific and Technical Advisory Committee on the board of the **Center for the Inland Bays**. We thank Dr. Price for his energy and service in forwarding the **DWRC's** water resources research mission in Delaware.

## ***The Delaware Water Resources Center***

The Delaware Water Resources Center (DWRC), established in 1965, is part of a network of 54 Water Resources Research institutes throughout the nation. The DWRC receives funding through Section 104 of the Water Resources Research Act of 1984. The U.S. Geological Survey administers the provisions of the Act and provides oversight of the nation's Water Resources Centers. The primary goals of the DWRC are: to support research that will provide solutions to Delaware's priority water problems, to promote the training and education of future water scientists, engineers, and policymakers, and to disseminate research results to water managers and the public. For further information, visit our website:

**<http://ag.udel.edu/dwrc/>**

***WATER NEWS*** is published biannually by the University of Delaware Water Resources Center, **Dr. J. Thomas Sims**, Director. **Amy Boyd**, Editor, welcomes materials for publication, including news articles and letters to the editor. To submit material or request future issues, please address your correspondence to the address below or contact the editor by email at [aboyd@udel.edu](mailto:aboyd@udel.edu) or phone (302) 831-6757.

## ***Delaware Water Resources Center Advisory Panel***

**Scott Andres**

*Delaware Geological Survey*

**Steven K. Dentel**

*UD Dept. of Civil & Environmental Engineering*

**Judith Denver**

*U.S. Geological Survey*

**Kevin Donnelly**

*DNREC Division of Water Resources*

**Bernard Dworsky**

*Delaware Water Resources Agency*

**Mark Isaacs**

*UD Research and Education Center*

**Maria Labreux**

*Delaware State University*

**Ken Lomax**

*UD Dept. of Bioresources Engineering*

## ***Delaware Water Resources Center Advisory Panel***

**Jenny McDermott**

*UD College of Ag. and Natural Resources*

**Paul Petrichenko**

*USDA Natural Resources & Conservation Service*

**Bruce Richards**

*Center for the Inland Bays*

**Bill Saylor**

*UD Dept. of Animal and Food Sciences*

**Carl Solberg**

*Sierra Club*

**Lori Spagnolo**

*Delaware Nature Society*

**William Vanderwende**

*Del. Nutrient Management Commission*

## ***WATER NEWS – SPRING 2004***

Delaware Water Resources Center  
College of Agriculture and Natural Resources  
University of Delaware  
113 Townsend Hall  
Newark, DE 19716-2103

**<http://ag.udel.edu/dwrc/>**

**Address Service Requested**