



# ESTUARY NEWS

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NEWSLETTER OF THE DELAWARE ESTUARY PROGRAM

## WATER, WATER, EVERYWHERE, BUT NOT A DROP TO SPARE

BY JOSEPH MATASSINO, DEPUTY DIRECTOR,  
PARTNERSHIP FOR THE DELAWARE ESTUARY

Do you want to be able to swim in a pool, water your lawn, or wash your car this summer and fall? If so, then you better start conserving water now.

Newspapers throughout the Delaware Estuary Region are sporting headlines calling for the worst drought in our region's history. I know it's hard to believe. Where are all of the tale-tail signs – brown lawns, hot sun-scorched days and wilted plant life? These signs have not been easy to spot, especially during the winter months, but our stream flows and groundwater levels are running at record lows.

In an effort to conserve our water resources, Pennsylvania and New Jersey both issued drought emergencies, for all of the counties located within the Delaware Estuary Region, empowering state environmental officials to impose water restrictions. As of the printing of this publication, the State of Delaware had issued a drought warning. In a drought emergency, mandatory water restrictions may be placed on nonessential water use, this includes for example, the watering of athletic fields and golf courses, and the washing of automobiles. A drought warning, on the other hand, asks that residents take steps to voluntarily conserve water.

The Delaware River supplies water for 17.5 million people in New York City, Philadelphia, and hundreds of communities along the river and its tributaries. Regardless of whether we are living under a drought emergency or warning, residents of the Delaware Estuary Region need to find ways to conserve our water resources for the enjoyment and use of everyone.

### WHY IS WATER CONSERVATION IMPORTANT TO THE DELAWARE ESTUARY?

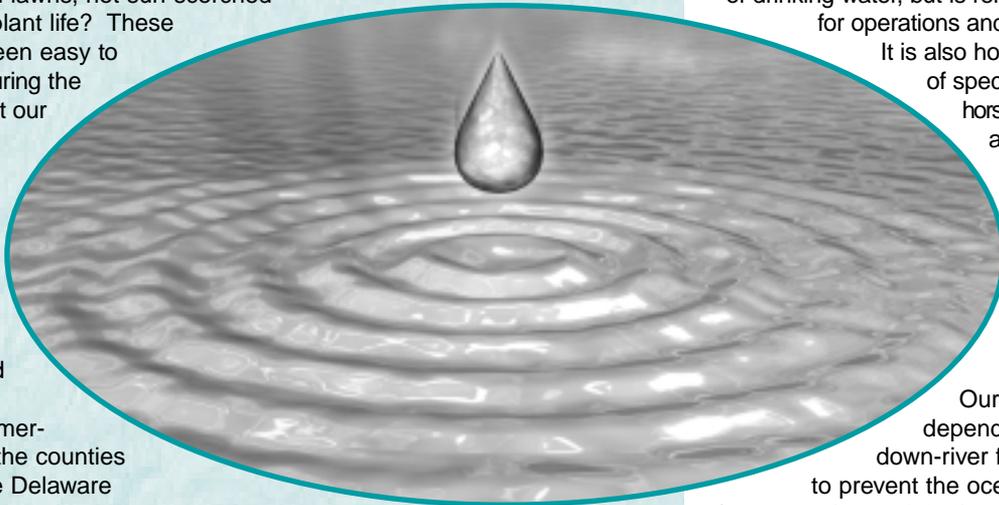
The Delaware Estuary is an ecosystem. This means any actions within that system affect the entire system. Water conservation is a good example. The Delaware River is not only a source of drinking water, but is relied upon by industry for operations and manufacturing.

It is also home to thousands of species, including the horseshoe crab, oysters, and shad, and is a stopover for thousands of migrating shorebirds. This shared use of the Estuary means a shared responsibility as well.

Our water supply depends on sufficient down-river flow of fresh water to prevent the ocean's salty water from creeping up into the northern reaches of the Estuary. When this happens, vital ground and surface water supplies can become contaminated. This, along with salt contamination of surface water intakes, puts drinkable water supplies in the Estuary at risk.

### HOW CAN YOU HELP TO CONSERVE WATER?

How we use water in our homes, yards, and workplaces can really make a difference. Conservation practices need not be expensive, difficult, or inconvenient, but they do mean simple changes to everyday habits – becoming aware of water and how we use it. By saving water and protecting the environment, you will also save money on your water bill. To get you



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started, there are a few simple things you can do right away: wash only full loads of laundry whenever possible, turn off the water while brushing your teeth or shaving, and take shorter showers. Remember that while these efforts may seem small, if everyone does the same, the combined impact will be huge.

To learn what else you can do inside your home and in your yard to help conserve water, call the Partnership for the Delaware Estuary at 1-800-445-4935 to receive a free copy of our Water Conservation Fact Sheet.

## GET YOUR FACTS STRAIGHT!

With the financial support of U.S. Environmental Protection Agency Region's II and III, the Partnership has produced five fact sheets covering water conservation, household hazardous wastes, nonpoint source pollution, conservation landscaping, and horseshoe crabs and shorebirds. To receive a free copy of any or all of these fact sheets, please call 1-800-445-4935.



## UPDATES FROM DELEP

### TOXICS ADVISORY COMMITTEE (TAC) UPDATE

The TAC has formed a subcommittee to investigate polychlorinated biphenyl (PCB) loadings to the tidal portions of tributaries to the Delaware Estuary.

Mapping of superfund sites with potential PCB loadings is near completion for the U.S. Environmental Protection Agency (EPA) Region III states - Delaware and Pennsylvania. Work has begun with EPA Region II to update the maps to include the State of New Jersey. Work has also been initiated with the Waste and Chemicals Management Division in EPA to map potential sources under its jurisdiction. The States have been asked to begin providing similar information/mapping for state programs.

The initial phase of point-source monitoring for PCBs is nearly complete. The Delaware River Basin Commission (DRBC) has received final data sets from most of the dischargers required to perform sampling, with the remaining data sets expected within the next few weeks. DRBC will evaluate the data to determine where additional sampling is needed.

The PCB Model Expert Panel met with DRBC and the TAC on February 12, 2002 to review and discuss development of the PCB model. The Expert Panel recommended that DRBC use additional modeling expertise resources to guide the development of the model.

The TAC is also coordinating with DRBC's Water Quality Advisory Committee and EPA to evaluate possible changes to DRBC's current water quality standards. The TAC is reviewing changes to hardness-based formulas published by EPA, fish consumption rates, cancer potency factors, and reference dose information to determine if DRBC should pursue updating their criteria for certain toxic pollutants.

The Philadelphia Water Department (PWD) has agreed to provide funding to perform additional wet weather PCB sampling at seven tributaries to the tidal Delaware River to help better define tributary PCB loadings. PWD is working with DRBC and the United States Geological Survey (USGS) to provide these additional resources in support of the PCB total maximum daily load (TMDL).

Scientists from the University of Delaware and EPA are using side-scan sonar, standard (chirp) sonar, and sediment core samples to map the Delaware River bottom. The map will be used for modeling the sediment transport in the river and will help in the development of a TMDL for PCBs in the Delaware.

Surficial sediment sampling for PCBs was carried out at 51 sites in the tidal Delaware in October 2001. Preliminary results were available in March 2002. Analytical parameters include PCBs, chlorinated pesticides, metals, organic carbon, grain size, and density. After initial results are received, DRBC will assess the data to determine if additional surficial sediment characterization is warranted.

Since July 2000, concentrations of PCBs and other organochlorines in bald eagles and ospreys have been monitored. A final report is in preparation and should be complete in spring 2002. Existing data on contaminants in osprey eggs and nestlings in southern New Jersey were compiled and a final report is available from the New Jersey Department of Environmental Protection by calling (609) 292-2965.

## **PUBLIC PARTICIPATION IMPLEMENTATION TEAM (PPIT) UPDATE**

Since 1991, the Delaware Estuary Program's Minigrant Program has awarded more than 90 grants, totaling more than \$290,000. The projects funded through the minigrant program are designed to multiply the number of people that are aware of the importance of the Delaware Estuary.

Every year, members of the PPIT review and select projects for funding. This year, 34 impressive proposals requesting more than \$120,000 were submitted by organizations from throughout the Estuary. Typically, the total amount of money available for distribution is \$20,000. For the second year, thanks to a grant from The William Penn Foundation, a total of \$35,000 was approved for distribution to the following organizations.

**Kaiserman Jewish Community Center** in Wynnewood, Pennsylvania was awarded **\$1,450** to restore a 300-foot area along the west branch of the Indian Creek through two community service events. Volunteers will remove invasive weeds and replant using native plants, trees, shrubs, and groundcover.

**Delaware Native Plant Society** in Dover, Delaware was awarded **\$3,600** to collect seeds of native plant species of trees and shrubs from intact, high quality habitats. These seeds will then be directly seeded onto sites destined for reforestation. The method ensures that only native plants, of local origins, are used in the reforestation projects undertaken in the Delaware Estuary.

**Delaware State University** in Dover, Delaware was awarded **\$2,160.75** to enhance the trail in Delaware State University's College Woods to make it available for the Outdoor Classroom Program. This program will educate elementary school students about the forest and wetlands and their role in the Estuary watershed.

**Boater Voter Coalition** of Willingboro, New Jersey was awarded **\$1,606.50** to create a tidal access brochure, which will identify ramp access locations plus pumpout locations on an area map of the Estuary.

**Center in the Park** of Philadelphia, Pennsylvania was awarded **\$3,834.50** as part of an organized, on-going effort by the Center in the Park Senior Environmental Corps and its partners to bridge the gap between target audiences in the Germantown community and the Monshone Watershed. The project will recognize and reward outstanding watershed stewardship, create community-based environmental role models, provide student-sponsored environmental education, and foster the community's awareness of and sensitivity to the Monshone and Wissahickon Creeks.

**John P. Turner Academic Plus Middle School** in Philadelphia, Pennsylvania was awarded **\$5,000** to raise beetles to thwart the unchecked growth of Purple Loosestrife, an invasive species of plant, in a local freshwater marsh.

**Woodford Cedar Run Wildlife Refuge** in Medford, New Jersey was awarded **\$5,000** to present an interactive classroom program about the watershed for grades 4-8. This program will incorporate the EnviroScape, a Sand-Tank Groundwater Flow Model, and other hands-on materials, plus a pre/post visit packet for teachers.



**New Jersey Marine Science Consortium** based in Fort Hancock, New Jersey was awarded **\$1,000** to advertise Coast Day New Jersey, an educational festival dedicated to New Jersey's marine and estuarine resources.

**Cobbs Creek Community Environmental Education Center** in Philadelphia, Pennsylvania was awarded **\$2,150** for a park management program. Sixty students from west and southwest Philadelphia will spend six weeks, during the summer, learning basic environmental concepts in the classroom and fundamental restoration practices in Fairmount Park.

**NetworkArts** of Philadelphia, Pennsylvania was awarded **\$2,500** to create a "Nonpoint Source Pollution in the Delaware Estuary Mural". This educational and artistic program with children of Turner Middle School on nonpoint source pollution in the Delaware Estuary will culminate in a public 30' permanent ceramic tile mosaic mural installation.

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*The meetings of the DELEP Implementation Teams and Advisory Committees occur on a regular basis and are open to the public. For meeting dates and times, please call the individuals listed below:*

### **Public Participation Implementation Team**

Kathy Klein  
(800) 445-4935  
kklein@delawareestuary.org

### **Habitat and Living Resources Implementation Team**

Jed Brown  
(302) 653-9152

### **Fish Consumption Advisory Implementation Team**

Tom Fikslin, DRBC  
(609) 883-9500 x 253  
tfikslin@drbc.state.nj.us

*The Delaware River Basin Commission also has three Committees that serve in the same capacity as the Implementation Teams:*

### **Monitoring Advisory Committee**

Edward Santoro, Monitoring  
Coordinator  
(609) 883-9500 x 268  
esantoro@drbc.state.nj.us

### **Information Management Advisory Committee**

Warren Huff, (609) 883-9500 x 237  
whuff@drbc.state.nj.us  
or Karl Heinicke, RIMS Coordinator  
(609) 883-9500 x 241  
heinicke@drbc.state.nj.us

### **Toxics Advisory Committee**

Tom Fikslin

## UPDATES FROM DELEP CONTINUED

**Delaware Nature Society**, in Hockessin, Delaware was awarded **\$2,520** to create promotional materials for a "Backyard Wildlife Habitat" program that will promote practices beneficial to wildlife such as planting native species and limiting use of chemical fertilizers and pesticides. The program will also help participants to improve local water quality by reducing their reliance on products that contribute to non-point source pollution. (See page 8 for more details about their program.)

**Peopling of Philadelphia Collaborative** was awarded **\$2,180** for a workshop entitled "By Water-By Land Urban Ecology Workshop for Teachers." The workshop will address the environmental consequences of population growth and technological advancement in the Delaware Estuary.

**Ecological Research & Development Group** in Milton, Delaware was awarded **\$2,500** to develop a web-based virtual horseshoe crab anatomy tour module. This module will be able to be viewed freely on their website or downloaded to PC/MAC classroom computers and run independently of the Internet.



*For the location of the above minigrant recipients and/or their projects, please refer to the map on page 15. The Partnership has also recently produced a summary of all the minigrant projects funded between 1991 and 2000. This publication would be especially helpful for organizations considering submitting a proposal in the next grant cycle. For a copy of the minigrant summary, please call 1-800-445-4935.*

## TIDINGS: NEWS FROM AROUND THE REGION

### DELAWARE MAKING STRIDES IN TEACHING BOATER SAFETY AND RESPECT FOR OUR MARINE RESOURCES

BY JOYCE HENNESSEY, BOATING EDUCATION SPECIALIST  
OFFICE OF BOATING EDUCATION, DIVISION OF FISH  
AND WILDLIFE ENFORCEMENT, DNREC

In 1995, personal watercraft accidents accounted for two-thirds of Delaware's boating accidents. Nineteen personal watercraft accidents were recorded out of Delaware's total 27 boating accidents. To help to reduce the number of these accidents, a program to work with personal watercraft rental owners was set-up in the spring of 1998. Rental agents agreed to let the Delaware Division of Fish and Wildlife, Office of Boating Education water rescue experts train the agent's employees in ethics, noise control, and operation and safety of personal watercraft, and to provide a review of personal watercraft laws. Through this program, the number of rental accidents declined to three in 1998 and one per year in 1999, 2000, and 2001, even though the registrations of personal watercraft increased by approximately 1,000 every year.

In addition to training employees at Delaware rental agencies, the staff at the Office of Boating Education has been welcomed by area water sports businesses to train their sales employees, as well as display posters in order to reach private owners with safety awareness. Boating safety classes are mandatory for all individuals born on or after January 1, 1978 to operate a boat, including personal watercraft in Delaware. For those adults who are not legally obligated, the program is one way to try to prevent accidents. It became clear, through the program, that training salespeople was an important component, because many were not aware of most of the personal watercraft laws.



The Office of Boating Education has also entered into a partnership with the National Marine Fisheries Service (NMFS) and Boat U.S. (Partnership in Marine Conservation) to promote ethics among anglers. The Office of Boating Education plans to distribute "Ethical Angler" stickers to boaters fishing in Delaware's freshwater and saltwater areas. The Ethical Angler program stresses the importance of the public's part in responsible fishing and prevention of water pollution. The program encourages anglers to avoid spilling and dumping gasoline, oil, or other pollutants on land or in the water; and to avoid leaving trash behind. It also encourages them to gain knowledge about aquatic nuisance species and how to prevent their spread; to learn and abide by all fishing regulations and boating laws; to educate fellow anglers; to respect private property and the rights of other anglers and out-door recreationists; and to save fish for tomorrow by practicing conservation and by learning proper catch-and-release techniques. Local law enforcement agents will make contact with fishermen and talk with them about not leaving plastics, lines, and other debris when they move out of an area. In addition, boater safety literature will be distributed to boaters at marinas in Delaware.

*For more information about boater safety and boating regulations, free copies of the "Delaware Boating Guide" are available by calling (302) 739-3486.*

## RESTORING AMERICAN SHAD TO THE SCHUYLKILL RIVER

BY CHARI TOWNE, DIRECTOR, SCHUYLKILL OFFICE,  
DELAWARE RIVERKEEPER NETWORK AND R. SCOTT CARNEY,  
ANADROMOUS FISH RESTORATION COORDINATOR,  
PENNSYLVANIA FISH AND BOAT COMMISSION

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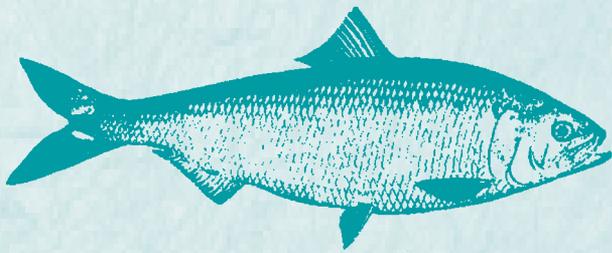
### **To Prepare American Shad:**

*Bake a shad layered with bacon on a hot plank.*

*Remove shad from plank. Throw away the shad and eat the plank.*

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Folk recipes notwithstanding, the American shad (*Alosa sapidissima*) was once an important source of food in this region in part due to their large numbers. Historically, shad spawned throughout the Delaware River Watershed, supporting both commercial and sport fishing. From 1896 to 1901, more shad were taken from the Delaware River than from any other river system on the Atlantic Coast.



Although the main stem Delaware remained open to shad, the construction of dams along tributary streams barred the passage of this migratory fish. In the spring of each year, the American shad, the largest member of the herring family, ascend coastal rivers to spawn. Shad seek their home streams when spawning time approaches and coastal rivers begin to warm to the low 50°F range. Shad use taste and smell to identify their home water.

Before the construction of dams, shad ascended the Schuylkill River as far as Pottsville in Schuylkill County, 123-miles upstream from the confluence with the Delaware River. (Please see map on page 15 for the location of the Schuylkill River.) In 1815, the Schuylkill Navigation Company was chartered and soon work began on a series of canals and dams. Ultimately, 32 dams were constructed on the Schuylkill River for the canal system. These dams eliminated shad from the Schuylkill River. In the remainder of the Delaware River system, shad runs declined. The number of shad caught in the Delaware River dropped rapidly.

Concern over the loss of the shad runs in the Susquehanna River drainage brought about legislation in 1866 that directed dam owners to provide fish passage. This legislation also created the agency we know today as the Pennsylvania Fish and Boat Commission. In the late 1800's, efforts to provide fish passage were attempted along the Susquehanna, but they failed to pass shad.

In the 1900's, coal mining practices in the Schuylkill River's headwaters contaminated the river with coal silt and mine drainage. Water quality was also worsened by industrial and sewage discharges. There seemed little chance that shad would ever be present in the Schuylkill River system again.

A massive four-year effort to remove coal sediment from the Schuylkill River was begun in 1947. During the course of this clean-up, many of the dams built for the canal system (now defunct) were removed. Only nine dams remained on the Schuylkill's main stem at the conclusion of the clean-up in 1951.

The passage of environmental regulations, notably the Clean Water Act (1972) and the Surface Mining Control and Reclamation Act (1977), also helped to improve water quality in the Schuylkill River. As water quality began to improve, the Pennsylvania Fish and Boat Commission began to look once again at the Schuylkill River.

In this modern age, the Pennsylvania Fish and Boat Commission has learned how to make shad restoration work. Knowledge gained through efforts to restore shad to the Susquehanna Basin is now being employed in an effort to restore shad to the Schuylkill River. At this time, the Fish and Boat Commission's goal is to restore shad to 100 miles of the Schuylkill River, to the base of New Kernsville Dam near Port Clinton.

The best fish passage is a free-flowing stream, but where dam removal is not an option, modern fish ladders go far toward providing a mechanism that allow for the movement of both resident and migratory fishes. A fish ladder built in 1979 allows fish to pass Fairmount Dam, the first dam that returning shad encounter. Further upstream, two dams have breached and their remains are slated for removal. Thus, of the nine dams that remained on the Schuylkill in 1951, only six still stand as barriers to fish passage.

Flat Rock is the next dam shad encounter after they pass Fairmount. Designs for this fishway have been completed and permitting is now underway. Construction could be complete by 2003. This passage represents a significant step forward in Schuylkill River shad restoration efforts. The Pennsylvania Department of Environmental Protection, an important partner in restoring shad to the Schuylkill drainage, has coordinated the effort to design the Flat Rock fish passage using funds allocated in 1981 and released in 1999.

If all goes as planned, shad will not be stopped at Flat Rock. The next dam upstream is breaching and being eyed for removal. The responsibility for passage at Norristown and Black Rock Dams lies with PECO Energy, which has committed to installing fishways. The dams near Limerick and Reading are also breached. The opportunity for 100 miles of the Schuylkill River to be open to shad once again is very real.

In the spring of 1999, the Pennsylvania Fish and Boat Commission began stocking hundreds of thousands of shad fry in the Schuylkill. Stocked fry feed in the River until fall when they head downstream in search of the sea. They spend the next four to five years in saltwater before returning to the

*(continued on page 6)*

# TIDINGS CONTINUED

Schuylkill. If these shad have escaped saltwater predators, in the spring of 2003 we should see them climbing the fishways at Fairmount and Flat Rock Dams. Certainly, the return of shad runs to the Schuylkill will have economic, recreational, and ecological benefits, but it also heralds a turning point in the restoration of the Schuylkill River. The American shad, lost from the watershed nearly 200 years ago, will be at home in the Schuylkill River once again.

*For more information, please call the Schuylkill Office of the Delaware Riverkeeper Network at (610) 469-6005.*

## **COWS MAY BE THE ANSWER TO DWINDLING GROUNDWATER SUPPLY**

**BY WILLIAM H. PALMER, SALES AND MARKETING DIRECTOR, APPLIED WATER MANAGEMENT INC.**

As we are fast approaching what may be the drought of the century, COWS may be an answer to the dwindling groundwater supplies we are seeing in the Delaware River Basin. But these are no cud-chewing COWS. These are Community Onsite Water/Wastewater Systems (COWS). COWS are small, decentralized systems that can be consolidated into a larger utility without being physically interconnected with other areas. This means that aquifers can be recharged at the point at which water is withdrawn instead of sending purified wastewater away for surface water discharge. With such a system, sprawl can be virtually eliminated and small lot sizes with large amounts of open space can be achieved.

A recent article in the *Water Environment and Technology Journal* pointed out that large centralized wastewater treatment facilities were certainly beneficial to the water quality of receiving streams, but had the drawback of depleting or polluting aquifers through poor runoff management or drought. The only option for many homeowners was a septic system, which would, by necessity, need to be built on a large residential lot to function properly. But by utilizing COWS, the homeowner is taken out of the role as owner and operator of the wastewater system. Instead, the liability and risk of system ownership is shifted to large regulated entities, which have the financial capabilities to withstand problems and capitalize upgrades when needed.

The wastewater is collected to a central point where performance monitoring, maintenance, and routine operation are manageable. The level of treatment can be set to address the specific needs and constraints of the site, and the system size, service area and location can be set by planning agencies to provide mechanisms for controlling growth, enhancing economic vitality, and creating open space.

The financing and overall management of the facility can be readily handled under existing public utility models. Creativity and innovation can be more readily implemented to improve performance, reduce costs and provide better environmental protection.

Last, but not least, the aquifer gets recharged. So, if COWS are so great, why haven't we heard more about them? Well, probably because good things take time. Public monies were expended for centralized wastewater treatment facilities, but that money is no longer there. Only one firm in the Delaware Basin, Applied Water Management (AWM), has been actively involved with COWS. To date, AWM has designed and built over sixty systems, which champion the theory of recycling and reuse. These systems can be designed for 20 to 500 equivalent dwelling units and can easily accommodate commercial and residential units. So maybe now is the time to consider COWS because history has shown that as soon as a drought is over we forget the importance of adequate water supplies.

*For more information, please contact William Palmer at [wpalmer@etownwater.com](mailto:wpalmer@etownwater.com). Mr. Palmer is also on the board for the Partnership of the Delaware Estuary.*

## **RWBR: WHAT IN THE WORLD DOES THAT MEAN?**

**BY RICHARD McDONALD, FORMER CHAIR SOUTHWEST BRANCH RANCOCAS CREEK DRAINAGE BASIN COMMITTEE**

RWBR is the acronym for Reclaimed Water for Beneficial Reuse. The operation to produce reclaimed water involves taking wastewater, and giving it a high degree of treatment or cleansing to protect both the public health and the environment. Although this treated water will not be of drinking quality, it can be used as a substitute for other water uses, potentially saving thousands upon thousands of gallons of potable (drinking) water a day. These uses include, but are not limited to, irrigation systems, fire protection, dust control on construction sites, and various industrial uses.

Reclaimed water projects have been used successfully in many states to augment potable water resources for decades. Recently the State of New Jersey has actively taken up the cause of implementing RWBR projects. There are some applications in use in New Jersey today, many of which are relatively small projects. The importance of smaller projects however, should not be minimized because of their size. They serve as an essential piece in the larger picture, because these programs have shown that the use of reclaimed water is a viable tool in conserving our potable water supply.

One local success story involves the Evesham Municipal Utilities Authority (MUA), located in the Rancocas Creek Watershed in Burlington County, New Jersey. (Please see map on page 15 for the location of the Rancocas Creek.) The Evesham MUA is currently working with the Township's Indian Springs Golf Course to implement a RWBR irrigation program. The program is proving to be a win-win situation for all parties concerned. The MUA received approval from the New Jersey Department of Environmental Protection (NJDEP) to provide this highly treated and disinfected wastewater to the golf course for use as irrigation water, eliminating the need to use potable water to irrigate the grounds. The MUA is considering expanding their RWBR to include other properties, including local schools and parks.

## Things to Consider

When contemplating a bigger RWBR project, there are many issues to be considered, such as the amount of water to be diverted to the RWBR project and ensuring that the treatment meets the required regulatory levels. In addition, a large diversion of flow could deplete the level and quality of the receiving stream or lake. This being the case, the total amount of flow being diverted must be taken into account so as not to have a negative impact on the nearby waterways.

One of the biggest challenges of any RWBR project is the education of both the public and local government. The general public, including the media, may not know the difference between wastewater (often referred to as black water or gray-water) and reclaimed water suitable for reuse. This public education could possibly be provided through the Education and Outreach component of the New Jersey Watershed Management process, or through the efforts of supporters in local watershed associations.

Lastly, there is an issue of cost. The truth is, a large RWBR project could be expensive, which means that the agencies involved would need to be willing to incur the initial costs of such a project. To fairly assess the true cost of such a project, one must also take into consideration the long-term benefits to the ecosystem, the local water supply, and finally weigh the costs against the potential future costs of finding alternative drinking water sources or the need to import drinking water.

## The Potential for Change

The Southwest Branch of the Rancocas Creek is part of NJDEP Watershed Management Area 19. It covers more than 75 square miles mainly in Evesham, Medford and Medford Lakes Townships in Burlington County, with most of that 75 square miles designated as Pinelands. This area contains the headwaters for the many streams and lakes making up the Southwest Branch of the Rancocas Creek Drainage Basin, which eventually flow into the Delaware River via the South Branch and Main Branch of the Rancocas Creek.

Within the watershed, there are four municipal wastewater facilities, all of which meet the required high level of treatment required of RWBR. This amounts to approximately five million gallons of treated wastewater a day suitable for RWBR. In this location, the largest users of water in the watershed include four golf courses, three high schools, a large number of elementary schools and local athletic association fields. The water is used to irrigate fairways and greens, athletic fields, and playgrounds. Add to this the general residential population and the lawns and landscaped areas commonly found at commercial properties and business parks, you get a large use of potable water withdrawn from critical Pinelands aquifers. In a situation such as this, making use of reclaimed wastewater would significantly reduce the amount of water taken from other sources. There is great potential, both in the Rancocas and throughout this region, for RWBR projects to help ease the burden of dwindling water supplies.

*For more information, please contact Richard McDonald at [mcdgroup@hotmail.com](mailto:mcdgroup@hotmail.com).*

*NJDEP Division of Water Quality, Bureau of Point Source Permitting states that "Approval for the Evesham MUA RWBR project was finalized in July of 1999, and it was the first of its kind in New Jersey. The beneficial reuse officially began in 2001, and Department records indicate that this project saved over 6 million gallons of water in 2001."*

*For more information on beneficial reuse, please visit the NJDEP Bureau of Point Source Permitting website at <http://www.state.nj.us/dep/dwq/reuseff.htm> and click on the link for the technical manual to view the "Technical Manual for Reclaimed Water for Beneficial Reuse".*

## MAKING WAVES

### DELAWARE RIVER IS PENNSYLVANIA'S 2002 RIVER OF THE YEAR

It helped George Washington win a battle. William Penn sealed a deal with the Lenape Indians along its banks. America's Industrial Revolution was fueled by it. In 2002, the 330-mile-long Delaware River has been chosen Pennsylvania's "River of the Year" by the Pennsylvania Department of Conservation and Natural Resources.

As River of the Year, the Delaware will be the subject of the June Rivers Month 2002 Poster to raise awareness of the

beauty and recreational, tourism and heritage values of rivers. The Delaware will also be Pennsylvania's featured river sojourn, entitled "The Delaware: A Revolutionary River." The recreational and educational paddle will take place from May 31 through June 8. (See the Estuary Events, "Delaware River Sojourn" on page 15)

"One of the reasons we chose the Delaware is to recognize its diverse resources and purposes," said DCNR Secretary John C. Oliver. "The upper river supports a world-class fishery, and

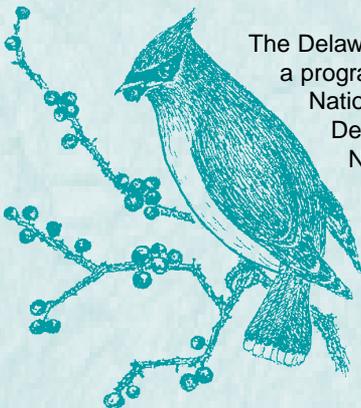
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# MAKING WAVES CONTINUED

canoes and kayaks are challenged by its riffles. In the lower river, cargo ships and barges ship products supporting a myriad of industries, including one of the nation's largest oil refining-petrochemical centers. The Delaware is a river of extraordinary quality and purpose, and a resource that touches millions of lives in multiple states. The river and the people who work so diligently to protect and enhance it are well-deserving of this recognition from the Commonwealth."

For more information on Pennsylvania's rivers, river sojourns, or DCNR, visit [www.state.pa.us](http://www.state.pa.us), PA Keyword "Rivers."

## HOW DELAWAREANS ARE CREATING WILDLIFE HABITAT IN THEIR OWN BACKYARDS



The Delaware Nature Society is offering a program, in partnership with the National Wildlife Federation, Delaware's Department of Natural Resources and Environmental Control, and Wild Birds Unlimited, to create habitat and improve the State's water quality. The program focuses on enhancing wildlife habitat in residential backyards.

The majority of Delaware's water supply comes from surface water, which means what we do on the land directly affects the quality of the water we drink. By creating a habitat-friendly environment using native plants, limiting the use of lawn chemicals, and reducing stormwater runoff we are helping to ensure clean, safe drinking water for people and wildlife. The Backyard Wildlife Habitat program provides official certification for properties where owners supply food, water, cover, and places for wildlife to raise young, as well as where owners implement water quality protection practices.

To get involved, you first have to purchase a Backyard Wildlife Habitat starter kit from the Delaware Nature Society. The kit costs \$19.95 and includes an application for certification, a nonpoint source pollution check list, a native plant list, tip sheets on attracting birds and butterflies, and much more. Once you become certified, you will receive a personalized certificate, recognizing your yard as an official Backyard Wildlife Habitat site. Beyond having a certified backyard, individuals have the opportunity to become volunteer Habitat Stewards. Stewards help their neighbors, local schools, businesses, and places of worship attain Backyard Wildlife Habitat certification.

For more information about the Delaware Nature Society's Backyard Wildlife Habitat Program, please call Jen Gochenaur at (302) 239-2334 x 42.

## GETTING DOWN TO BUSINESS IN PROTECTING OUR WATER

BY LIZ FEINBERG, PROJECT COORDINATOR,  
CLEAN WATER PARTNERS

Soap suds bubble to the ground during vehicle washing. Dirt, grease, and chemicals meander across a parking lot and down a storm drain. Soil erodes off construction and excavation sites. Fertilizers and pesticides leach unseen from over-watered landscaping. Oil drips from the undercarriage of a car or truck. Grease drips or trash spills over when their storage containers are being emptied. Fresh water is used once and dumped.

Soap suds and soil particles may seem like minor pollutants, but in this populated metropolitan region, small pollution sources add up. All of the pollutants I just described are carried by stormwater into the region's creeks and streams. This is what is called stormwater runoff pollution.

Sources of stormwater pollution are all over the map. In West Whiteland Township in Chester County, and in the neighborhoods of Roxborough and Chinatown in Philadelphia, businesses are making a commitment to take action to control stormwater runoff pollution. They are choosing to become involved in a new program called Clean Water Partners.

Being a Clean Water Partner means scheduling a Clean Water Partners survey with the Partnership for the Delaware Estuary at your business' site and answering questions and sharing information about stormwater management and pollution prevention. Following a site survey, led by the Partnership's professional pollution prevention staff, businesses are offered an opportunity to take a Clean Water Partner's Pledge. Taking a Pledge means adhering to a list of ten actions that prevent stormwater runoff pollution. Businesses taking the pledge receive a framed pledge certificate and a window decal for display at their site, serving as a daily reminder to customers and employees about business' commitment to protect water quality.

Look for our logo displayed at the businesses you patronize, it's a good sign that this business is doing its share to help protect the environment. For businesses in West Whiteland Township, Roxborough, or Chinatown, call 1-800-445-4935 or (610) 212-2345 to learn more about Clean Water Partners.



# ESTUARY BASICS

## AIR POLLUTION AND WATER QUALITY—ATMOSPHERIC DEPOSITION

CATHERINE A. LIBERTZ, U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION III, DELAWARE ESTUARY PROGRAM COORDINATOR

Over the past 30 years, scientists have collected a large amount of convincing information demonstrating that air pollutants can be deposited on land and water, sometimes at great distances from their original sources, and can be an important contributor to declining water quality. In other words, a large amount of the pollution we send up into the air is falling back down on our forests, grasslands and agricultural fields, and in our lakes, rivers, streams, wetlands, estuaries and oceans. This type of pollution is called “atmospheric deposition” or “air deposition.”



Pollution deposited from the air can reach estuaries in two ways. It can either be deposited directly onto the surface of the water (direct deposition) or deposited onto the landscape and run off into streams and rivers before making its way into an estuary (indirect deposition). Across the country, federal, state, and local groups charged with protecting and improving water quality are discovering that air deposition *can* represent a significant portion of the total pollutant loading. These air pollutants can have undesirable health and environmental impacts, such as contaminated fish, harmful algal blooms, and unsafe drinking water.

### What is it and where is it coming from?

An air pollutant is any substance in the air that causes damage to life, ecosystems or property. Some of the pollutants with the greatest potential to harm water quality are nitrogen, mercury, other metals, and pesticides. These pollutants all have the ability to settle into bodies of water and damage ecosystems as well as public health.

Air pollution can occur from natural sources such as volcanoes and forest fires, but most arises from man-made, or anthropogenic, sources. Driving cars, operating power plants and spraying pesticides all release pollutants into the atmosphere. As human activities increase, the amount of air pollution also increases. For example, mercury is a naturally occurring element, but studies show that human activities have more than tripled its concentration in the environment. Since airborne pollutants can travel very long distances, identifying sources of pollution to a particular body of water can be very complicated.

### Air Deposition of Toxic Chemicals: A Concern for the Delaware Estuary

Toxic substances such as metals, polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), heavy metals, and pesticides are a concern in estuarine environments. These substances enter waterways through storm drains;

industrial discharges; runoff from lawns, streets and farmlands; sewage treatment plants; and from atmospheric deposition. Many toxic contaminants are also found in sediments and are resuspended into the environment. Bottom-dwelling organisms are exposed to these chemicals and may pose a risk to human health if consumed. As a result there may be fishery and shellfish bed closures, and fish consumption advisories. In the Delaware Estuary, there are fish consumption advisories for mercury and PCBs in all three states — Delaware, New Jersey and Pennsylvania.

### A Study on Atmospheric Deposition of PCBs in the Delaware Estuary

Currently, the Delaware Estuary Program partners are funding a project to study PCBs in the atmosphere of the Delaware Estuary. Recent studies of air concentrations of organic contaminants by the New Jersey Department of Environmental Protection revealed very high concentration of PCBs in the atmosphere in Camden, New Jersey, directly across and downwind of the City of Philadelphia. Thus, depending on the season and meteorological conditions, air deposition may be a significant source of PCB loadings to the Estuary. The current study will determine PCB congener concentrations in air samples collected during both wet and dry weather to establish the deposition of PCBs in Philadelphia and surrounding counties. The study also will help to identify possible source locations for PCBs observed in these samples.

### Helpful Resources

#### *Atmospheric Deposition Handbook*

EPA's Office of Air and Radiation and Office of Water collaboratively developed the technical handbook *Frequently Asked Questions about Atmospheric Deposition: A Handbook for Watershed Managers* (EPA-453/R-01-009, September 2001).

*(continued on page 10)*

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DELAWARE ESTUARY AT  
PARTNERS@UDEL.EDU.**

The handbook answers basic questions about air deposition and sources, how its significance can be assessed through existing information, monitoring and modeling, and how the information can be used in a management strategy. It also provides extensive references for additional resources. It is available on the web at <http://www.epa.gov/oar/oaqps/gr8water/> and <http://www.epa.gov/owow/oceans/airdep/>.

### Deposition of Air Pollutants to the Great Waters— 3<sup>rd</sup> Report to Congress

With section 112(m) of the 1990 Clean Air Act, Congress directed the U.S. Environmental Protection Agency (EPA), in cooperation with the National Oceanic and Atmospheric Administration, to identify and assess the extent of atmospheric deposition of air pollutants to the Great Waters. The water bodies collectively referred to as the “Great Waters” are the

Great Lakes, Lake Champlain, Chesapeake Bay, and specific coastal waters defined in the statute as coastal waters designated through the National Estuary Program and the National Estuarine Research Reserve System. Further, section 112(m) directed EPA to report its findings to Congress in periodic reports. The latest report is available at <http://www.epa.gov/oar/oaqps/gr8water/3rd rpt/>

For additional information about atmospheric deposition, please refer to these websites: National Atmospheric Deposition Program at <http://nadp.sws.uiuc.edu/nadpoverview.asp>, the Atmospheric Integrated Monitoring Network (AIRMoN) at <http://www.arl.noaa.gov/research/programs/airmon.html>, and the U.S. EPA Office of Wetlands Oceans and Watersheds - Atmospheric Deposition Initiative at <http://www.epa.gov/nep/airdep.htm>.

## SPECIES SPECIFIC

### BLUE CRABS BETWEEN THE BAYS

BY KIRSTIN WAKEFIELD, COASTAL MANAGEMENT FELLOW,  
PENNSYLVANIA COASTAL ZONE MANAGEMENT PROGRAM

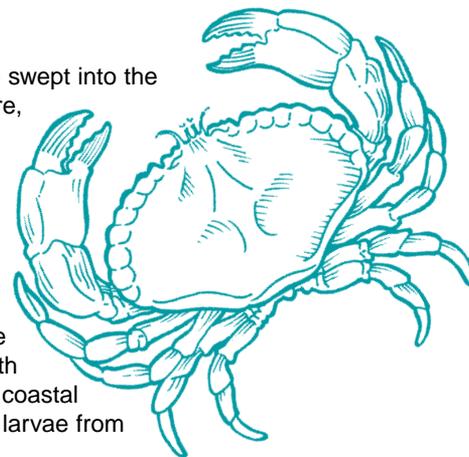
An icon of the Eastern shore, the blue crab (*Callinectes sapidus*) is tightly woven into the past, present, and future of the Delaware and Chesapeake Bays. The Bay's vast spawning grounds lay the foundation for a lucrative commercial fishery, and their brackish ecosystems provide recreational and culinary opportunities for sun-loving suburbanites. But neither the commercial nor the recreational fisheries would be as strong as they are without natural ecosystem patterns and processes.

The blue crab fishery has the largest dockside value of any commercial fishery in the Chesapeake and Delaware Bays. More than 6 million pounds of blue crabs, worth \$6.8 million, were harvested from Delaware Bay alone in 2000, and nearly 51 million pounds were harvested from the Chesapeake Bay. Between Delaware and Maryland, more than 6,000 watermen depended on the income from blue crab harvests to set their pots in the spring of 2001.

Recreational crabbing composes one percent of Delaware landings and almost 15 percent of Maryland's. Armed with sinkers, strings, and chicken necks, patient crabbers are rewarded with a nutritional jackpot, because whether they are broiled, steamed, or battered, blue crab meat is rich in protein and essential vitamins, including zinc, calcium, and iron. Blue crabs are also low in saturated fat and a healthy alternative to fried chicken. You'd have to eat 15 crabs to consume the same amount of fat calories in a fried chicken breast!

Commercial and recreational harvests depend heavily on larval recruitment and the overall health of the ecosystem. Of the 3 million eggs a single female can produce, few are likely to reach adulthood. Episodic storm events, habitat quality, and predation make the survival rate highly unpredictable. Released in the early summer at the mouth of Delaware Bay,

blue crab larvae are swept into the Atlantic Ocean. Here, they pass through several larval stages, first as zoea, then megalopae. While many larvae remain close to the mouth of Delaware Bay, some are transported south along the Delaware coastal current, mixing with larvae from the Chesapeake.



Megalopae are then faced with the difficult task of returning to Delaware Bay, against the currents of the open ocean. Autumn nor'easters play a significant role transporting larvae from coastal waters back into the mouth of the estuaries. After metamorphosis into juveniles, successful recruits utilize eelgrass and other aquatic vegetation to escape predation by striped bass, red drum, and croaker. For those that escape predation unscathed, the danger is not yet over. Winter's severe storms bring ice to the shallow waters of the estuaries. Burrowed in the mud, even adult crabs are not impervious to temperatures below freezing.

From watermen, to the local residents employed by picking houses, to the seafood processors supplying Delmarva restaurants, communities bordering the Chesapeake and Delaware Bays have relied on the continued availability of blue crabs to sustain their way of life. Thus, the current population status of *Callinectes sapidus* in these estuaries is a source of concern for watermen and fishery managers alike. Delaware Division of Fish and Wildlife and the Chesapeake Blue Crab Advisory Committee have reported declines in blue crab catch per unit effort since the mid

1980's. Subsequently, watermen must spend more hours fishing, or set more pots, to catch the same number of crabs harvested the previous year. In 2000, blue crab landings also fell below the long-term average in the Chesapeake Bay. The lower harvest of mature crabs suggests that the percent of the population of blue crabs capable of reproducing is also decreasing. Declines in Chesapeake Bay stock coupled with rising domestic demand for crabmeat have increased commercial fishing pressure on the Delaware Bay blue crab population.

Commercial and recreational harvests are also influenced by human impacts on the ecosystem. Non-point source pollution and sediment loading have reduced the quantity of sea grasses available for habitat in the Chesapeake Bay. The astounding recovery of the striped bass population has greatly increased the number of predators in both estuaries. In addition, the threat of PCB accumulation in the hepatopancreas, or other crab tissue, directly affects public attitudes about seafood consumption. Tougher industrial pollution laws have greatly improved water quality in these rivers, reducing the quantity of the chemicals entering the estuaries. Today, the Pennsylvania and New Jersey Department's of Environmental Protection routinely analyze blue crabs for PCB's and mercury. If the contaminant concentration increases to an unsafe level, consumption

advisories will be posted on the Pennsylvania Fish and Boat Commission website (<http://www.fish.state.pa.us>).

Attributing the decline in blue crab populations to increased fishing pressure and anthropogenic impacts on the ecosystems, the Bay states are working conscientiously to improve habitat quality and create a more sustainable fishery. In order to manage the Delaware Bay blue crab population, Delaware and New Jersey recently limited entry to the fishery and regulated the number of pots per fisherman. Between 2001 and 2003, Maryland, Virginia, and the Potomac River Fisheries Commission plan to reduce Chesapeake Bay landings by 15%. Reducing nutrient runoff into the Chesapeake and Delaware Bays will also help to restore sea grasses, an essential nursery habitat and food source for juvenile and adult blue crabs. With current fisheries management and habitat restoration efforts, the bond between the blue crab and coastal communities of the Chesapeake and Delaware Bays will hopefully endure the test of time.

*For more information about the Blue Crab, please refer to <http://www.mdsg.umd.edu/crabs/index.html> or <http://www.ocean.udel.edu/kiosk/bcrab.html>*

## ESTUARY EXCURSIONS

### WOODFORD CEDAR RUN WILDLIFE REFUGE

BY VIRGINIA LOFFT, BOARD MEMBER, WOODFORD CEDAR RUN WILDLIFE REFUGE

The New Jersey Pine Barrens, a miracle of natural environment in the midst of urban sprawl, is a mecca for individuals who treasure nature's bounty. Its 1.1 million acres teem with animal and bird life and rare species of plants. Through all seasons of the year hikers, campers, canoeists and families seeking nothing more than a pleasant afternoon outdoors enjoy the spare beauty of its dense forests, streams and rivers.

Preservation of this natural wonder is one of the goals of a unique facility in Medford, New Jersey, 20 miles east of Philadelphia and the Delaware River. Woodford Cedar Run Wildlife Refuge sits astride the headwaters of the Rancocas Creek on 171 acres of pineland preserved by the New Jersey Green Acres program. (Please refer to the map on page 15 for the location of the Refuge.) At its Elizabeth Woodford Pine Barrens Education Center, thousands of school children delight in interactive programs

year 'round that help them learn how to enjoy and protect this wilderness environment. The education center comes alive with activity as families explore the hands-on museum, watch the live animals on display in the classroom or crawl through the chipmunk burrow.

The education center is base camp for family workshops on weekend afternoons, adult programs, summer camps and birthday parties, as well as on-going school and scout group

tours. Cedar Run also offers canoeing, mountain biking and other outdoor adventures in the Pines. Whatever the theme of each program, caring for the environment is the central message.

Woodford Cedar Run Wildlife Refuge is also an important rehabilitation center for injured wildlife. A 1,200 square-foot hospital building, with full time staff, treat everything from the tiniest bird to large deer. Many of

these animals are frequently hurt in automobile accidents. The outdoor rehab compound consists of about 50 enclosures where visitors can observe the animals close-up. A highlight of the wildlife compound is an eagle habitat where a majestic bird

*(continued on page 12)*



*Canoe class on Cedar Run Lake*

# ESTUARY EXCURSIONS CONTINUED

injured in Colorado now enjoys a safe home. Another recent addition is a rare snowy owl that lost a wing in a collision with an aircraft.

Whenever possible, treated animals are returned to their wild habitat, but when they can't fend for themselves, the birds and animals become permanent residents of Woodford Cedar Run. Care for these animals is provided through membership support, and individual and corporate contributions.

The Refuge is open to the public from 10 a.m. to 4 p.m. Monday through Saturday and 1-4 p.m. on Sunday. Programs for school, scout, and adult groups are available by reservation six days of the week. Cedar Run also sponsors several annual events that are open to the public. They include the fun-filled *Autumn with the Animals* on the first Saturday in November, a *Mardi Gras Bash* in early March, and *Serenade for Wildlife*, a classical music concert held in late March.

*For more information on Woodford Cedar Run activities and programs, group events, and educational projects, please call Janet Jackson-Gould, Executive Director, at (856) 983-0326.*

## TEACHERS PAGE

### RESOURCES

#### Need Educational Resources for your Science Classroom?

Call Pennsylvania Sea Grant! Their educational materials collection is growing. For example, PA Sea Grant has a Zebra Mussel Mania Traveling Trunk that is available for loan to your classroom. This trunk contains several fun activities and lessons relating to zebra mussels and other exotic species. If they don't have what you need, they can find someone who does! For more information, please call Anne Danielski at (814) 898-6421.



#### PA Teachers list your project on the Green Project Bank!

The Pennsylvania Department of Environmental Protection has established a website to link organizations or schools who are seeking funding for an environmental project with organizations seeking to fund such projects. Log on to [www.greenprojectbank.org](http://www.greenprojectbank.org), and check it out.

#### Earth Day Central

The goal of the Earth Day Central calendar is to make everyone aware and involve entire communities in the volunteer opportunities available this Earth Day. With a focus on this year's theme, biodiversity, the site allows visitors to explore the variety of ecosystems that exist in Pennsylvania and the uniquely adapted species that make up the State's natural communities. Educators can register online and become part of the Pennsylvania Department of Environmental Protection's educator database. The database notifies educators of important educational opportunities and provides free grade-level appropriate educational resources. Visit [www.state.pa.us](http://www.state.pa.us), PA Keyword: "Earth Day Central."

#### Doing Water Right

*Doing Water Right* is a 24-minute video demonstrating the environmental benefits of "blue-green technologies," or environmentally friendly ways to handle stormwater runoff pollution.

The video examines six applications of blue-green technology: a roof garden and a porous asphalt parking lot in Philadelphia; bio-retention basins in a Maryland subdivision; an expanded detention basin or constructed wetland at a Delaware mall; a transformed sump or holding area on Long Island; and a reconstructed stream bed in Massachusetts. *Doing Water Right* is available from the Great Swamp Watershed Association in Madison, New Jersey. The video may be purchased for \$13. To obtain a copy, please call (973) 966-1900.

### WORKSHOPS

#### Richard Stockton College Environmental Education Forum

The Richard Stockton College Environmental Education Forum is a day-long event pertaining to the environment and concerns on a local and global scale. Organizations and speakers that deal directly with the environment will be leading workshops, as well as providing information about what you can do to help. The workshop is scheduled to take place on April 13, 2002. For more information, please call Eileen Lloyd at (609) 399-2780.

#### New Jersey at the Crossroads of Migration

A professional development workshop for educators in and around Burlington County examines the connections between New Jersey's habitats and Central and South American habitats where birds winter. Focus topics include biogeography, biodiversity, and interaction with human populations. Methods include lecture, discussion, field trips and modeling hands-on activities. The workshop will take place on April 17, 2002. For more information, please call Pat Kane at (908) 859-4753.

#### Raindrops to Rivers – Teacher Training Workshop

This one-day workshop for middle and secondary teachers will introduce you to the Pennsylvania Resources Council's innovative new curriculum on nonpoint source pollution. This course is ideal for teachers who are interested in watershed activities that go beyond stream ecology and water quality monitoring. Continuing education, Pennsylvania Act 48 credits will be available for this class through the Delaware County Intermediate Unit. The workshop is scheduled to take place on April 27, 2002, and there is a fee. For more information, please call Beverly Oliver at (610) 353-1555.

**Exciting Summer Programming with Stroud**

The Stroud Water Research Center, located in Avondale,



Pennsylvania, is offering a number of professional education workshops this summer. From July 15-19, 2002, educators will be provided with the opportunity to travel from the headwaters of the Delaware River to the Delaware Estuary. They will canoe the Delaware Water Gap and learn about land-use issues related to water quality, as well as visit research sites and talk with Stroud scientists. This and many other programs are outlined in a brochure, which provides a brief description of the program, cost, registration deadline, and PDE Act 48 credits. To receive a copy of their summer program brochure for continuing professional education workshops, please contact Jim McGonigle at (610) 268-2153 x 255.

**6th Annual Delaware Estuary Teacher Education Institute**

Time is running out to register for the Delaware Estuary Teacher Education Institute. The Institute will take place this year from July 8 through July 12. This program will take you from the cities to the bayshore and all stops in between as you learn about the Delaware Estuary's habitat and living resources, current issues, history and culture. The registration deadline is April 12, 2002. Pennsylvania Act 48, New Jersey Professional Development, and Delaware Inservice credit are provided. The Institute is free for teachers working within the Estuary. For more information, please call 1-800-445-4935.



## ESTUARY EVENTS

### UPCOMING DELAWARE ESTUARY EVENTS AND HAPPENINGS

**Acres of Spring**

**April 6 – May 24, 2002**

**Longwood Gardens**

**Kennett Square, Pennsylvania**

Thousands of spring bulbs, flowering shrubs, and trees flourish throughout 1,050 acres of gardens, woodlands, and meadows. For more information, please call (610) 388-1000.

**Horseshoe Crab Lecture**

**Thursday, April 11, 2002, 7 p.m. – 9 p.m.**

**Rutger's Shellfish Lab**

**Bivalve, New Jersey**

As part of their monthly lecture series, the Delaware Bay Schooner Project is hosting Glenn Gauvry, of the Ecological Research and Development Group, who will address how watermen are saving thousands of horseshoe crabs annually, the importance of this creatures survival, and some fascinating facts. For more information, please call (856) 785-2060 x 100.

**Earth Day Festival**

**Saturday, April 13, 2002**

**Brecknock Park**

**Camden, Delaware**

The Delaware Solid Waste Authority is sponsoring their second annual Earth Day Festival with friends "Trash Can Dan" and the "Clean-up Kids." Families will be able to travel through the EcoTrail to explore the many wonders of the environment. EcoStations will be placed throughout the trail to educate everyone about soil, forestry, aquatic, and wildlife issues. For more information, please call (302) 739-5361.

**Gardening Green**

**Wednesday, April 17, 2002, 6:30 p.m. – 9:30 p.m.**

**Rancocas Nature Center**

**Mt. Holly, New Jersey**

This workshop is for those just starting to garden and for those interested in making their gardens more environmentally friendly. For more information, please call (609) 261-2495.

**Wilmington Storm Drain Marking Kick-off**

**Tuesday, April 23, 2002**

**Partnership for the Delaware Estuary  
Wilmington, Delaware**

In an effort to reduce stormwater runoff pollution, the Partnership, the City of Wilmington, and DNREC will kick-off the second annual storm drain marking initiative with the Mayor of Wilmington and many volunteers. For more information, please call 1-800-445-4935.

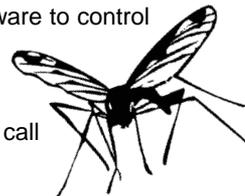


**Control of Phragmites and Mosquitos**

**Saturday, April 27, 2002, 10 a.m.**

**Society of Natural History of Delaware  
Hockessin, Delaware**

Tom Moran of the Delaware Division of Fish and Wildlife, Office of Mosquito Control and Wetland Rehabilitation, will show the current methods being used in Delaware to control the spread of Phragmites and control the mosquito population. The program meets at Chestnut Street in New Castle, Delaware. For more information, please call Al Matlack at (302) 239-5383.



## ESTUARY EVENTS CONTINUED



### **Oyster Sail and Raw Bar**

**Saturday, May 4, 2002,**

**1:30 p.m. – 4:30 p.m.**

**A.J. Meerwald**

**Bivalve, New Jersey**

Listen to stories told by local oyster-

men, chow down at the raw oyster bar, and view the remnants of the historic oyster industry along the Maurice River. Trips depart from Bivalve. There is a cost of \$30/person and reservations are required. For more information, please call (800) 485-3072.

### **Ann Bartram Carr: The Last Bartram Botanist**

**May 4 & 5, 2002, 11 a.m., 1 p.m. and 3 p.m.**

**Historic Bartram's Garden**

**Philadelphia, Pennsylvania**

A musical production for the whole family based on the life of Ann Bartram Carr, botanist, artist, and businesswoman, performed by the Westmont Theater Company. For more information, please call (215) 729-5281.

### **Native Plant Sale**

**May 4 & 5, 2002**

**Ashland Nature Center**

**Hockessin, Delaware**

More than 200 choices of rare and popular native wildflowers, trees, shrubs, ferns, grasses and aquatic plants for sale. Plus exhibits, activities for children, native plant garden and refreshments. For more information, please call (302) 239-2334.

### **Schuylkill River Headwaters Tour**

**Saturday, May 11, 2002, 8 a.m. – 6 p.m.**

**Green Valleys Association**

**Pottstown, Pennsylvania**

Keep this date open for a full-day tour featuring history and the environment including visits to the Mahanoy Valley, Girard Mansion, and Molly Maguire's headquarters, as well as to Centralia and "the Swamp" – a wetlands designed to filter out pollutants from mining spoiled streams. Registration is required. For more information, please call Margot Taylor at (610) 469-4900

## NEWS IN A FLASH

**TO BE PERIODICALLY UPDATED ABOUT VOLUNTEER ACTIVITIES, EVENTS, AND PROGRAMS**



**TAKING PLACE IN THE DELAWARE ESTUARY, SEND YOUR EMAIL ADDRESS WITH YOUR NAME AND PHONE NUMBER TO [ROSSD@DELAWAREESTUARY.ORG](mailto:ROSSD@DELAWAREESTUARY.ORG)**

### **The Shorebird Connection**

**Monday, May 20, 2002, 9 a.m. - 10 a.m.**

**Delaware National Estuarine Research Reserve**

**Dover, Delaware**

Migratory shorebirds on their way to the Arctic nesting grounds stop in Delaware Bay to feed on the eggs of spawning horseshoe crabs. This program will allow guided viewing of the various species, discuss the "crab connection" and delve into some of the research regarding these long distance fliers. Program meets at Bowers Beach Public Access Area. For more information, please call (302) 739-3436.

## SAVE THE DATE



### **Pennsylvania Coast Day 2002**

The Partnership for the Delaware Estuary and the Philadelphia Water Department, with support from the Pennsylvania Coastal Zone Management Program, is coordinating

the first-ever Coast Day celebration in Southeastern Pennsylvania. This event is scheduled to take place on September 29, 2002 at the Fairmount Water Works in Philadelphia, the heart of America's first major urban water supply system. Coast Day will be one of the opening

events of the Philadelphia Water Department's Fairmount Water Works Interpretive Center.

Coast Day is being designed to be a family-oriented outdoor fair with a heavy supply of "edu-tainment." The Partnership is looking for non-profit groups, government agencies, and local water-related institutions to host educational booths that engage the event participants in fun, educational activities.

*To learn more about Pennsylvania's 1st Annual Coast Day, call the Partnership at 1-800-445-4935.*

Please use the map below to locate the places, towns, or waterways mentioned in the articles in this edition of *Estuary News*. We hope this feature will help to enhance your knowledge of the Estuary region and to encourage you to explore its fascinating resources.



**Map of the Delaware Estuary**

**MAP KEY**

1. **Kaiserman Jewish Community Center**
2. **Delaware Native Plant Society**
3. **Delaware State University**
4. **Boater Voter Coalition**
5. **Center in the Park**
6. **John P. Turner Middle School**
7. **Woodford Cedar Run Wildlife Refuge**
8. **Coast Day New Jersey**
9. **Cobbs Creek Community Environmental Education Center**
10. **NetworkArts**
11. **Delaware Nature Society**
12. **Peopling of Philadelphia Collaborative**
13. **Ecological Research and Development Group**
14. **Schuylkill River**
15. **Rancocas Creek**

**Celebrate National Trails Day  
Saturday, June 1, 2002  
White Clay Creek Preserve  
Landenberg, Pennsylvania**

The Wilmington Trail Club and the Preserve are sponsoring a series of morning hikes. The first hike is 10-12 miles and begins at 8:30 a.m. For more information, please call Anthony Belfiglio at (410) 392-9699.

**Delaware Bay Day  
Saturday, June 1, 2002  
Port Norris, New Jersey**

Bay Day celebrates the unique maritime heritage and incredible natural resources of the Bay. The festival will feature street and boat parades, environmental activities for children and adults, blue crab races, oyster shucking contests, river tours, and evening fireworks. For more information, please call (856) 785-2060.



**Fascinating Fields  
Saturday, June 22, 2002, 10 a.m. – 12 noon  
Rancocas Nature Center  
Mt. Holly, New Jersey**

Explore several fields at the nature center and discover the interaction among plants and animals that use the field as a habitat and also how fields eventually become forests. For more information, please call (609) 261-2495.

**If you have an event that you would like included in *Estuary News*, please call 1-800-445-4935.**

**Schuylkill River Sojourn  
May 31 – June 7**

The sojourn is a seven-day canoe/kayak trip from Schuylkill Haven to Philadelphia. Join them for the whole week or as many days as you can. For more information, please call (484) 945-0200.

**Delaware River Sojourn  
May 31 – June 8**

Take a trip down this Revolutionary River. Sojourners can spend time on the upper Delaware, middle Delaware, and the Estuary, experiencing the river's history, beauty and ecological diversity. For more information, please call (908) 996-0230.





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## ESTUARY NEWS

**Partnership for the Delaware Estuary, Inc.**  
 400 West Ninth Street  
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 Wilmington, DE 19801  
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## DELAWARE ESTUARY PROGRAM

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 E-mail: [kklein@delawareestuary.org](mailto:kklein@delawareestuary.org)

**Delaware Estuary Program**  
 Forsyth Kineon, Program Director  
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 E-mail: [forsyth.kineon@delep.org](mailto:forsyth.kineon@delep.org)

**Environmental Protection Agency**  
 Irene Purdy, EPA Region II  
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Catherine Libertz, EPA Region III  
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**Pennsylvania**  
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 Department of Environmental Protection  
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**Delaware**  
 John Kennel  
 Department of Natural Resources  
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### WHAT IS THE DELAWARE ESTUARY PROGRAM?

The Delaware Estuary Program (DELEP) is a partnership of governmental agencies, nonprofits, the private sector, and citizens working together to restore and protect the Delaware Estuary. It was established in 1988 and is one of 28 national estuary programs around the nation. The estuary region extends from Trenton, New Jersey to the mouth of the Delaware Bay. To learn more about DELEP activities, visit [www.delep.org](http://www.delep.org).

### WHO IS THE PARTNERSHIP?

The Partnership for the Delaware Estuary, Inc. is a private, nonprofit organization established in 1996. The Partnership promotes the estuary as a regional resource through public outreach and education. It also serves as the education, outreach, and fundraising arm for the Delaware Estuary Program. To find out how you can become one of our partners, call the Partnership at 1-800-445-4935 or visit our website at [www.DelawareEstuary.org](http://www.DelawareEstuary.org).

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